

## Assistant Commissioner (Direct)

There will be two papers. The 1<sup>st</sup> and 2<sup>nd</sup> papers will be of 150 marks each ( 150 objective type multiple choice questions in each paper) carrying 01 mark for each question. The duration of written test will be 150 minutes for each paper without any time limit for each part individually.

### Paper-I

Section name (Nature of Questions)	No. of questions
<b>Part I - Proficiency in Languages (30 marks):</b>	30 questions
A. General English-15 questions	

B. General Hindi-15 questions

<b>Part-II: Perspectives on Education and Leadership (120 Marks)</b>	120 questions
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- (a) Understanding the Learner-(15 questions)
- (b) Understanding Teaching Learning - (30 questions)
- (c) Creating Conducive Learning Environment - (15 questions)
- (d) School Organization and Leadership - (30 questions)
- (e) Perspectives in Education ( 30 questions)

### Paper-II

<b>Part I – General awareness, Reasoning &amp; Proficiency in Computers (50 marks)</b>	50 questions
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- General Awareness& Current Affairs – (20 Questions)
- Reasoning Ability – (20 Questions)
- Computer Literacy – ( 10 Questions)

<b>Part-II: Management, Supervision &amp; Leadership - (30 Marks)</b>	(30 questions)
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<b>Part-III: Administration &amp; Finance – (70 marks)</b>	(70 questions)
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- The interview is of 100 marks

The weightage of Written Test and Interview will be 80:20. Final merit list will be based on the performance of the candidate in Written Test and Interview taken together.

### Syllabus of Examination for Direct Recruitment of Assistant Commissioner: (Direct)

#### Paper-I

Section name (Nature of Questions)	No.of questions
<b>Part I - Proficiency in Languages :</b>	30 questions
A. General English	

B. General Hindi

<b>Part II - Perspectives on Education and Leadership :</b>	120 questions
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- **Understanding the Learner** (15 questions)
- Concept of growth, maturation and development, principles and debates of development,
- Development tasks and challenges with special reference to the primary and middle school children
- Domains of Development: Physical, Cognitive, Socio-emotional, Moral etc., deviations in development and its

implications.

- **Role of Primary and Secondary Socialization agencies.** Steps to ensure Home school continuity.
- **Understanding Teaching Learning** (30 questions)  
Theoretical perspectives on Learning -Behaviorism, Cognitivism and Constructivism with special reference to their implications for:
  - The role of Principal
  - The role of teacher
  - The role of learner
  - Nature of teacher-student relationship
  - Choice of teaching methods
  - Classroom environment
  - Understanding of discipline, power etc.
  - Factors affecting learning and their implications for:
  - Designing classroom instructions,
  - Planning student activities and,
  - Creating learning spaces in school.
  - Planning and Organization of Teaching-Learning
  - Concept of Syllabus and Curriculum, Overt and Hidden Curriculum
  - Preparation of School Time-table
  - Foundational Literacy and Numeracy, Early Childhood Care and Education
  - Competency based Education, Experiential learning, etc.
  - Instructional Plans: -Year Plan, Unit Plan, Lesson Plan
  - Instructional material and resources
  - Information and Communication Technology(ICT) for teaching-learning
  - Assessment of learning, for learning and as learning: Meaning, purpose and considerations in planning each.
  - Enhancing Teaching Learning processes: Classroom Observation and Feedback, Reflections and Dialogues as a means of constructivist teaching
- (c) **Creating Conducive Learning Environment** (15 questions)
  - The concepts of Diversity, disability and Inclusion, implications of disability as social construct, types of disabilities-their identification and interventions
  - Concept of School Mental Health, addressing the curative, preventive and promotive dimensions of mental health for all students and staff. Provisioning for guidance and counselling.
  - Developing School and community as a learning resource.
- (d) **School Organization and Leadership** (30 questions)
  - Leader as reflective practitioner, team builder, initiator, coach and mentor.
  - Perspectives on School Leadership: instructional, distributed and transformative
  - Vision building, goal setting and creating a School development Plan
  - Using School Processes and forums for strengthening teaching learning-Annual Calendar, time-tabling, parent teacher forums, school assembly, teacher development forums , using achievement data for improving teaching – learning, School Self Assessment and Improvement
  - Creating partnerships with community , industry and other

neighboring schools and Higher Education Institutes – forming learning communities

**(e) Perspectives in Education (30 questions)**

- Role of school in achieving aims of education.
- NEP-2020: Early Childhood Care and Education: The Foundation of Learning ; Foundational Literacy and Numeracy; Curriculum and Pedagogy in Schools: Holistic & Integrated Learning; Equitable and Inclusive Education: Learning for All; Competency based learning and Education.
- Guiding Principles for Child Rights, Protecting and provisioning for rights of children to safe and secure school environment, Right of Children to free and Compulsory Education Act, 2009,
- Historically studying the National Policies in education with special reference to school education;
- School Curriculum Principles: Perspective, Learning and Knowledge, Curricular Areas, School Stages – Pedagogy & Assessment.

**Paper-II**

**Part I – General awareness, Reasoning & Proficiency in Computers 50 questions**

- General Awareness & Current Affairs
- Reasoning Ability
- Computer Literacy

**Part-II: Management, Supervision, & Leadership**

30 Questions

Management: its nature and scope; The Management Processes; Planning, Organization, Staffing, Directing and Controlling; The Role of a Manager in an Organization. Leadership: The Tasks of a Leader, Leadership Styles; Leadership Theories; A successful Leader versus an effective Leader. Human Resource Development: Concept of HRD; Goals of HRD; Performance Appraisal — Potential appraisal and development — Feedback and Performance Counseling — Career Planning — Training and Development — Rewards — Employee Welfare. Motivation, Morale and Incentives: Theories of Motivation; How Managers Motivate; Concept of Morale; Factors determining morale; Role of Incentives in Building up Morale. Communication: Steps in the Communication Process; Communication Channels; Oral versus Written Communication; Verbal versus non-verbal Communication; upward, downward and lateral Communication; Barriers to Communication, Role of Information Technology. Class Observation and School Supervision.

**Part-III: Administration and Finance**

70 Questions

- Office Management
- CCS (CCA) Rules
- CCS (Conduct) Rules
- Fundamental & Supplementary Rules
- TA Rules
- Leave Travel Concession Rules
- Medical Attendance Rules

- Income Tax & GST
  - POSH & POCSO Acts
  - MoE, NCPCR and NIDM guidelines for school safety and security
  - Constitutional Provisions for PWD, EWS, SC/ST and other disadvantageous groups
  - GFR – 2017
  - Pension, NPS
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The interview is of 100 marks

The weightage of Written Test and Interview will be in the ratio of 80:20. Final merit list will be based on the performance of the candidates in Written Test and Interview taken together.

### **Scheme of Exam for Direct Recruitment of Principals:**

There will be two papers. The 1<sup>st</sup> and 2<sup>nd</sup> paper will be 150 marks each (150 Objective type multiple choice questions in each paper) carrying 01 mark for each question. The duration of written test will be 150 minutes for each paper without any time limit for each part individually.

#### **Paper-I**

##### **Part I - Proficiency in Languages (30 marks):**

A. General English-15 questions

B. General Hindi-15 questions

##### **Part-II: Perspectives on Education and Leadership (120 marks)**

- (f) Perspectives in Education ( 30 questions)
- (g) Understanding the Learner-(15 questions)
- (h) Understanding Teaching Learning - (30 questions)
- (i) Creating Conducive Learning Environment - (15 questions)
- (j) School Organization and Leadership - (30 questions)

#### **Paper-II**

##### **Part I – General awareness, Reasoning & Proficiency in Computers (50 marks)**

1. General Awareness& Current Affairs – (20 Questions)
2. Reasoning Ability – (20 Questions)
3. Computer Literacy – ( 10 Questions)

##### **Part-II: Administration and Finance - (100 marks)**

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**The interview is of 60 marks (30+30).**

- The candidate would be expected to present his/her vision for overall school improvement through a School Development Plan (could be based on the previous school served) (30 marks)
- Question–Answer/Interview round (30 marks)

The weightage of Written Test and Interview will be in the ratio of 80:20. Final merit list will be based on the performance of the candidates in Written Test and Interview taken together.

## Syllabus of Examination for Direct Recruitment of Principals:

### Paper-I

#### Part I - Proficiency in Languages (30 marks):

##### (a) General English (15 questions)

Reading comprehension, word power, Grammar & usage with emphasis on communicative and administrative usage

##### (b) General Hindi (15 questions)

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#### Part II - Perspectives on Education and Leadership (120 marks):

##### (A) Perspectives in Education (30 questions)

- Role of school in achieving aims of education.
- NEP-2020: Early Childhood Care and Education: The Foundation of Learning ; Foundational Literacy and Numeracy; Curriculum and Pedagogy in Schools: Holistic & Integrated Learning; Equitable and Inclusive Education: Learning for All; Competency based learning and Education.
- Guiding Principles for Child Rights, Protecting and provisioning for rights of children to safe and secure school environment, Right of Children to free and Compulsory Education Act, 2009,
- Historically studying the National Policies in education with special reference to school education;
- School Curriculum Principles: Perspective, Learning and Knowledge, Curricular Areas, School Stages – Pedagogy & Assessment.

##### (B) Understanding the Learner(15 questions)

- Concept of growth, maturation and development, principles and debates of development,
- Development tasks and challenges with special reference to the primary and middle school children
- Domains of Development: Physical, Cognitive, Socio-emotional, Moral etc., deviations in development and its implications.
- Role of Primary and Secondary Socialization agencies. Steps to ensure Home school continuity.
- Mental Health and well-being (MANODARPAN)

##### (C) Understanding Teaching Learning (30 questions)

- Theoretical perspectives on Learning -Behaviorism, Cognitivism and Constructivism with special reference to their implications for:
  - I. The role of Principal
  - II. The role of teacher
  - III. The role of learner
  - IV. Nature of teacher-student relationship
  - V. Choice of teaching methods
  - VI. Classroom environment
  - VII. Understanding of discipline, power etc.
- Factors affecting learning and their implications for:

- I. Designing classroom instructions,
- II. Planning student activities and,
- III. Creating learning spaces in school.
- **Planning and Organization of Teaching-Learning**
  - I. Concept of Syllabus and Curriculum, Overt and Hidden Curriculum
  - II. Preparation of School Time-table
  - III. Foundational Literacy and Numeracy, Early Childhood Care and Education
  - IV. Competency based Education, Experiential learning, etc.
  - V. Instructional Plans: -Year Plan, Unit Plan, Lesson Plan
  - VI. Instructional material and resources
  - VII. Information and Communication Technology(ICT) for teaching-learning
  - VIII. Assessment of learning, for learning and as learning: Meaning, purpose and considerations in planning each.
  - IX. Enhancing Teaching Learning processes: Classroom Observation and Feedback, Reflections and Dialogues as a means of constructivist teaching
  - X.

**(d) Creating Conducive Learning Environment (15 questions)**

- Inclusive Education: The concepts of Diversity, disability and Inclusion, implications of disability as social construct, types of disabilities-their identification and interventions
- Concept of School Mental Health, addressing the curative, preventive and promotive dimensions of mental health for all students and staff. Provisioning for guidance and counselling.
- Developing School and community as a learning resource.

**(k) School Organization and Leadership (30 questions)**

- Leader as reflective practitioner, team builder, initiator, coach and mentor.
- Perspectives on School Leadership: instructional, distributed and transformative
- Vision building, goal setting and creating a School development Plan
- Using School Processes and forums for strengthening teaching learning-Annual Calendar, time-tabling, parent teacher forums, school assembly, teacher development forums , using achievement data for improving teaching –learning, School Self-Assessment and Improvement
- Creating partnerships with community , industry and other neighboring schools and Higher Education Institutes – forming learning communities

**Paper-II**

**Part I – General awareness, Reasoning & Proficiency in Computers (50 marks):**

- (a) General Awareness & Current Affairs **(20 questions)**
- (b) Reasoning Ability **(20 questions)**
- (c) Computer Literacy **(10 questions)**

**Part-II: School Administration & Finance:**

**(100 Marks )**

- Office Management/
- CCS (CCA) Rules
- CCS (Conduct) Rules
- Fundamental & Supplementary Rules
- TA Rules
- Leave Travel Concession Rules
- Medical Attendance Rules

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- for school safety and security
- EWS, SC/ST and other disadvantaged groups
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- Income Tax & GST  
RTI, PoSH & POCSO Acts  
MoE, NCPCR and NIDM guidelines
- Constitutional Provisions for PWD,
- GFR – 2017 / GeM  
Pension, NPS  
Office Accounting, PFMS
- Note:**
- The interview is of 60 marks (30+30).
- The Principal would be expected to share a vision for School and present the School Development Plan for overall school improvement (this could be based on the previous school served) (Presentation of SDP - 30 marks)
- Question – Answer/Interview round (30 marks)



## **Scheme of Exam for Direct Recruitment of Vice Principals:**

There will be two papers. The 1<sup>st</sup> and 2<sup>nd</sup> papers will be of 150 marks each (150 objective type multiple choice questions in each paper) carrying 01 mark for each question. The duration of written test will be 150 minutes for each papers without any time limit for each part individually.

### **Paper-I**

#### **Section name -Nature of Questions**

#### **Part I - Proficiency in Languages (30 marks):**

A. General English-(15 questions)

B. General Hindi-(15 questions)

#### **Part-II: Perspectives on Education and Leadership (120 questions)**

(l) Understanding the Learner-(15 questions)

(m) Understanding Teaching Learning-(30 questions)

(n) Creating Conducive Learning Environment - (15 questions)

(o) School Organization and Leadership - (30 questions)

(p) Perspectives in Education ( 30 questions)

### **Paper-II**

#### **Part I – General awareness, Reasoning & Proficiency in Computers (70 marks)**

4. General Awareness& Current Affairs – (20 Questions)

5. Reasoning Ability – (30 Questions)

6. Computer Literacy – (20 Questions)

#### **Part-II: Administration and Finance - (80 questions)**

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The interview is of 60 marks (30+30).

- The candidate would be expected to present his/her vision for overall school improvement through a School Development Plan (could be based on the previous school served) (30 marks)
- Question–Answer/Interview round (30 marks)

The weightage of Written Test and Interview will be **80:20**. Final merit list will be based on the performance of the candidate in Written Test and Interview taken together.

## Syllabus of Exam for Direct Recruitment of Vice Principals:

### Paper-I

#### Part I - Proficiency in Languages (30 marks)

##### (a) General English

Reading comprehension, word power, Grammar & usage with emphasis on communicative and administrative usage

##### (b) General Hindi

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#### Part II - Perspectives on Education and Leadership (120 marks)

##### (a) Understanding the Learner (15 marks)

- Concept of growth, maturation and development, principles and debates of development
- Development tasks and challenges with special reference to the primary and middle school children
- Domains of Development: Physical, Cognitive, Socio-emotional, Moral etc., deviations in development and its implications.
- Role of Primary and Secondary Socialization agencies. Steps to ensure Home school continuity.

##### (b) Understanding Teaching Learning (30 marks)

- Theoretical perspectives on Learning -Behaviorism, Cognitivism and Constructivism with special reference to their implications for:
  - i. The role of Principal
  - i. The role of teacher
  - i. The role of learner
  - i. Nature of teacher-student relationship
  - i. Choice of teaching methods
  - i. Classroom environment
  - i. Understanding of discipline, power etc.
- Factors affecting learning and their implications for:
  - i. Designing classroom instructions,
  - i. Planning student activities and,
  - i. Creating learning spaces in school.
- Planning and Organization of Teaching-Learning
  - i. Concept of Syllabus and Curriculum, Overt and Hidden Curriculum
  - i. Preparation of School Time-table
  - i. Foundational Literacy and Numeracy, Early Childhood Care and Education
  - i. Competency based Education, Experiential learning, etc.
  - i. Instructional Plans: -Year Plan, Unit Plan, Lesson Plan
  - i. Instructional material and resources
  - i. Information and Communication Technology(ICT) for teaching-learning
  - i. Assessment of learning, for learning and as learning: Meaning, purpose and considerations in planning each.

- Enhancing Teaching Learning processes: Classroom Observation and Feedback, Reflections and Dialogues as a means of constructivist teaching

**(c) Creating Conducive Learning Environment (15 marks)**

- The concepts of Diversity, disability and Inclusion, implications of disability as social construct, types of disabilities-their identification and interventions
- Concept of School Mental Health, addressing the curative, preventive and promotive dimensions of mental health for all students and staff. Provisioning for guidance and counselling.
- Developing School and community as a learning resource.

**(d) School Organization and Leadership (30 marks) — — —**

- Leader as reflective practitioner, team builder, initiator, coach and mentor.
- Perspectives on School Leadership: instructional, distributed and transformative
- Vision building, goal setting and creating a School development Plan
- Using School Processes and forums for strengthening teaching learning-Annual Calendar, time-tabling, parent teacher forums, school assembly, teacher development forums, using achievement data for improving teaching-learning, School Self Assessment and Improvement
- Creating partnerships with community, industry and other neighbouring schools and Higher Education Institutes – forming learning communities

**(e) Perspectives in Education (30 marks)**

- Role of school in achieving aims of education.
- Guiding Principles for Child Rights, Protecting and provisioning for rights of children to safe and secure school environment, Right of Children to free and Compulsory Education Act, 2009,
- Historically studying the National Policies in education – 1968, 1986, Program of Action 1992, and 2020 with special reference to school education;
- National Curriculum Frameworks: Perspective, Learning and Knowledge, Curricular Areas, School Stages and Assessment, vision for school education proposed Systemic Reforms

**Paper-II**

**Part I – General awareness, Reasoning & Proficiency in Computers (70 marks)**

- (d) General Awareness & Current Affairs
- (e) Reasoning Ability
- (f) Computer Literacy

**Part-II - School Administration & Finance (80 marks)**

- Office Management
- CCS (CCA) Rules
- CCS (Conduct) Rules
- Fundamental & Supplementary Rules
- TA Rules
- Leave Travel Concession Rules

•	Medical Attendance Rules
•	Income Tax & GST
•	POSH & POCSO Acts
•	MoE, NCPCR and NIDM guidelines for school
safety and security	
•	Constitutional Provisions for PWD, EWS,
SC/ST and other disadvantageous groups	
•	GFR – 2017
•	Pension, NPS

The interview is of 60 marks (30+30).

- The Vice Principals would be expected to share a vision for School and present the School Development Plan for overall school improvement (this could be based on the previous school served) (Presentation of SDP - 30 marks)
- Question – Answer/Interview round (30 marks)

The weightage of Written Test and Interview will be in the ratio of 80:20. Final merit list will be based on the performance of the candidates in Written Test and Interview taken together.

### **Scheme of Exam for Direct Recruitment of Post Graduate Teacher:**

The written test is of 180 marks (180 objective type multiple choice questions) carrying 01 mark for each question. The duration of written test will be 180 minutes without any time limit for each part individually.

#### **Section Name -Nature of Questions**

##### **Part I - Proficiency in Languages (20 marks):**

A. General English-10 questions

B. General Hindi-10 questions

##### **Part II – General awareness, Reasoning & Proficiency in Computers (20 marks)**

1. General Awareness & Current Affairs(10 ques.)
2. Reasoning Ability (5 ques.)
3. Computer Literacy (5 ques.)

##### **Part-III: Perspectives on Education and Leadership (40 questions)**

- (a) Understanding the Learner-(15 questions)
- (b) Understanding Teaching Learning -(15 questions)
- (c) Creating Conducive Learning Environment
- (d) School Organization and Leadership- (10 questions)
- (e) Perspectives in Education

##### **Part IV - Subject-specific Syllabus (100 marks) – Refer Annexure**

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##### **Professional Competency Test:**

The Professional Competency Test is of 60 marks (Demo Teaching -30 marks and Interview -30 Marks ).

##### **Note:**

The weightage of Written Test & Professional Competency ( Demo Teaching:15 and Interview:15) will be 70:30 Final merit list will be based on the performance of the candidate in Written Test & Professional Competency Test taken together.

## Scheme & Syllabus of Exam for Direct Recruitment of PGTs:

### Part I - Proficiency in Languages (20 marks):

#### (a) General English(10 questions)

Reading comprehension, word power, Grammar & usage

#### (b) General Hindi(10 questions)

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### Part II – General awareness, Reasoning & Proficiency in Computers

(20 marks):

(g) General Awareness& Current Affairs(10 questions)

(h) Reasoning Ability(5 questions)

(i) Computer Literacy(5 questions)

### Part III -Perspectives on Education and Leadership

(40 marks):

#### (a) Understanding the Learner(15 questions)

- Concept of growth, maturation and development, principles and debates of development, development tasks and challenges
- Domains of Development: Physical, Cognitive, Socio-emotional, Moral etc., deviations in development and its implications.
- Understanding Adolescence: Needs, challenges and implications for designing institutional support.
- Role of Primary and Secondary Socialization agencies. Ensuring Home school continuity.

#### (b) Understanding Teaching Learning (15 questions)

- Theoretical perspectives on Learning -Behaviorism, Cognitivism and Constructivism with special reference to their implications for:
  - i. The role of teacher
  - ii. The role of learner
  - iii. Nature of teacher-student relationship
  - iv. Choice of teaching methods
  - v. Classroom environment
  - vi. Understanding of discipline, power etc.
- Factors affecting learning and their implications for:
  - i. Designing classroom instructions,
  - ii. Planning student activities and,
  - iii. Creating learning spaces in school.
- Planning and Organization of Teaching-Learning
  - i. Concept of Syllabus and Curriculum, Overt and Hidden Curriculum, Principles of curriculum organization
  - ii. Competency based Education, Experiential learning, etc.
  - iii. Instructional Plans: -Year Plan, Unit Plan, Lesson Plan
  - iv. Instructional material and resources

- v. Information and Communication Technology(ICT) for teaching-learning
- vi. Evaluation: Purpose, types and limitations. Continuous and Comprehensive Evaluation, Characteristics of a good tool.
- vii. Assessment of learning, for learning and as learning: Meaning, purpose and considerations in planning each.
- Enhancing Teaching Learning processes: Classroom Observation and Feedback, Reflections and Dialogues as a means of constructivist teaching

**c.) Creating Conducive Learning Environment(04 questions)**

- The concepts of Diversity, disability and Inclusion, implications of disability as social construct, types of disabilities-their identification and interventions
- Concept of School Mental Health, addressing the curative, preventive and promotive dimensions of mental health for all students and staff. Provisioning for guidance and counselling.
- Developing School and community as a learning resource.

**(d) School Organization and Leadership(04 questions)**

- Leader as reflective practitioner, team builder, initiator, coach and mentor.
- Perspectives on School Leadership: instructional, distributed and transformative
- Vision building, goal setting and creating a School development Plan
- Using School Processes and forums for strengthening teaching learning-Annual Calendar, time-tabling, parent teacher forums, school assembly, teacher development forums , using achievement data for improving teaching –learning, School Self Assessment and Improvement
- Creating partnerships with community , industry and other neighbouring schools and Higher Education Institutes – forming learning communities

**(e) Perspectives in Education(02 questions)**

- NEP-2020: Curriculum and Pedagogy in Schools: Holistic & Integrated Learning; Equitable and Inclusive Education: Learning for All; Competency based learning and Education.
- Guiding Principles for Child Rights, Protecting and provisioning for rights of children to safe and secure school environment, Right of Children to free and Compulsory Education Act, 2009,
- Historically studying the National Policies in education with special reference to school education;
- School Curriculum Principles: Perspective, Learning and Knowledge, Curricular Areas, School Stages, Pedagogy and Assessment

**Part IV - Subject-specific Syllabus (100 marks): Refer Annexure**

**Note:**

*The Professional Competency Test (Demo Teaching and Interview), is of 60 marks. The weightage of Written Test & Professional Competency Test ( Demo Teaching and Interview) will be in the ratio of 70:30.*

*Final merit list will be based on the performance of the candidate in Written Test, Professional Competency Test taken together.*



### **Scheme of Exam for Direct Recruitment of Trained Graduate Teachers:**

The written test is of 180 marks (180 objective type multiple choice questions) carrying 01 mark for each question. The duration of written test will be 180 minutes without any time limit for each part individually.

#### **Section Name -Nature of Questions**

##### **Part I - Proficiency in Languages (20 marks):**

A. General English-10 questions

B. General Hindi-10 questions

##### **Part II – General awareness, Reasoning & Proficiency in Computers (20 marks)**

4. General Awareness & Current Affairs (10 ques.)

5. Reasoning Ability (5 ques.)

6. Computer Literacy (5 ques.)

##### **Part-III: Perspectives on Education and Leadership (40 questions)**

(f) Understanding the Learner-(10 questions)

(g) Understanding Teaching Learning -(15 questions)

(h) Creating Conducive Learning Environment

(i) School Organization and Leadership

(j) Perspectives in Education

} (15 questions)

##### **Part IV - Subject-specific Syllabus (100 marks)**

##### **Professional Proficiency Test:**

The Professional Competency Test is of 60 marks (including Demo Teaching - 30 marks and Interview – 30 Marks).

##### **Note:**

The weightage of Written Test & Professional Competency ( Demo Teaching: 15 and Interview: 15 will be 70:30 Final merit list will be based on the performance of the candidate in Written Test & Professional Competency Test taken together.

## **Syllabus of Exam for Direct Recruitment of Trained Graduate Teachers:**

### **Part I - Proficiency in Languages (20 marks):**

#### **(a) General English(10 questions)**

Reading comprehension, word power, Grammar & usage

#### **(b) General Hindi(10 questions)**

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### **Part II – General awareness, Reasoning & Proficiency in Computers (20 marks):**

(j) General Awareness& Current Affairs (10 questions)

(k) Reasoning Ability (5 questions)

(l) Computer Literacy(5 questions)

### **Part III -Perspectives on Education and Leadership (40 marks):**

#### **(c) Understanding the Learner (10 questions)**

- Concept of growth, maturation and development, principles and debates of development, development tasks and challenges
- Domains of Development: Physical, Cognitive, Socio-emotional, Moral etc., deviations in development and its implications.
- Understanding Adolescence: Needs, challenges and implications for designing institutional support.
- Role of Primary and Secondary Socialization agencies. Ensuring Home school continuity.

#### **(d) Understanding Teaching Learning (15 questions)**

- Theoretical perspectives on Learning -Behaviorism, Cognitivism and Constructivism with special reference to their implications for:
  - vii. The role of teacher
  - viii. The role of learner
  - ix. Nature of teacher-student relationship
  - x. Choice of teaching methods
  - xi. Classroom environment
  - xii. Understanding of discipline, power etc.
- Factors affecting learning and their implications for:
  - iv. Designing classroom instructions,
  - v. Planning student activities and,
  - vi. Creating learning spaces in school.
- Planning and Organization of Teaching-Learning
  - viii. Concept of Syllabus and Curriculum, Overt and Hidden Curriculum, Principles of curriculum organization
  - ix. Competency based Education, Experiential learning, etc.
  - x. Instructional Plans: -Year Plan, Unit Plan, Lesson Plan
  - xi. Instructional material and resources
  - xii. Information and Communication Technology(ICT) for teaching-learning
  - xiii. Evaluation: Purpose, types and limitations. Continuous and Comprehensive Evaluation,Characteristics of a good tool.
  - xiv. Assessment of learning, for learning and as learning: Meaning, purpose and considerations in planning each.
- Enhancing Teaching Learning processes: Classroom Observation and Feedback, Reflections and

Dialogues as a means of constructivist teaching

**c.) Creating Conducive Learning Environment(06 questions)**

- The concepts of Diversity, disability and Inclusion, implications of disability as social construct, types of disabilities-their identification and interventions
- Concept of School Mental Health, addressing the curative, preventive and promotive dimensions of mental health for all students and staff. Provisioning for guidance and counselling.
- Developing School and community as a learning resource.

**(d) School Organization and Leadership(06 questions)**

- Leader as reflective practitioner, team builder, initiator, coach and mentor.
- Perspectives on School Leadership: instructional, distributed and transformative
- Vision building, goal setting and creating a School development Plan
- Using School Processes and forums for strengthening teaching learning-Annual Calendar, time-tabling, parent teacher forums, school assembly, teacher development forums , using achievement data for improving teaching –learning, School Self Assessment and Improvement
- Creating partnerships with community , industry and other neighbouring schools and Higher Education Institutes – forming learning communities

**(e) Perspectives in Education(03 questions)**

- Role of school in achieving aims of education.
- NEP-2020: Curriculum and Pedagogy in Schools: Holistic & Integrated Learning; Equitable and Inclusive Education: Learning for All; Competency based learning and Education.
- Guiding Principles for Child Rights, Protecting and provisioning for rights of children to safe and secure school environment, Right of Children to free and Compulsory Education Act, 2009,
- Historically studying the National Policies in education with special reference to school education;
- School Curriculum Principles: Perspective, Learning and Knowledge, Curricular Areas, School Stages, Pedagogy and Assessment

**Part IV – Subject-specific Syllabus (100 marks): Refer Annexure**

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**Professional Competency Test:**

The Professional Competency Test is of 60 marks (Demo Teaching -30 marks and Interview -30 Marks)

**Note:** The weightage of Written Test & Professional Competency Test (Demo Teaching and Interview) will be 70:30. Final merit list will be based on the performance of the candidates in Written Test, Professional Competency Test taken together.

### **Scheme of Exam for Direct Recruitment of PRTs:**

The written test is of 180 marks (180 objective type multiple choice questions) carrying 01 mark for each question. The duration of written test will be 180 minutes without any time limit for each part individually.

#### **Section name -Nature of Questions**

##### **Part I - Proficiency in Languages (20 marks):**

**A. General English-10 questions**

**B. General Hindi-10 questions**

##### **Part II – General awareness, Reasoning & Proficiency in Computers (20 marks)**

7. General Awareness & Current Affairs (10 ques.)

8. Reasoning Ability (5 ques.)

9. Computer Literacy (5 ques.)

##### **Part-III: Perspectives on Education and Leadership (60 questions)**

(k) Understanding the Learner-(15 questions)

(l) Understanding Teaching Learning -(15 questions)

(m) Creating Conducive Learning Environment - (10 questions)

(n) School Organization and Leadership - (10 questions)

(o) Perspectives in Education ( 10 questions)

##### **Part IV - Subject-specific Syllabus (80 marks)**

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##### **Professional Competency Test:**

The Professional Competency Test is of 60 marks

( Demo Teaching -30 marks and Interview – 30 Marks).

##### **Note:**

The weightage of Written Test & Professional Competency ( Demo Teaching:15 and Interview: 15 will be 70:30 Final merit list will be based on the performance of the candidate in Written Test & Professional Competency Test taken together.

## Syllabus of Exam for Direct Recruitment of PRTs:

### Part I - Proficiency in Languages (20 marks)

#### (a) General English

Reading comprehension, word power, Grammar & usage

#### (b) General Hindi

पठन कौशल, शब्द सामर्थ्य, व्याकरण एवं प्रयुक्ति

### Part II – General awareness, Reasoning & Proficiency in Computers (20 marks)

(m) General Awareness & Current Affairs

(n) Reasoning Ability

(o) Computer Literacy

### Part III - Perspectives on Education and Leadership (60 marks)

#### (a) Understanding the Learner

- Concept of growth, maturation and development, principles and debates of development, development tasks and challenges
- Domains of Development: Physical, Cognitive, Socio-emotional, Moral etc., deviations in development and its implications.
- Understanding Adolescence: Needs, challenges and implications for designing institutional support.
- Role of Primary and Secondary Socialization agencies. Ensuring Home school continuity.

#### (b) Understanding Teaching Learning

- Theoretical perspectives on Learning -Behaviorism, Cognitivism and Constructivism with special reference to their implications for:
- The role of teacher
- The role of learner
- Nature of teacher-student relationship
- Choice of teaching methods
- Classroom environment
- Understanding of discipline, power etc.
- Factors affecting learning and their implications for:
- Designing classroom instructions,
- Planning student activities and,
- Creating learning spaces in school.
- Planning and Organization of Teaching-Learning
- Concept of Syllabus and Curriculum, Overt and Hidden Curriculum
- Foundational Literacy and Numeracy, Early Childhood Care and Education
- Competency based Education, Experiential learning, etc.
- Instructional Plans: -Year Plan, Unit Plan, Lesson Plan
- Instructional material and resources
- Information and Communication Technology(ICT) for teaching-learning
- Assessment of learning, for learning and as learning: Meaning, purpose and considerations in planning each.
- Enhancing Teaching Learning processes: Classroom Observation and Feedback, Reflections and Dialogues as a means of constructivist teaching

#### c) Creating Conducive Learning Environment

- The concepts of Diversity, disability and Inclusion, implications of disability as social construct, types of disabilities-their identification and interventions

- Concept of School Mental Health, addressing the curative, preventive and promotive dimensions of mental health for all students and staff. Provisioning for guidance and counselling.
- Developing School and community as a learning resource.

**(d) School Organization and Leadership**

- Leader as reflective practitioner, team builder, initiator, coach and mentor.
- Perspectives on School Leadership: instructional, distributed and transformative
- Vision building, goal setting and creating a School development Plan
- Using School Processes and forums for strengthening teaching learning-Annual Calendar, time-tabling, parent teacher forums, school assembly, teacher development forums , using achievement data for improving teaching –learning, School Self Assessment and Improvement
- Creating partnerships with community , industry and other neighbouring schools and Higher Education Institutes – forming learning communities

**(e) Perspectives in Education**

- Role of school in achieving aims of education.
- NEP-2020: Early Childhood Care and Education: The Foundation of Learning ; Foundational Literacy and Numeracy; Curriculum and Pedagogy in Schools: Holistic & Integrated Learning; Equitable and Inclusive Education: Learning for All; Competency based learning and Education.
- Guiding Principles for Child Rights, Protecting and provisioning for rights of children to safe and secure school environment, Right of Children to free and Compulsory Education Act, 2009,
- Historically studying the National Policies in education with special reference to school education;
- School Curriculum Principles: Perspective, Learning and Knowledge, Curricular Areas, School Stages – Pedagogy & Assessment.
- 

**Part IV - Subject-specific Syllabus – Refer annexure**

**(80 marks)**

**Note:**

The interview is of 60 marks (including Demo teaching and interview). The weightage of Written Test, Professional Competency and Interview will be in the ratio of 70:30. Final merit list will be based on the performance of the candidates in Written Test, Professional Competency and Interview.

## **Scheme of Examination for Direct Recruitment of Primary Teacher (Music)**

The written test is of 180 marks (180 objective type multiple choice questions) carrying 01 mark for each question.  
The duration of written test will be 180 minutes.

### **No. Questions**

#### **Section name (Nature of Questions)**

#### **Part-I : Proficiency in Languages ( 30 Marks)**

##### **A. General English (15 Marks)**

Reading comprehension, word power, Grammar & usage 15 questions

##### **B. General Hindi (15 Marks)**

पठन कौशल, शब्द सामर्थ्य, व्याकरण एवं प्रयुक्ति

15 questions

#### **Part-II : General Awareness, Reasoning & Proficiency in Computers ( 50 Marks)**

20 questions

1. General Knowledge & Current Affairs (20 Marks)

20 questions

2. Reasoning Ability (20 Marks)

3. Computer Literacy (10 Marks)

10 questions

#### **Part III: Subject-specific Syllabus (100 Marks)**

Refer Annexure

100 questions

#### **Professional Competency Test:**

The Professional Competency Test is of 60 marks (Performance Test -30 marks and Interview -30 Marks).

#### **Note:**

The weightage of Written Test and Professional Competency Test (Performance Test & Interview) will be in the ratio of 60:40. Final merit list will be based on the performance of the candidate in Written Test & Professional Competency Test taken together.

### **Scheme of Examination for Direct Recruitment of Trained Graduate Teachers (Work Experience)**

The written test is of 180 marks (180 objective type multiple choice questions) carrying 01 mark for each question. The duration of written test will be 180 minutes.

Section name (Nature of Questions)	No. of items
<b>Part-I : Proficiency in Languages (30 Marks)</b>	15 questions
<b>A. General English (15 Marks)</b>	
Reading comprehension, word power, Grammar & usage	15 questions
<b>B. General Hindi ( 15 Marks)</b>	
पठन कौशल, शब्द सामर्थ्य, व्याकरण एवं प्रयुक्ति	
<b>Part-II : General Awareness, Reasoning &amp; Proficiency in Computers (50 Marks)</b>	
1. General Knowledge & Current Affairs related to subject/discipline	20 questions
2. Reasoning Ability	20 questions
3. Computer Literacy	10 questions
<b>Part III: Subject-specific Syllabus (100 Marks)</b>	100 Questions
Refer Annexure	

#### **Professional Competency Test:**

The Professional Competency Test is of 60 marks - Demo Teaching -30 marks and Interview -30 Marks.

#### **Note:**

The weightage of Written Test and Professional Competency (Demo Teaching & Interview) will be in the ratio of 70:30. Final merit list will be based on the performance of the candidate in Written Test & Professional Competency Test taken together.



## Scheme of Examination for Direct Recruitment of Librarian

The written test is of 180 marks (180 objective type multiple choice questions) carrying 01 mark for each question. The duration of written test will be 180 minutes.

Section name (Nature of Questions)	No. of items
<b>Part-I : Proficiency in Languages (30 Marks)</b>	
<b>A. General English ( 15 Marks)</b>	
Reading comprehension, word power, Grammar & usage	15 questions
<b>B. General Hindi (15 Marks)</b>	
पठन कौशल, शब्द सामर्थ्य, व्याकरण एवं प्रयुक्ति	
	15 questions
<b>Part-II : General Awareness, Reasoning &amp; Proficiency in Computers (50 Marks)</b>	
1. General Knowledge & Current Affairs (20 Marks)	
2. Reasoning Ability (20 Marks)	
3. Computer Literacy (10 Marks)	20 questions
<b>Part III: Subject-specific Syllabus (100 Marks)</b>	20 questions
Refer Annexure	10 questions
	100 Question

### Professional Competency Test:

The Professional Competency Test is of 60 marks (Demo Teaching -30 marks and Interview -30 Marks ).

### Note:

The weightage of Written Test and Professional Competency (Demo Teaching & Interview) will be in the ratio of 70:30. Final merit list will be based on the performance of the candidate in Written Test & Professional Competency Test taken together.

**Scheme of Examination for Direct Recruitment of Trained Graduate Teachers**  
**(Physical & Health Education and Art Education)**

The written test is of 180 marks (180 objective type multiple choice questions) carrying 01 mark for each question. The duration of written test will be 180 minutes.

Section name (Nature of Questions)	No. of items
<b>Part-I : Proficiency in Languages (30 Marks)</b>	15 questions
<b>A. General English (15 Marks)</b>	
Reading comprehension, word power, Grammar & usage	15 questions
<b>B. General Hindi ( 15 Marks)</b>	
पठन कौशल, शब्द सामर्थ्य, व्याकरण एवं प्रयुक्ति	
<b>Part-II : General Awareness, Reasoning &amp; Proficiency in Computers (50 Marks)</b>	
1. General Knowledge & Current Affairs related to subject/discipline	20 questions
2. Reasoning Ability	20 questions
3. Computer Literacy	10 questions
<b>Part III: Subject-specific Syllabus (100 Marks)</b>	100 Questions
Refer Annexure	

**Professional Competency Test:**

The Professional Competency Test is of 60 marks - Demo Teaching -30 marks and Interview -30 Marks.

**Note:**

The weightage of Written Test and Professional Competency (Demo Teaching & Interview) will be in the ratio of 70:30. Final merit list will be based on the performance of the candidate in Written Test & Professional Competency Test taken together.

## Scheme of Examination for Direct Recruitment of Finance Officer

The written test is of 150 marks (150 objective type multiple choice questions) carrying 01 mark for each question. The duration of written test will be 150 minutes. The question papers are divided in three sections

Section name (Nature of Questions)	No. of questions
<b>Part-I: Language (20 marks)</b>  <b>General English – 10 marks</b> (Comprehension, One word substitution, Synonyms and Antonyms, Spelling error, Spotting error in sentences Grammar- Noun, Pronoun, Adjective, Verb, Preposition, Conjunction, Use of 'A', 'AN' and 'THE', Idioms and Phrases.)  <b>General Hindi – 10 marks</b> पठन कौशल, शब्द सामर्थ्य, व्याकरण एवं प्रयुक्ति	10 questions          10 questions
<b>Part-II: General Awareness &amp; Computer Literacy (40 Marks)</b>  <b>General Knowledge – 10 marks</b> (Indian History, Indian Geography, Indian Economy, Indian Polity & Constitution, Scientific Research, awards, Sports, Current India & World)  <b>Logical Reasoning – 20 marks</b> (Analogies-Semantic Analogy, Symbolic/Number Analogy, Figural Analogy, Similarities and difference, word building, relationship concepts, Arithmetic number series-Semantic Series, Number Series, Coding and decoding- Small & Capital letters/numbers coding, decoding and classification)  <b>Computer Literacy – 10 marks</b> (Characteristics of Computers, Computer Organization including RAM, ROM, File System, Input Devices, Computer Software-Relationship between Hardware and Software, Operating System, MS-Office (exposure of Word, Excel/spread sheet, Power point), Information Technology and Society-Indian IT Act, Digital Signatures, Application of information technology in Government for E-Governance, mobile/Smartphone's, information Kiosks)	10 questions          20 questions          10 questions

Continued...

<b>Part-III:</b>  <b>Financial Administration – 90 Marks</b> <ul style="list-style-type: none"> <li>- Maintenance of Cash Book - 05 marks</li> <li>- Preparation of back reconciliation statement- 05 marks,</li> <li>- Posting of ledger accounts -05 marks</li> <li>- Preparation of Trial balance and final accounts -05 marks</li> <li>- Principles of Auditing -10 marks</li> <li>- General Financial Rules, 2017 related to purchase of general stores/services and award of contract etc. – 20 marks</li> <li>- Income tax and GST -10 marks</li> <li>- FR &amp; SR. – 05 marks</li> <li>- CCS (Pension) Rules &amp; NPS – 05 marks</li> <li>- TA Rules &amp; LTC Rules -05 marks</li> <li>- Medical Attendance Rules -05 marks</li> <li>- Provident Fund Rules – 05 marks</li> <li>- Delegation of Financial power -05 marks</li> </ul>	90 questions
<b>Skill Test (Computer Proficiency Test)</b>  MS Word, MS Excel, MS Access, MS Power Point and internet and Tally Accounting	100 Marks (CPT is qualifying in nature)

The interview is of 60 marks. The weightage of written test and interview will be in the ratio of 80:20. Merit list will be prepared on the basis of marks obtained by the candidates in the written test and interview taken together.

Skill test is qualifying in nature and candidates have to obtained minimum 40% marks in the computer proficiency test.

**Note:** Minimum 40% marks would qualify for empanelment.

## SCHEME OF EXAMINATION for Direct Recruitment of ASSISTANT SECTION OFFICER

The written test is of 150 marks (150 objective type multiple choice questions) carrying 01 mark for each question. The duration of written test will be 150 minutes. The question papers are divided in three sections.

Section name ( Nature of Questions)	No. of questions
<b>Part-I: Language including Comprehensive (30 marks)</b> <b>General English – 15 marks</b> (One word substitution, Synonyms and Antonyms, Spelling error, Spotting error in sentences Grammar- Noun, Pronoun, Adjective, Verb, Preposition, Conjunction, Use of 'A', 'AN' and 'THE', Idioms and Phrases.) <b>General Hindi – 15 marks</b> पठन कौशल, शब्द सामर्थ्य, व्याकरण एवं प्रयुक्ति	15 questions  15 questions
<b>Part-II: General Awareness &amp; Computer Literacy ( 30 marks)</b> <b>General Knowledge – 10 marks</b> (Indian History, Indian Geography, Indian Geography, Indian Economy, Indian Polity & Constitution, Scientific Research, awards, Sports, Current India & World) <b>Logical Reasoning – 10 Marks</b> (Analogies-Semantic Analogy, Symbolic/Number Analogy, Figural Analogy, Similarities and difference, word building, relationship concepts, Arithmetic number series-Semantic Series, Number Series, Coding and decoding- Small & Capital letters/numbers coding, decoding and classification) <b>Computer Usage – 10 marks</b> (Characteristics of Computers, Computer Organization including RAM, ROM, File System, Input Devices, Computer Software-Relationship between Hardware and Software, Operating System, MS-Office (exposure of Word, Excel/spread sheet, Power point), Information Technology and Society-Indian IT Act, Digital Signatures, Application of information technology in Government for E-Governance, mobile/Smartphone's, information Kiosks)	10 questions  10 questions  10 questions
<b>Part-III: Administration, Establishment &amp; Finance -90 marks</b> - CCS (CCA) Rules -15 marks - CCS (Conduct) Rules - 15 marks - CCS (Leave) Rules - 10 marks - Fundamental & Supplementary Rules - 20 marks - Pension Rules & New Pension Scheme - 10 marks - Medical Attendance Rules - 10 marks - Provident Fund Rules - 10 marks	90 questions

There will be no interview for the post of ASO. The merit list will be prepared on the basis of marks obtained by the candidates in the written test only.

### Scheme of Examination for Direct Recruitment of HINDI TRANSLATOR

The written test is of 180 marks (180 objective type multiple choice questions carrying 01 mark for each question). The duration of written test will be 180 minutes. The question papers are divided in three parts.

Part number & description	No. of items
<b>Part-I: Language Proficiency Test – 80 Marks</b> <b>General English – 40 marks</b> (Comprehension, One word substitution, Synonyms and Antonyms, Spelling error, Spotting error in sentences Grammar- Noun, Pronoun, Adjective, Verb, Preposition, Conjunction, Use of 'A', 'AN' and 'THE', Idioms and Phrases.) <b>General Hindi – 40 Marks</b> पठन कौशल, शब्द सामर्थ्य, व्याकरण एवं प्रयुक्ति	40 questions 40 questions
<b>Part-II: General Awareness &amp; Computer Literacy – 40 Marks</b> <b>General Knowledge – 10 marks</b> (Indian History, Indian Geography, Indian Geography, Indian Economy, Indian Polity & Constitution, Scientific Research, awards, Sports, Current India & World) <b>Logical Reasoning – 10 marks</b> (Analogies-Semantic Analogy, Symbolic/Number Analogy, Figural Analogy, Similarities and difference, word building, relationship concepts, Arithmetic number series-Semantic Series, Number Series, Coding and decoding- Small & Capital letters/numbers coding, decoding and classification) <b>Computer Literacy – 10 marks</b> (Characteristics of Computers, Computer Organization including RAM, ROM, File System, Input Devices, Computer Software-Relationship between Hardware and Software, Operating System, MS-Office (exposure of Word, Excel/spread sheet, Power point), Information Technology and Society-Indian IT Act, Digital Signatures, Application of information technology in Government for E-Governance, mobile/Smartphone's, information Kiosks) <b>Quantitative Aptitude – 10 marks</b> (Number System, Time and Work, Averages, Percentages, Profit and loss, Ratio and Proportions, Simple and Compound Interest, Time and Distance)	10 questions 10 questions 10 questions 10 questions
<b>PART III – Translation Skills (60 marks)</b> Translation from Hindi to English and English to Hindi	60 questions

The interview is of 90 marks. Merit list of the candidates will be prepared on the basis of marks obtained by the candidates in the written test and interview. The weightage of written test and interview will be in the ratio of 80:20 taken together.

## SCHEME OF EXAMINATION SENIOR SECRETARIAT ASSISTANT (DIRECT)

The written test is of 150 marks (150 objective type multiple choice questions) carrying 01 mark for each question. The duration of written test was 150 minutes. The questions papers are divided in three sections.

Section name (Nature of Questions)	No. of questions
<b>Part-I: Language including Comprehensive (30 questions)</b> <b>General English – 15 marks</b> (One word substitution, Synonyms and Antonyms, Spelling error, Spotting error in sentences Grammar- Noun, Pronoun, Adjective, Verb, Preposition, Conjunction, Use of 'A', 'AN' and 'THE', Idioms and Phrases.) <b>General Hindi – 15 marks</b> पठन कौशल, शब्द सामर्थ्य, व्याकरण एवं प्रयुक्ति	15 questions  15 questions
<b>Part-II: General Awareness &amp; Computer Literacy ( 30 marks)</b> <b>General Knowledge – 10 marks</b> (Indian History, Indian Geography, Indian Geography, Indian Economy, Indian Polity & Constitution, Scientific Research, awards, Sports, Current India & World) <b>Logical Reasoning – 10 Marks</b> (Analogies-Semantic Analogy, Symbolic/Number Analogy, Figural Analogy, Similarities and difference, word building, relationship concepts, Arithmetic number series-Semantic Series, Number Series, Coding and decoding- Small & Capital letters/numbers coding, decoding and classification) <b>Computer Usage – 10 marks</b> (Characteristics of Computers, Computer Organization including RAM, ROM, File System, Input Devices, Computer Software-Relationship between Hardware and Software, Operating System, MS-Office (exposure of Word, Excel/spread sheet, Power point), Information Technology and Society-Indian IT Act, Digital Signatures, Application of information technology in Government for E-Governance, mobile/Smartphone's, information Kiosks)	10 questions  10 questions  10 questions
<b>Part-III: Administration, Establishment &amp; Finance --90 marks</b> <ul style="list-style-type: none"> <li>- CCS (CCA) Rules -15 marks</li> <li>- CCS (Conduct) Rules – 15 marks</li> <li>- CCS (Leave) Rules – 10 marks</li> <li>- Fundamental &amp; Supplementary Rules - 20 marks</li> <li>- Pension Rules &amp; New Pension Scheme - 10 marks</li> <li>- Medical Attendance Rules- 10 marks</li> <li>- Provident Fund Rules – 10 marks</li> </ul>	90 questions

## SCHEME OF EXAMINATION for Direct Recruitment of STENOGRAPHER GRADE-II

The written test is of 120 marks (120 objective type multiple choice questions carrying 01 mark for each question. The duration of written test will be 120 minutes. The question papers were divided in three sections.

Section name (Nature of Questions)	No. of questions
<b>Part-I: Language Proficiency Test – 50 Marks</b>	
<b>General English – 25 marks</b> (Comprehension, One word substitution, Synonyms and Antonyms, Spelling error, Spotting error in sentences Grammar- Noun, Pronoun, Adjective, Verb, Preposition, Conjunction, Use of 'A', 'AN' and 'THE', Idioms and Phrases.)	25 questions
<b>General Hindi – 25 marks</b> (गद्यांश आधारित प्रश्न, तत्सम, तद्भव, पर्यायवाची, विलोम, मुहावरे और लोकोत्तियाँ, शुद्ध अशुद्ध वाक्य, संधि-विच्छेद, अलंकार और समास, वचन, लिंग, अनेकार्थी और वाक्य के लिए एक शब्द)	25 questions
<b>Part-II: General Awareness &amp; Computer Literacy - 60 marks</b>	
<b>General Knowledge – 15 marks</b> (Indian History, Indian Geography, Indian Geography, Indian Economy, Indian Polity & Constitution, Scientific Research, awards, Sports, Current India & World)	15 questions
<b>Logical Reasoning- 20 marks</b> (Analogies-Semantic Analogy, Symbolic/Number Analogy, Figural Analogy, Similarities and difference, word building, relationship concepts, Arithmetic number series-Semantic Series, Number Series, Coding and decoding- Small & Capital letters/numbers coding, decoding and classification)	20 questions
<b>Computer Literacy – 15 marks</b> (Characteristics of Computers, Computer Organization including RAM, ROM, File System, Input Devices, Computer Software-Relationship between Hardware and Software, Operating System, MS-Office (exposure of Word, Excel/spread sheet, Power point), Information Technology and Society-Indian IT Act, Digital Signatures, Application of information technology in Government for E-Governance, mobile/Smartphone's, information Kiosks)	15 questions
<b>Quantitative Aptitude – 20 marks</b> (Number System, Time and Work, Averages, Percentages, Profit and loss, Ratio and Proportions, Simple and Compound Interest, Time and Distance)	20 questions

Contd..



**SKILL TEST**

<b>Shorthand Test</b> Dictation 10 minutes @ 80 w.p.m. Transcription : 50 minutes English, / 65 minutes Hindi, on computer	Qualify the shorthand and typing test
<b>Typing Test</b> Typing Test only on computer Net typing speed English- 40 w.p.m. or Hindi - 35 w.p.m	
<b>Computer Proficiency Test</b> MS Word, MS Excel, MS Access, MS Power Point and internet.	100 marks.

There will be no interview for the post of Stenographer-II.

Skill test is qualifying in nature and candidates have to obtain minimum 40% marks in Computer Proficiency Test and also qualify the shorthand and typing test taken together.

The final merit list will be prepared on the basis of marks obtained by the candidates in the written test.

**SCHEME OF EXAMINATION for Direct Recruitment of JUNIOR SECRETARIAT ASSISTANT**

The written test is of 120 marks (120 objective type multiple choice questions) carrying 01 mark for each question. The duration of written test will be 120 minutes. The question papers are divided in two sections.

Section name (Nature of Questions)	No. of questions
<b>Part-I: Language Proficiency Test – 40 Marks</b> <b>General English – 20 marks</b> (Comprehension, One word substitution, Synonyms and Antonyms, Spelling error, Spotting error in sentences Grammar- Noun, Pronoun, Adjective, Verb, Preposition, Conjunction, Use of 'A', 'AN' and 'THE', Idioms and Phrases.) <b>General Hindi – 20 marks</b> (गद्यांश आधारित प्रश्न, तत्सम, तद्भव, पर्यायवाची, विलोम, मुहावरे और लोकोत्तियाँ, शुद्ध अशुद्ध वाक्य, संधि-विच्छेद, अलंकार और समास, वचन, लिंग, अनेकार्थी और वाक्य के लिए एक शब्द)	20 questions  20 questions
<b>Part-II: General Awareness &amp; Computer Literacy – 80 marks</b> <b>General Knowledge – 20 marks</b> (Indian History, Indian Geography, Indian Geography, Indian Economy, Indian Polity & Constitution, Scientific Research, awards, Sports, Current India & World) <b>Logical Reasoning – 20 marks</b> (Analogies-Semantic Analogy, Symbolic/Number Analogy, Figural Analogy, Similarities and difference, word building, relationship concepts, Arithmetic number series-Semantic Series, Number Series, Coding and decoding- Small & Capital letters/numbers coding, decoding and classification) <b>Computer Literacy –20 marks</b> (Characteristics of Computers, Computer Organization including RAM, ROM, File System, Input Devices, Computer Software-Relationship between Hardware and Software, Operating System, MS-Office (exposure of Word, Excel/spread sheet, Power point), Information Technology and Society-Indian IT Act, Digital Signatures, Application of information technology in Government for E-Governance, mobile/Smartphone's, information Kiosks) <b>Quantitative Aptitude – 20 marks</b> (Number System, Time and Work, Averages, Percentages, Profit and loss, Ratio and Proportions, Simple and Compound Interest, Time and Distance)	20 questions  20 questions  20 questions  20 questions

Contd....

**SKILL TEST**

<b>Typing Test</b> Typing Test only on computer New typing speed English- 35 w.p.m. or Hindi - 30 w.p.m.	Qualify the typing test.
<b>Computer Proficiency Test</b> MS Word, MS Excel, MS Access, MS Power Point and internet.	100 marks.

There will be no interview for the post of LDC.

Skill test is qualifying in nature and candidates have to obtain minimum 40% marks in computer Proficiency Test and also qualify in the typing test as per prescribed norms.

The final merit list will be prepared on the basis of marks obtained by the candidates in the written test only.



# **Kendriya Vidyalaya Sangathan**

## **New Delhi**

**Subject specific syllabus for**  
**PGTs/TGTs/Librarian/PRT/PRT (Music)**  
**Direct Recruitment (2022)**

# **Index**

## **1. Subject specific syllabus for PGTs**

- Mathematics
- Physics
- Chemistry
- Biology
- Computer Science
- Commerce(Accountancy and Business Studies)
- Economics
- Geography
- History
- English
- Hindi
- Biotechnology

## **2. Subject specific syllabus for TGTs**

- Mathematics
- Science
- Social Science
- English
- Hindi
- Sanskrit

## **3. Subject specific Syllabus for TGT (Art, P&HE, Librarian, WE)**

## **4. Subject specific Syllabus PRTs**

## **5. Subject specific Syllabus PRT (Music)**

## **Subject specific syllabus for PGTs**

### **Direct Recruitment (2022)**

**Subject specific syllabus includes the concepts of NCERT/CBSE syllabus and Text Books (Classes XI & XII) as indicated under respective subject headings.**

**However, the questions will be testing the depth of understanding and application of these concepts at the level of Post- Graduation.**

- Mathematics
- Physics
- Chemistry
- Biology
- Computer Science
- Commerce(Accountancy and Business Studies)
- Economics
- Geography
- History
- English
- Hindi
- Biotechnology

## Syllabus for the post of PGT -Mathematics

**Subject specific syllabus includes the concepts of NCERT/CBSE syllabus and Text Books (Classes XI & XII), however, the questions will be testing the depth of understanding and application of these concepts at the level of Post- Graduation.**

### **Sets:**

Sets and their representations, Empty set, Finite and Infinite sets, Equal sets, Subsets. Subsets of a set of real numbers especially intervals (with notations). Universal set. Venn diagrams. Union and Intersection of sets. Difference of sets. Complement of a set. Properties of Complement.

### **Relations & Functions:**

Ordered pairs. Cartesian product of sets. Number of elements in the Cartesian product of two finite sets. Cartesian product of the set of reals with itself (upto  $\mathbb{R} \times \mathbb{R} \times \mathbb{R}$ ). Definition of relation, pictorial diagrams, domain, co-domain and range of a relation. Function as a special type of relation. Pictorial representation of a function, domain, co-domain and range of a function. Real valued functions, domain and range of these functions, constant, identity, polynomial, rational, modulus, signum, exponential, logarithmic and greatest integer functions, with their graphs. Sum, difference, product and quotients of functions.

### **Trigonometric Functions**

Positive and negative angles. Measuring angles in radians and in degrees and conversion from one measure to another. Definition of trigonometric functions with the help of unit circle. Truth of the identity  $\sin^2 x + \cos^2 x = 1$ , for all  $x$ . Signs of trigonometric functions. Domain and range of trigonometric functions and their graphs. Expressing  $\sin(x \pm y)$  and  $\cos(x \pm y)$  in terms of  $\sin x$ ,  $\sin y$ ,  $\cos x$  &  $\cos y$  and their simple applications. Identities related to  $\sin 2x$ ,  $\cos 2x$ ,  $\tan 2x$ ,  $\sin 3x$ ,  $\cos 3x$  and  $\tan 3x$ .

### **Complex Numbers and Quadratic Equations**

Need for complex numbers, especially  $\sqrt{-1}$ , to be motivated by inability to solve some of the quadratic equations. Algebraic properties of complex numbers. Argand plane

### **Linear Inequalities**

Linear inequalities. Algebraic solutions of linear inequalities in one variable and their representation on the number line.

### **Permutations and Combinations**

Fundamental principle of counting. Factorial  $n$ . ( $n!$ ) Permutations and combinations, derivation of Formulae for  $nPr$  and  $nCr$  and their connections, simple applications.

### **Binomial Theorem**

Historical perspective, statement and proof of the binomial theorem for positive integral indices. Pascal's triangle, simple applications.

### **Sequence and Series**

Sequence and Series. Arithmetic Progression (A. P.). Arithmetic Mean (A.M.) Geometric Progression (G.P.), general term of a G.P., sum of  $n$  terms of a G.P., infinite G.P. and its sum, geometric mean (G.M.), relation between A.M. and G.M.

### **Straight Lines**

Slope of a line and angle between two lines. Various forms of equations of a line: parallel to axis, point-slope form, slope-intercept form. Distance of a point from a line.

### **Conic Sections**

Sections of a cone: circles, ellipse, parabola, hyperbola, a point, a straight line and a pair of intersecting lines as a degenerated case of a conic section. Standard equations and simple properties of parabola, ellipse and hyperbola. Standard equation of a circle.

## **Introduction to Three-dimensional Geometry**

Coordinate axes and coordinate planes in three dimensions. Coordinates of a point. Distance between two points.

## **Limits and Derivatives**

Derivative introduced as rate of change both as that of distance function and geometrically. Intuitive idea of limit. Limits of polynomials and rational functions trigonometric, exponential and logarithmic functions. Definition of derivative relate it to slope of tangent of the curve, derivative of sum, difference, product and quotient of functions. Derivatives of polynomial and trigonometric functions.

## **Statistics**

Measures of Dispersion: Range, Mean deviation, variance and standard deviation of ungrouped/grouped data.

## **Probability**

Random experiments; outcomes, sample spaces (set representation). Events; occurrence of events, 'not', 'and' and 'or' events, exhaustive events, mutually exclusive events, Axiomatic (set theoretic) probability, connections with other theories of earlier classes. Probability of an event, probability of 'not', 'and' and 'or' events.

## **Relations and Functions**

Types of relations: reflexive, symmetric, transitive and equivalence relations. One to one and onto functions.

## **Inverse Trigonometric Functions**

Definition, range, domain, principal value branch. Graphs of inverse trigonometric functions.

## **Matrices**

Concept, notation, order, equality, types of matrices, zero and identity matrix, transpose of a matrix, symmetric and skew symmetric matrices. Operation on matrices: Addition and multiplication and multiplication with a scalar. Simple properties of addition, multiplication and scalar multiplication. On commutativity of multiplication of matrices and existence of non-zero matrices whose product is the zero matrix (restrict to square matrices of order 2). Invertible matrices and proof of the uniqueness of inverse, if it exists; (Here all matrices will have real entries).

## **Determinants**

Determinant of a square matrix (up to  $3 \times 3$  matrices), minors, co-factors and applications of determinants in finding the area of a triangle. Adjoint and inverse of a square matrix. Consistency, inconsistency and number of solutions of system of linear equations by examples, solving system of linear equations in two or three variables (having unique solution) using inverse of a matrix.

## **Continuity and Differentiability**

Continuity and differentiability, derivative of composite functions, chain rule, derivative of inverse trigonometric functions, derivative of implicit functions. Concept of exponential and logarithmic functions. Derivatives of logarithmic and exponential functions. Logarithmic differentiation, derivative of functions expressed in parametric forms. Second order derivatives.

## **Applications of Derivatives**

Applications of derivatives: rate of change of bodies, increasing/decreasing functions, maxima and minima (first derivative test motivated geometrically and second derivative test given as a provable tool). Simple problems (that illustrate basic principles and understanding of the subject as well as real-life situations).



## Integrals

Integration as inverse process of differentiation. Integration of a variety of functions by substitution, by partial fractions and by parts, Evaluation of simple integrals of the following types and problems based on them.

$$\int \frac{dx}{x^2 \pm a^2}, \int \frac{dx}{\sqrt{x^2 \pm a^2}}, \int \frac{dx}{\sqrt{a^2 - x^2}}, \int \frac{dx}{ax^2 + bx + c}, \int \frac{dx}{\sqrt{ax^2 + bx + c}}$$
$$\int \frac{px + q}{ax^2 + bx + c} dx, \int \frac{px + q}{\sqrt{ax^2 + bx + c}} dx, \int \sqrt{a^2 \pm x^2} dx, \int \sqrt{x^2 - a^2} dx$$
$$\int \sqrt{ax^2 + bx + c} dx,$$

Fundamental Theorem of Calculus. Basic Properties of definite integrals and evaluation of definite integrals;

## Applications of the Integrals

Applications in finding the area under simple curves, especially lines, circles/ parabolas/ellipses (in standard form only)

## Differential Equations

Definition, order and degree, general and particular solutions of a differential equation. Solution of differential equations by method of separation of variables, solutions of homogeneous differential equations of first order and first degree. Solutions of linear differential equation of the type:  $dy/dx + py = q$ , where p and q are functions of x or constants.  $dx/dy + px = q$ , where p and q are functions of y or constants.

## Vectors

Vectors and scalars, magnitude and direction of a vector. Direction cosines and direction ratios of a vector. Types of vectors (equal, unit, zero, parallel and collinear vectors), position vector of a point, negative of a vector, components of a vector, addition of vectors, multiplication of a vector by a scalar, position vector of a point dividing a line segment in a given ratio. Definition, Geometrical Interpretation, properties and application of scalar (dot) product of vectors, vector (cross) product of vectors.

## Three - dimensional Geometry

Direction cosines and direction ratios of a line joining two points. Cartesian equation and vector equation of a line, skew lines, shortest distance between two lines. Angle between two lines.

## Linear Programming

Introduction, related terminology such as constraints, objective function, optimization, graphical method of solution for problems in two variables, feasible and infeasible regions (bounded or unbounded), feasible and infeasible solutions, optimal feasible solutions (up to three non-trivial constraints).

## Probability

Conditional probability, multiplication theorem on probability, independent events, total probability, Bayes' theorem, Random variable and its probability distribution, mean of random variable.

## Syllabus for the post of PGT -Physics

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### **Units and Measurements**

Need for measurement: Units of measurement; systems of units; SI units, fundamental and derived units, significant figures. Dimensions of physical quantities, dimensional analysis and its applications.

**Motion in a Straight Line:** Frame of reference, Motion in a straight line, Elementary concepts of differentiation and integration for describing motion, uniform and non- uniform motion, and instantaneous velocity, uniformly accelerated motion, velocity - time and position-time graphs, Relations for uniformly accelerated motion .

**Motion in a Plane:** Scalar and vector quantities; position and displacement vectors, general vectors and their notations; equality of vectors, multiplication of vectors by a real number; addition and subtraction of vectors, Unit vector; resolution of a vector in a plane, rectangular components, Scalar and Vector product of vectors. Motion in a plane, cases of uniform velocity and uniform acceleration, projectile motion, uniform circular motion.

**Laws of Motion:** Intuitive concept of force, Inertia, Newton's first law of motion; momentum and Newton's second law of motion; impulse; Newton's third law of motion. Law of conservation of linear momentum and its applications. Equilibrium of concurrent forces, Static and kinetic friction, laws of friction, rolling friction, lubrication. Dynamics of uniform circular motion: Centripetal force, examples of circular motion- vehicle on a level circular road, vehicle on a banked road.

### **Work, Energy and Power:**

Work done by a constant force and a variable force; kinetic energy, work-energy theorem, power, Notion of potential energy, potential energy of a spring, conservative forces: non- conservative forces, motion in a vertical circle; elastic and inelastic collisions in one and two dimensions.

### **Motion of System of Particles and Rigid Body & System of Particles and Rotational Motion**

Centre of mass of a two-particle system, momentum conservation and Centre of mass motion, Centre of mass of a rigid body; centre of mass of a uniform rod, Moment of a force, torque, angular momentum, law of conservation of angular momentum and its applications, Equilibrium of rigid bodies, rigid body rotation and equations of rotational motion, comparison of linear and rotational motions. Moment of inertia, radius of gyration, values of moments of inertia for simple geometrical objects.

### **Gravitation:**

Kepler's laws of planetary motion, universal law of gravitation, Acceleration due to gravity and its variation with altitude and depth. Gravitational potential energy and gravitational potential, escape velocity, orbital velocity of a satellite.

### **Mechanical Properties of Solids**

Elasticity, Stress-strain relationship, Hooke's law, Young's modulus, bulk modulus, shear modulus of rigidity, Poisson's ratio; elastic energy.

### **Mechanical Properties of Fluids**

Pressure due to a fluid column; Pascal's law and its applications -hydraulic lift and hydraulic brakes, effect of gravity on fluid pressure, Viscosity, Stokes' law, terminal velocity, streamline and turbulent flow, critical velocity, Bernoulli's theorem and its simple applications, Surface energy and surface tension, angle of contact, excess of pressure across a curved surface, application of surface tension ideas to drops, bubbles and capillary rise.

## **Thermal Properties of Matter**

Heat, temperature, thermal expansion; thermal expansion of solids, liquids and gases, anomalous expansion of water; specific heat capacity;  $C_p$ ,  $C_v$  - calorimetry; change of state - latent heat capacity. Heat transfer-conduction, convection and radiation, thermal conductivity, qualitative ideas of Blackbody radiation, Wein's displacement Law, Stefan's law.

## **Thermodynamics**

Thermal equilibrium and definition of temperature, zeroth law of thermodynamics, heat, work and internal energy, First law of thermodynamics, Second law of thermodynamics: gaseous state of matter, change of condition of gaseous state -isothermal, adiabatic, reversible, irreversible, and cyclic processes.

## **Behavior of Perfect Gases and Kinetic Theory of Gases :**

Equation of state of a perfect gas, work done in compressing a gas, Kinetic theory of gases - assumptions, concept of pressure. Kinetic interpretation of temperature; rms speed of gas molecules; degrees of freedom, law of equi-partition of energy and application to specific heat capacities of gases; concept of mean free path, Avogadro's number.

## **Oscillations and Waves:**

Periodic motion - time period, frequency, displacement as a function of time, periodic functions and their application, Simple harmonic motion (S.H.M) and its equations of motion; phase; oscillations of a loaded spring- restoring force and force constant; energy in S.H.M. Kinetic and potential energies; simple pendulum -its time period. Transverse and longitudinal waves, speed of travelling wave, displacement relation for a progressive wave, principle of superposition of waves, reflection of waves, standing waves in strings and organ pipes, fundamental mode and harmonics, Beats.

## **Electric Charges and Fields:**

Electric charges, Conservation of charge, Coulomb's law-force between two point charges, forces between multiple charges; superposition principle and continuous charge distribution, Electric field, electric field due to a point charge, electric field lines, electric dipole, electric field due to a dipole, torque on a dipole in uniform electric field. Electric flux, statement of Gauss's theorem and its applications to find field due to infinitely long straight wire, uniformly charged infinite plane sheet and uniformly charged thin spherical shell-field inside and outside.

## **Electrostatic Potential and Capacitance:**

Electric potential, potential difference, electric potential due to a point charge, a dipole and system of charges; equipotential surfaces, electrical potential energy of a system of two-point charges and of electric dipole in an electrostatic field. Conductors and insulators, free charges and bound charges inside a conductor. Dielectrics and electric polarization, capacitors and capacitance, combination of capacitors in series and in parallel, capacitance of a parallel plate capacitor with and without dielectric medium between the plates, energy stored in a capacitor

## **Current Electricity:**

Electric current, flow of electric charges in a metallic conductor, drift velocity, mobility and their relation with electric current; Ohm's law, V-I characteristics (Linear & Non-Linear), electrical energy and power, electrical resistivity and conductivity, temperature dependence of resistance, Internal resistance of a cell, potential difference and emf of a cell, combination of cells in series and in parallel, Kirchhoff's rules, Wheatstone bridge.

## **Magnetic Effects of Current and Magnetism:**

Concept of magnetic field, Oersted's experiment, Biot - Savart law and its application to current carrying circular loop, Ampere's law and its applications to infinitely long straight wire. Straight solenoid, force on a moving charge in uniform magnetic and electric fields. Force on a current-carrying conductor in a uniform magnetic field, force between two parallel current-carrying

conductors-definition of ampere, torque experienced by a current loop in uniform magnetic field; Current loop as a magnetic dipole and its magnetic dipole moment, moving coil galvanometer - its current sensitivity and conversion to ammeter and voltmeter.

### **Magnetism and Matter**

Bar magnet, bar magnet as an equivalent solenoid (qualitative treatment only), magnetic field intensity due to a magnetic dipole (bar magnet) along its axis and perpendicular to its axis (qualitative treatment only), torque on a magnetic dipole (bar magnet) in a uniform magnetic field (qualitative treatment only), magnetic field lines. Magnetic properties of materials- Para-, dia- and ferro - magnetic substances with examples, Magnetization of materials, effect of temperature on magnetic properties.

### **Electromagnetic Induction and Alternating Currents**

Electromagnetic induction; Faraday's laws, induced EMF and current; Lenz's Law, Self and mutual induction, Alternating Current Alternating currents, peak and RMS value of alternating current/voltage; reactance and impedance; LCR series circuit, resonance, power in AC circuits, power factor, wattless current, AC generator, Transformer.

### **Electromagnetic Waves**

Basic idea of displacement current, Electromagnetic waves, their characteristics, their transverse nature (qualitative idea only). Electromagnetic spectrum (radio waves, microwaves, infrared, visible, ultraviolet, X-rays, gamma rays) including elementary facts about their uses.

### **Ray Optics and Optical Instruments Ray Optics:**

Reflection of light, spherical mirrors, mirror formula, refraction of light, total internal reflection and optical fibers, refraction at spherical surfaces, lenses, thin lens formula, lens maker's formula, magnification, power of a lens, combination of thin lenses in contact, refraction of light through a prism. Optical instruments: Microscopes and astronomical telescopes (reflecting and refracting) and their magnifying powers.

### **Wave optics:**

Wave front and Huygen's principle, reflection and refraction of plane wave at a plane surface using wave fronts, Proof of laws of reflection and refraction using Huygen's principle. Interference, Young's double slit experiment and expression for fringe width, coherent sources and sustained interference of light, diffraction due to a single slit, width of central maxima.

### **Dual Nature of Radiation and Matter:**

Dual nature of radiation, Photoelectric effect, Hertz and Lenard's observations; Einstein's photoelectric equation-particle nature of light, Experimental study of photoelectric effect Matter waves-wave nature of particles, de-Broglie relation.

### **Atoms & Nuclei:**

Alpha-particle scattering experiment; Rutherford's model of atom; Bohr model of hydrogen atom, Expression for radius of nth possible orbit, velocity and energy of electron in its orbit, hydrogen line spectra, Composition and size of nucleus, nuclear force Mass-energy relation, mass defect; binding energy per nucleon and its variation with mass number; nuclear fission, nuclear fusion.

### **Semiconductor Electronics:**

Energy bands in conductors, semiconductors and insulators, Intrinsic and extrinsic semiconductors- p and n type, p-n junction Semiconductor diode - I-V characteristics in forward and reverse bias, application of junction diode -diode as a rectifier.

## Syllabus for the post of PGT -Chemistry

**Subject specific syllabus includes the concepts of NCERT/CBSE syllabus and Text Books (Classes XI & XII), however, the questions will be testing the depth of understanding and application of these concepts at the level of Post- Graduation.**

**Basic Concepts of Chemistry:** General Introduction: Importance and scope of Chemistry. Nature of matter, laws of chemical combination, Dalton's atomic theory: concept of elements, atoms and molecules. Atomic and molecular masses, mole concept and molar mass, percentage composition, empirical and molecular formula, chemical reactions, stoichiometry and calculations based on stoichiometry.

**Structure of Atom:** Discovery of Electron, Proton and Neutron, atomic number, isotopes and isobars. Thomson's model and its limitations. Rutherford's model and its limitations, Bohr's model and its limitations, concept of shells and subshells, dual nature of matter and light, de Broglie's relationship, Heisenberg uncertainty principle, concept of orbitals, quantum numbers, shapes of s, p and d orbitals, rules for filling electrons in orbitals - Aufbau principle, Pauli's exclusion principle and Hund's rule, electronic configuration of atoms, stability of half-filled and completely filled orbitals.

**Classification of Elements and Periodicity in Properties:** Significance of classification, brief history of the development of periodic table, modern periodic law and the present form of periodic table, periodic trends in properties of elements -atomic radii, ionic radii, inert gas radii, Ionization enthalpy, electron gain enthalpy, electronegativity, valency. Nomenclature of elements with atomic number greater than 100.

**Chemical Bonding and Molecular Structure:** Valence electrons, ionic bond, covalent bond, bond parameters, Lewis structure, polar character of covalent bond, covalent character of ionic bond, valence bond theory, resonance, geometry of covalent molecules, VSEPR theory, concept of hybridization, involving s, p and d orbitals and shapes of some simple molecules, molecular orbital theory of homonuclear diatomic molecules (qualitative idea only), Hydrogen bond.

**Chemical Thermodynamics:** Concepts of System and types of systems, surroundings, work, heat, energy, extensive and intensive properties, state functions. First law of thermodynamics -internal energy and enthalpy, heat capacity and specific heat, measurement of  $\Delta U$  &  $\Delta H$ , Hess's law of constant heat summation, enthalpy of bond of dissociation, combustion, formation, atomization, sublimation, phase transition, ionization, solution and dilution. Second law of Thermodynamics, Introduction of entropy as a state function, Gibb's energy change for spontaneous and nonspontaneous processes, criteria for equilibrium. Third law of thermodynamics.

**Equilibrium:** Equilibrium in physical and chemical processes, dynamic nature of equilibrium, law of mass action, equilibrium constant, factors affecting equilibrium - Le Chatelier's principle, ionic equilibrium- ionization of acids and bases, strong and weak electrolytes, degree of ionization, ionization of poly basic acids, acid strength, concept of pH, hydrolysis of salts (elementary idea), buffer solution, Henderson Equation, solubility product, common ion effect (with illustrative examples).

**Redox Reactions:** Concept of oxidation and reduction, redox reactions, oxidation number, balancing redox reactions, in terms of loss and gain of electrons and change in oxidation number, applications of redox reactions.

**Organic Chemistry -Some Basic Principles and Techniques:** General introduction, methods of purification, qualitative and quantitative analysis, classification and IUPAC nomenclature of organic compounds. Electronic displacements in a covalent bond: inductive effect, electromeric effect, resonance and hyper conjugation. Homolytic and heterolytic fission of a covalent bond: free radicals, carbocations, carbanions, electrophiles and nucleophiles, types of organic reactions.

## Classification of Hydrocarbons

### Aliphatic Hydrocarbons:

Alkanes - Nomenclature, isomerism, conformation (ethane only), physical properties, chemical reactions including free radical mechanism of halogenation, combustion and pyrolysis. Alkenes - Nomenclature, structure of double bond (ethene), geometrical isomerism, physical properties, methods of preparation, chemical reactions: addition of hydrogen, halogen, water, hydrogen halides (Markovnikov's addition and peroxide effect), ozonolysis, oxidation, mechanism of electrophilic addition. Alkynes - Nomenclature, structure of triple bond (ethyne), physical properties, methods of preparation, chemical reactions: acidic character of alkynes, addition reaction of - hydrogen, halogens, hydrogen halides and water.

Aromatic Hydrocarbons: Introduction, IUPAC nomenclature, benzene: resonance, aromaticity, chemical properties: mechanism of electrophilic substitution. Nitration, sulphonation, halogenation, Friedel Craft's alkylation and acylation, directive influence of functional group in monosubstituted benzene. Carcinogenicity and toxicity.

### Solutions

Types of solutions, expression of concentration of solutions of solids in liquids, solubility of gases in liquids, solid solutions, Raoult's law, colligative properties - relative lowering of vapour pressure, elevation of boiling point, depression of freezing point, osmotic pressure, determination of molecular masses using colligative properties, abnormal molecular mass, Van't Hoff factor.

### Electrochemistry

Redox reactions, EMF of a cell, standard electrode potential, Nernst equation and its application to chemical cells, Relation between Gibbs energy change and EMF of a cell, conductance in electrolytic solutions, specific and molar conductivity, variations of conductivity with concentration, Kohlrausch's Law, electrolysis and law of electrolysis (elementary idea), dry cell-electrolytic cells and Galvanic cells, lead accumulator, fuel cells, corrosion.

### Chemical Kinetics

Rate of a reaction (Average and instantaneous), factors affecting rate of reaction: concentration, temperature, catalyst; order and molecularity of a reaction, rate law and specific rate constant, integrated rate equations and half-life (only for zero and first order reactions), concept of collision theory (elementary idea, no mathematical treatment), activation energy, Arrhenius equation.

### d and f Block Elements

General introduction, electronic configuration, occurrence and characteristics of transition metals, general trends in properties of the first-row transition metals - metallic character, ionization enthalpy, oxidation states, ionic radii, colour, catalytic property, magnetic properties, interstitial compounds, alloy formation, preparation and properties of  $K_2Cr_2O_7$  and  $KMnO_4$ . **Lanthanoids** - Electronic configuration, oxidation states, chemical reactivity and lanthanoid contraction and its consequences. **Actinoids** - Electronic configuration, oxidation states and comparison with lanthanoids.

### Coordination Compounds

Coordination compounds - Introduction, ligands, coordination number, colour, magnetic properties and shapes, IUPAC nomenclature of mononuclear coordination compounds. Bonding, Werner's theory, VBT, and CFT; structure and stereoisomerism, importance of coordination compounds (in qualitative analysis, extraction of metals and biological system).

## **Haloalkanes and Haloarenes.**

Haloalkanes: Nomenclature, nature of C-X bond, physical and chemical properties, optical rotation mechanism of substitution reactions. **Haloarenes:** Nature of C-X bond, substitution reactions (Directive influence of halogen in monosubstituted compounds only). Uses and environmental effects of - dichloromethane, trichloromethane, tetrachloromethane, iodoform, freons, DDT.

## **Alcohols, Phenols and Ethers**

Alcohols: Nomenclature, methods of preparation, physical and chemical properties (of primary alcohols only), identification of primary, secondary and tertiary alcohols, mechanism of dehydration, uses with special reference to methanol and ethanol. **Phenols:** Nomenclature, methods of preparation, physical and chemical properties, acidic nature of phenol, electrophilic substitution reactions, uses of phenols. **Ethers:** Nomenclature, methods of preparation, physical and chemical properties, uses.

## **Aldehydes, Ketones and Carboxylic Acids**

**Aldehydes and Ketones:** Nomenclature, nature of carbonyl group, methods of preparation, physical and chemical properties, mechanism of nucleophilic addition, reactivity of alpha hydrogen in aldehydes, uses. **Carboxylic Acids:** Nomenclature, acidic nature, methods of preparation, physical and chemical properties; uses.

## **Amines**

**Amines:** Nomenclature, classification, structure, methods of preparation, physical and chemical properties, uses, identification of primary, secondary and tertiary amines. Diazonium salts: Preparation, chemical reactions and importance in synthetic organic chemistry.

## **Biomolecules**

**Carbohydrates** - Classification (aldoses and ketoses), monosaccharides (glucose and fructose), D-L configuration oligosaccharides (sucrose, lactose, maltose), polysaccharides (starch, cellulose, glycogen); Importance of carbohydrates. **Proteins** -Elementary idea of - amino acids, peptide bond, polypeptides, proteins, structure of proteins - primary, secondary, tertiary structure and quaternary structures (qualitative idea only), denaturation of proteins; enzymes. Hormones - Elementary idea excluding structure. **Vitamins** - Classification and functions. Nucleic Acids: DNA and RNA.

## Syllabus for the post of PGT -Biology

**Subject specific syllabus includes the concepts of NCERT/CBSE syllabus and Text Books (Classes XI & XII), however, the questions will be testing the depth of understanding and application of these concepts at the level of Post- Graduation.**

### **The Living World**

Biodiversity; Need for classification; three domains of life; taxonomy and systematics; concept of species and taxonomical hierarchy; binomial nomenclature

### **Biological Classification**

Five kingdom classification; Salient features and classification of Monera, Protista and Fungi into major groups; Lichens, Viruses and Viroids.

### **Plant Kingdom**

Classification of plants into major groups; Salient and distinguishing features and a few examples of Algae, Bryophyta, Pteridophyta, Gymnospermae (Topics excluded – Angiosperms, Plant Life Cycle and Alternation of Generations)

### **Animal Kingdom**

Salient features and classification of animals, non-chordates up to phyla level and chordates up to class level (salient features and at a few examples of each category).

### **Morphology of Flowering Plants**

Morphology of different parts of flowering plants: root, stem, leaf, inflorescence, flower, fruit and seed. Description of families: Solanaceae

### **Anatomy of Flowering Plants**

Anatomy and functions of tissue systems in dicots and monocots.

### **Structural Organisation in Animals**

Morphology, Anatomy and functions of different systems (digestive, circulatory, respiratory, nervous and reproductive) of frog.

### **Cell-The Unit of Life**

Cell theory and cell as the basic unit of life, structure of prokaryotic and eukaryotic cells; Plant cell and animal cell; cell envelope; cell membrane, cell wall; cell organelles - structure and function; endomembrane system- endoplasmic reticulum, ribosomes, golgi bodies, lysosomes, vacuoles; mitochondria, plastids, microbodies; cytoskeleton, cilia, flagella, centrioles (ultrastructure and function); nucleus.

### **Biomolecules**

Chemical constituents of living cells: biomolecules, structure and function of proteins, carbohydrates, lipids, nucleic acids; Enzymes - properties, enzyme action.

### **Cell Cycle and Cell Division**

Cell cycle, mitosis, meiosis and their significance

### **Photosynthesis in Higher Plants**

Photosynthesis as a means of autotrophic nutrition; site of photosynthesis, pigments involved in photosynthesis (elementary idea); photochemical and biosynthetic phases of photosynthesis; cyclic and non-cyclic photophosphorylation; chemiosmotic hypothesis; photorespiration; C<sub>3</sub> and C<sub>4</sub> pathways; factors affecting photosynthesis.



## **Respiration in Plants**

Exchange of gases; cellular respiration - glycolysis, fermentation (anaerobic), TCA cycle and electron transport system (aerobic); energy relations - number of ATP molecules generated; amphibolic pathways; respiratory quotient.

## **Plant - Growth and Development**

Seed germination; phases of plant growth and plant growth rate; conditions for growth; differentiation, dedifferentiation and redifferentiation; sequence of developmental processes in a plant cell; growth regulators - auxin, gibberellin, cytokinin, ethylene, ABA.

## **Breathing and Exchange of Gases**

Introduction to respiratory organs in animals; Respiratory system in humans; mechanism of breathing and its regulation in humans - exchange of gases, transport of gases and regulation of respiration, respiratory volumes; disorders related to respiration - asthma, emphysema, occupational respiratory disorders.

## **Body Fluids and Circulation**

Composition of blood, blood groups, coagulation of blood; composition of lymph and its function; human circulatory system - Structure of human heart and blood vessels; cardiac cycle, cardiac output, ECG; double circulation; regulation of cardiac activity; disorders of circulatory system - hypertension, coronary artery disease, angina pectoris, heart failure.

## **Excretory Products and their Elimination**

Modes of excretion - ammonotelism, ureotelism, uricotelism; human excretory system - structure and function; urine formation, osmoregulation; regulation of kidney function - renin - angiotensin, atrial natriuretic factor, ADH, diabetes insipidus; micturition; role of other organs in excretion; disorders - uremia, renal failure, renal calculi, nephritis; dialysis and artificial kidney, kidney transplant.

## **Locomotion and Movement**

Types of movement - amoeboid, ciliary, flagellar, muscular; skeletal muscle, contractile proteins and muscle contraction; skeletal system and its functions; joints; disorders of muscular and skeletal systems - myasthenia gravis, tetany, muscular dystrophy, arthritis, osteoporosis, gout.

## **Neural Control and Coordination**

Neuron and nerves; Nervous system in humans - central nervous system and peripheral nervous system; generation and conduction of nerve impulse; visceral nervous system.

## **Chemical Coordination and Integration**

Endocrine glands and hormones; human endocrine system - hypothalamus, pituitary, pineal, thyroid, parathyroid, thymus, adrenal, pancreas, gonads; hormones of heart, kidney and gastrointestinal tract; mechanism of hormone action (elementary idea); role of hormones as messengers and regulators, hypo - and hyperactivity and related disorders; dwarfism, acromegaly, cretinism, goiter, exophthalmic goiter, diabetes, Addison's disease.

## **Sexual Reproduction in Flowering Plants**

Flower structure; development of male and female gametophytes; pollination - types, agencies and examples; outbreeding devices; pollen-pistil interaction; double fertilization; post fertilization events - development of endosperm and embryo, development of seed and formation of fruit; special modes - apomixis, parthenocarpy, polyembryony; Significance of seed dispersal and fruit formation.

## **Human Reproduction**

Male and female reproductive systems; microscopic anatomy of testis and ovary; gametogenesis - spermatogenesis and oogenesis; menstrual cycle; fertilisation, embryo development upto blastocyst formation, implantation; pregnancy and placenta formation ; parturition ; lactation .

## **Reproductive Health**

Need for reproductive health and prevention of Sexually Transmitted Diseases (STDs); birth control - need and methods; medical termination of pregnancy (MTP); amniocentesis; infertility and assisted reproductive technologies - IVF, ZIFT, GIFT

## **Principles of Inheritance and Variation**

Heredity and variation, Mendelian inheritance; deviations from Mendelism – incomplete dominance, co-dominance, multiple alleles and inheritance of blood groups, pleiotropy; elementary idea of polygenic inheritance; chromosome theory of inheritance; chromosomes and genes; linkage and crossing over; Sex determination - in human being, birds and honey bee; sex linked inheritance - haemophilia, colour blindness; Mendelian disorders in humans –thalassemia; chromosomal disorders in humans; Down's syndrome, Turner's and Klinefelter's syndromes.

## **Molecular Basis of Inheritance**

Structure of DNA and RNA; DNA packaging; Search for genetic material and DNA as genetic material; DNA replication; Central Dogma; transcription, genetic code, translation; gene expression and regulation - lac operon; Human genome project; DNA fingerprinting.

## **Evolution**

Origin of life; biological evolution and evidences for biological evolution (paleontology, comparative anatomy, embryology and molecular evidences); adaptive radiation; Darwin's theory of evolution; mechanism of evolution - variation (mutation and recombination) and natural selection with examples, types of natural selection; Gene flow and genetic drift; Hardy - Weinberg's principle; human evolution

## **Human Health and Diseases**

Pathogens; parasites causing human diseases (malaria, dengue, chikungunya, filariasis, ascariasis, typhoid, pneumonia, common cold, amoebiasis, ring worm) and their control; Basic concepts of immunology - vaccines; cancer, HIV and AIDS; Adolescence - drug and alcohol abuse.

## **Biotechnology - Principles and Processes**

Genetic Engineering (Recombinant DNA Technology).

## **Biotechnology and its Application**

Application of biotechnology in health and agriculture: genetically modified organisms - Bt crops; Human insulin, gene therapy; molecular diagnosis; transgenic animals; biosafety issues, biopiracy and patents.

## **Organisms and Populations**

Population interactions - mutualism, competition, predation, parasitism, commensalism; population attributes - growth, birth rate and death rate, age distribution.

## **Ecosystem**

Ecosystem, productivity and decomposition; energy flow; pyramids of number, biomass, energy.

## **Biodiversity and Conservation**

Biodiversity - Concept, levels, patterns, importance; loss of biodiversity; biodiversity conservation; hotspots, endangered organisms, extinction, Red Data Book, Sacred Groves, biosphere reserves, national parks, wildlife, sanctuaries and Ramsar sites.

## Syllabus for the post of PGT -Computer Science

**Subject specific syllabus includes the concepts of NCERT/CBSE syllabus and Text Books (Classes XI & XII), however, the questions will be testing the depth of understanding and application of these concepts at the level of Post- Graduation.**

### **Computer Systems and Organisation**

- Basic Computer Organisation : Introduction to computer system, hardware, software, input device, output device, CPU, memory (primary, cache and secondary), units of memory (Bit, Byte, KB, MB, GB, TB, PB)
- Types of software: system software (operating systems, system utilities, device drivers), programming tools and language translators (assembler, compiler & interpreter), application software
- Operating system (OS): functions of operating system, OS user interface
- Boolean logic: NOT, AND, OR, NAND, NOR, XOR, truth table, De Morgan's laws and logic circuits
- Number system: Binary, Octal, Decimal and Hexadecimal number system; conversion between number systems.
- Encoding schemes: ASCII, ISCII and UNICODE (UTF8, UTF32)

### **Computational Thinking and Programming**

- Introduction to problem solving: Steps for problem solving (analysing the problem, developing an algorithm, coding, testing and debugging). representation of algorithms using flow chart and pseudo code, decomposition
- Familiarization with the basics of Python programming: Introduction to Python, features of Python, executing a simple "hello world" program, execution modes: interactive mode and script mode, Python character set, Python tokens (keyword, identifier, literal, operator, punctuator), variables, concept of l-value and r-value, use of comments
- Knowledge of data types: number (integer, floating point, complex), boolean, sequence (string, list, tuple), none, mapping (dictionary), mutable and immutable data types
- Operators: arithmetic operators, relational operators, logical operators, assignment operator, augmented assignment operators, identity operators (is, is not), membership operators (in, not in)
- Expressions, statement, type conversion & input/output: precedence of operators, expression, evaluation of expression, python statement, type conversion (explicit & implicit conversion), accepting data as input from the console and displaying output
- Errors: syntax errors, logical errors, runtime errors
- Flow of control: introduction, use of indentation, sequential flow, conditional and iterative flow control
- Conditional statements: if, if-else, if-elif-else, flowcharts, simple programs: e.g.: absolute value, sort 3 numbers and divisibility of a number
- Iterative statements: for loop, range function, while loop, flowcharts, break and continue statements, nested loops, suggested programs: generating pattern, summation of series, finding the factorial of a positive number etc
- Strings: introduction, indexing, string operations (concatenation, repetition, membership & slicing), traversing a string using loops, built-in functions: len(), capitalize(), title(), lower(), upper(), count(), find(), index(), endswith(), startswith(), isalnum(), isalpha(), isdigit(), islower(), isupper(), isspace(), lstrip(),rstrip(), strip(), replace(), join(), partition(), split()
- Lists: introduction, indexing, list operations (concatenation, repetition, membership & slicing), traversing a list using loops, built-in functions: len(), list(), append(), extend(), insert(), count(), index(), remove(), pop(), reverse(), sort(), sorted(), min(), max(), sum(); nested lists, suggested programs: finding the maximum, minimum, mean of numeric values stored in a list; linear search on list of numbers and counting the frequency of elements in a list

- Tuples: introduction, indexing, tuple operations (concatenation, repetition, membership & slicing), built-in functions: len(), tuple(), count(), index(), sorted(), min(), max(), sum(); tuple assignment, nested tuple, suggested programs: finding the minimum, maximum, mean of values stored in a tuple; linear search on a tuple of numbers, counting the frequency of elements in a tuple
- Dictionary: introduction, accessing items in a dictionary using keys, mutability of dictionary (adding a new item, modifying an existing item), traversing a dictionary, built-in functions: len(), dict(), keys(), values(), items(), get(), update(), del(), clear(), fromkeys(), copy(), pop(), popitem(), setdefault(), max(), min(), count(), sorted(), copy(); suggested programs : count the number of times a character appears in a given string using a dictionary, create a dictionary with names of employees, their salary and access them
- Introduction to Python modules: Importing module using 'import ' and using from statement, Importing math module (pi, e, sqrt, ceil, floor, pow, fabs, sin, cos, tan); random module (random, randint, randrange), statistics module (mean, median, mode)

## **Society, Law and Ethics**

- Digital Footprints
- Digital society and Netizen: net etiquettes, communication etiquettes, social media etiquettes
- Data protection: Intellectual Property Right (copyright, patent, trademark), violation of IPR (plagiarism, copyright infringement, trademark infringement), open source softwares and licensing (Creative Commons, GPL and Apache)
- Cyber-crime: definition, hacking, eavesdropping, phishing and fraud emails, ransomware, preventing cyber crime
- Cyber safety: safely browsing the web, identity protection, confidentiality, cyber trolls and bullying.
- Safely accessing web sites: malware, viruses, trojans, adware
- E-waste management: proper disposal of used electronic gadgets
- Indian Information Technology Act (IT Act)
- Technology & Society: Gender and disability issues while teaching and using computers

## **Computational Thinking and Programming – 2**

- Functions: types of function (built-in functions, functions defined in module, user defined functions), creating user defined function, arguments and parameters, default parameters, positional parameters, function returning value(s), flow of execution, scope of a variable (global scope, local scope)
- Introduction to files, types of files (Text file, Binary file, CSV file), relative and absolute paths
- Text file: opening a text file, text file open modes (r, r+, w, w+, a, a+), closing a text file, opening a file using with clause, writing/appending data to a text file using write() and writelines(), reading from a text file using read(), readline() and readlines(), seek and tell methods, manipulation of data in a text file
- Binary file: basic operations on a binary file: open using file open modes (rb, rb+, wb, wb+, ab, ab+), close a binary file, import pickle module, dump() and load() method, read, write/create, search, append and update operations in a binary file
- CSV file: import csv module, open / close csv file, write into a csv file using csv.writerow() and read from a csv file using csv.reader()

## Computer Networks

- Evolution of networking: introduction to computer networks, evolution of networking (ARPANET, NSFNET, INTERNET)
- Data communication terminologies: concept of communication, components of data communication (sender, receiver, message, communication media, protocols), measuring capacity of communication media (bandwidth, data transfer rate), IP address, switching techniques (Circuit switching, Packet switching)
- Transmission media: Wired communication media (Twisted pair cable, Co-axial cable, Fiber-optic cable), Wireless media (Radio waves, Micro waves, Infrared waves)
- Network devices (Modem, Ethernet card, RJ45, Repeater, Hub, Switch, Router, Gateway, WIFI card)
- Network topologies and Network types: types of networks (PAN, LAN, MAN, WAN), networking topologies (Bus, Star, Tree)
- Network protocol: HTTP, FTP, PPP, SMTP, TCP/IP, POP3, HTTPS, TELNET, VoIP, wireless/mobile communication protocol such as GSM, GPRS and WLL
- Introduction to web services: WWW, Hyper Text Markup Language (HTML), Extensible Markup Language (XML), domain names, URL, website, web browser, web servers, web hosting

## Database Management

- Database concepts: introduction to database concepts and its need
- Relational data model: relation, attribute, tuple, domain, degree, cardinality, keys (candidate key, primary key, alternate key, foreign key)
- Structured Query Language: introduction, Data Definition Language and Data Manipulation Language, data type (char(n), varchar(n), int, float, date), constraints (not null, unique, primary key), create database, use database, show databases, drop database, show tables, create table, describe table, alter table (add and remove an attribute, add and remove primary key), drop table, insert, delete, select, operators (mathematical, relational and logical), aliasing, distinct clause, where clause, in, between, order by, meaning of null, is null, is not null, like, update command, delete command, aggregate functions (max, min, avg, sum, count), group by, having clause, joins: cartesian product on two tables, equi-join and natural join
- Interface of python with an SQL database: connecting SQL with Python, performing insert, update, delete queries using cursor, display data by using fetchone(), fetchall(), rowcount, creating database connectivity applications

## Introduction to Computer System

- Introduction to computers and computing: evolution of computing devices, components of a computer system and their interconnections, Input/Output devices.
  - Computer Memory: Units of memory, types of memory – primary and secondary, data deletion, its recovery and related security concerns. Software: purpose and types – system and application software, generic and specific purpose software.

## Introduction to Python

- Basics of Python programming, Python interpreter - interactive and script mode, the structure of a program, indentation, identifiers, keywords, constants, variables, types of operators, precedence of operators, data types, mutable and immutable data types, statements, expressions, evaluation of expressions, comments, input and output statements, data type conversion, debugging, control statements: if-else, for loop Lists: list operations - creating, initializing, traversing and manipulating lists, list methods and built-in functions.: len(), list(), append(), extend(), insert(), count(), find(), remove(), pop(), reverse(), sort(), sorted(), min(), max(), sum()
- Dictionary: concept of key-value pair, creating, initializing, traversing, updating and deleting elements, dictionary methods and built-in functions: len(), dict(), keys(), values(), items(), get(), update(), clear(), del()

## Database concepts and the Structured Query Language

- Database Concepts: Introduction to database concepts and its need, Database Management System. Relational data model: concept of attribute, domain, tuple, relation, candidate key, primary key, alternate key, foreign key.
- Advantages of using Structured Query Language, Data Definition Language, Data Query Language and Data Manipulation Language, Introduction to MySQL, creating a database using MySQL, Data Types
- Definition Commands: CREATE TABLE
- Data Query Commands: SELECT-FROM- WHERE
- Data Manipulation Commands: INSERT

## Emerging Trends

Artificial Intelligence, Machine Learning, Natural Language Processing, Immersive experience (AR, VR), Robotics, Big data and its characteristics, Internet of Things (IoT), Sensors, Smart cities, Cloud Computing and Cloud Services (SaaS, IaaS, PaaS); Grid Computing, Block chain technology.

## Data Handling using Pandas

- Introduction to Python libraries- Pandas, Matplotlib.
- Data structures in Pandas - Series and Data Frames.
- Series: Creation of Series from - ndarray, dictionary, scalar value; mathematical operations; Head and Tail functions; Selection, Indexing and Slicing.
- Data Frames: creation - from dictionary of Series, list of dictionaries, Text/CSV files; display; iteration; Operations on rows and columns: add, select, delete, rename; Head and Tail functions; Indexing using Labels, Boolean Indexing;
- Importing/Exporting Data between CSV files and Data Frames.
- Data Visualization Purpose of plotting; drawing and saving following types of plots using Matplotlib - line plot, bar graph, histogram Customizing plots: adding label, title, and legend in plots
- 

## Database Query using SQL

- Math functions: POWER (), ROUND (), MOD ().
- Text functions: UCASE ()/UPPER (), LCASE ()/LOWER (), MID ()/SUBSTRING ()/SUBSTR (), LENGTH (), LEFT (), RIGHT (), INSTR (), LTRIM (), RTRIM (), TRIM ().
- Date Functions: NOW (), DATE (), MONTH (), MONTHNAME (), YEAR (), DAY (), DAYNAME ().
- Aggregate Functions: MAX (), MIN (), AVG (), SUM (), COUNT (); using COUNT (\*).
- Querying and manipulating data using Group by, Having, Order by.

## Introduction to Computer Networks

- Introduction to networks, Types of network: LAN, MAN, WAN.
- Network Devices: modem, hub, switch, repeater, router, gateway
- Network Topologies: Star, Bus, Tree, Mesh.
- Introduction to Internet, URL, WWW, and its applications- Web, email, Chat, VoIP.
- Website: Introduction, difference between a website and webpage, static vs dynamic web page, web server and hosting of a website.
- Web Browsers: Introduction, commonly used browsers, browser settings, add-ons and plug-ins, cookies.

## **Societal Impacts**

- Digital footprint, net and communication etiquettes, data protection, intellectual property rights (IPR), plagiarism, licensing and copyright, free and open source software (FOSS), cybercrime and cyber laws, hacking, phishing, cyber bullying, overview of Indian IT Act.
- E-waste: hazards and management.
- Awareness about health concerns related to the usage of technology.

## Syllabus for the post of PGT Commerce - Accountancy & Business Studies

### **A. Accountancy**

**Subject specific syllabus includes the concepts of NCERT/CBSE syllabus and Text Books (Classes XI & XII), however, the questions will be testing the depth of understanding and application of these concepts at the level of Post- Graduation.**

#### **Introduction to Accounting**

- Accounting- concept, meaning, as a source of information objectives, advantages and limitations, types of accounting information; users of accounting information and their needs. Qualitative Characteristics of Accounting Information. Role of Accounting in Business.
- Basic Accounting Terms- Business Transaction, entity, Capital, Drawings. Liabilities (Non Current and Current). Assets (Non Current, Current); Fixed assets (Tangible and Intangible), Expenditure (Capital and Revenue), Expense, Revenue, Income, Profit, Gain, Loss, Purchase, Sales, Goods, Stock, Debtor, Creditor, Voucher, Discount (Trade discount and Cash Discount)

#### **Theory Base of Accounting**

- Fundamental accounting assumptions: GAAP: Concept
- Business Entity, Money Measurement, Going Concern, Accounting Period, Cost Concept, Dual Aspect, Revenue Recognition, Matching, Full Disclosure, Consistency, Conservatism, Materiality and Objectivity System of Accounting. Basis of Accounting: cash basis and accrual basis
- Accounting Standards: Applicability in IndAS
- Goods and Services Tax (GST): Characteristics and Advantages.

#### **Recording of Business Transactions**

- Voucher and Transactions: Source documents and Vouchers, Preparation of Vouchers, Accounting Equation Approach: Meaning and Analysis, Rules of Debit and Credit.
- Recording of Transactions: Books of Original Entry- Journal
- Special Purpose books
- Cash Book: Simple, cash book with bank column and petty cashbook
- Purchases book
- Sales book
- Purchases return book
- Sales return book
- Journal Proper
- Ledger: Format, Posting from journal and subsidiary books, Balancing of accounts
- Bank Reconciliation Statement:
  - Need and preparation, Bank Reconciliation, Statement with Adjusted Cash Book
- Depreciation, Provisions and Reserves
  - Depreciation: Meaning, Features, Need, Causes, factors
  - Other similar terms: Depletion and Amortisation
  - Methods of Depreciation: i. Straight Line Method (SLM)  
ii. Written Down Value Method (WDV)
- Difference between SLM and WDV;
- Advantages of SLM and WDV Accounting treatment of depreciation
  - i. Charging to asset account
  - ii. Creating provision for depreciation/accumulated depreciation account
  - iii. Treatment for disposal of asset
- Provisions and Reserves: Difference
- Types of Reserves: i. Revenue reserve ii. Capital reserve iii. General reserve iv. Specific reserve v. Secret Reserve
- Difference between capital and revenue reserve



### **Trial balance and Rectification of Errors**

- Trial balance: objectives and meaning & preparation
- Errors: types-errors of omission, commission, principles, and compensating; their effect on Trial Balance. Detection and rectification of errors; preparation of suspense account.

### **Financial Accounting - II**

- Financial Statements Meaning, objectives, and importance; Revenue and Capital Receipts; Revenue and Capital Expenditure;
- Deferred Revenue expenditure.
- Trading and Profit and Loss Account: Gross Profit, Operating profit and Net profit. Preparation.
- Balance Sheet: need, grouping and marshalling of assets and liabilities. Preparation.
- Adjustments in preparation of financial statements with respect to closing stock, outstanding expenses, prepaid expenses, accrued income, income received in advance, depreciation, bad debts, provision for doubtful debts, provision for discount on debtors, Abnormal loss, Goods taken for personal use/staff welfare, interest on capital and managers commission.
- Preparation of Trading and Profit and Loss account and Balance Sheet of a sole proprietorship with adjustments.

### **Accounting for Partnership Firms**

- Partnership: features, Partnership Deed. Provisions of the Indian Partnership Act 1932 in the absence of partnership deed.
- Fixed v/s fluctuating capital accounts. Preparation of Profit and Loss Appropriation account- division of profit among partners, guarantee of profits.
- Past adjustments (relating to interest on capital, interest on drawing, salary and profit sharing ratio). Goodwill: meaning, nature, need, factors affecting and methods of valuation - average profit, super profit and capitalization.

### **Accounting for Partnership firms - Reconstitution and Dissolution.**

- Change in the Profit Sharing Ratio among the existing partners - sacrificing ratio, gaining ratio, accounting for revaluation of assets and reassessment of liabilities and treatment of reserves, accumulated profits and losses. Preparation of revaluation account and balance sheet.
- Admission of a partner - effect of admission of a partner on change in the profit sharing ratio, treatment of goodwill (as per AS 26), treatment for revaluation of assets and reassessment of liabilities, treatment of reserves, accumulated profits and losses, adjustment of capital accounts and preparation of capital, current account and balance sheet.

### **Retirement and death of a partner**

- effect of retirement / death of a partner on change in profit sharing ratio, treatment of goodwill (as per AS 26), treatment for revaluation of assets and reassessment of liabilities, adjustment of accumulated profits, losses and reserves, adjustment of capital accounts and preparation of capital, current account and balance sheet. Preparation of loan account of the retiring partner.
- Calculation of deceased partner's share of profit till the date of death. Preparation of deceased partner's capital account and his executor's account.

### **Dissolution of a partnership firm:**

- Meaning of dissolution of partnership and partnership firm, types of dissolution of a firm. Settlement of accounts - preparation of realization account, and other related accounts: capital accounts of partners and cash/bank a/c (excluding piecemeal distribution, sale to a company and insolvency of partner(s)).

### **Accounting for Share Capital**

- Features and types of companies
- Share and share capital: nature and types.
- Accounting for share capital: issue and allotment of equity and preferences shares. Public subscription of shares - over subscription and under subscription of shares; issue at par and at premium, calls in advance and arrears (excluding interest), issue of shares for consideration other than cash.
- Concept of Private Placement and Employee Stock Option Plan (ESOP), Sweat Equity.
- Accounting treatment of forfeiture and reissue of shares. Disclosure of share capital in the Balance Sheet of a company.

### **Accounting for Debentures**

- Debentures: Meaning, types, Issue of debentures at par, at a premium and at a discount. Issue of debentures for consideration other than cash; Issue of debentures with terms of redemption; debentures as collateral security-concept, interest on debentures. Writing off discount / loss on issue of debentures.

### **Financial statements of a Company:**

- Meaning, Nature, Uses and importance of financial Statement.
- Statement of Profit and Loss and Balance Sheet in prescribed form with major headings and sub headings (as per Schedule III to the Companies Act, 2013)
- Financial Statement Analysis: Meaning, Significance Objectives, importance and limitations.
- Tools for Financial Statement Analysis: Cash flow analysis, ratio analysis.
- Accounting Ratios: Meaning, Objectives, Advantages, classification and computation.
- Liquidity Ratios: Current ratio and Quick ratio.
- Solvency Ratios: Debt to Equity Ratio, Total Asset to Debt Ratio, Proprietary Ratio and Interest Coverage Ratio. Debt to Capital Employed Ratio.
- Activity Ratios: Inventory Turnover Ratio, Trade Receivables Turnover Ratio, Trade Payables Turnover Ratio, Fixed Asset Turnover Ratio, Net Asset Turnover Ratio and Working Capital Turnover Ratio.
- Profitability Ratios: Gross Profit Ratio, Operating Ratio, Operating Profit Ratio, Net Profit Ratio and Return on Investment.

### **Cash Flow Statement**

- Meaning, objectives Benefits, Cash and Cash Equivalents, Classification of Activities and preparation

## Syllabus for the post of PGT Commerce - Accountancy & Business Studies

### **B. Business Studies**

**Subject specific syllabus includes the concepts of NCERT/CBSE syllabus and Text Books (Classes XI & XII), however, the questions will be testing the depth of understanding and application of these concepts at the level of Post- Graduation.**

#### **Foundation of Business**

- Meaning and features

#### **Evolution and Fundamentals of Business**

History of Trade and Commerce in India: Indigenous Banking System, Rise of Intermediaries, Transport, Trading Communities: Merchant Corporations, Major Trade Centres, Major Imports and Exports, Position of Indian Sub-Continent in the World Economy. Business-meaning and Characteristics, Business- profession and employment-Concept, Objectives of business  
Classification of business activities - Industry and Commerce, Industry-types: primary, secondary, tertiary Meaning and subgroups, Commerce-trade: (types-internal, external; wholesale and retail) and auxiliaries to trade; (banking, insurance, transportation, warehousing, communication, and advertising) – meaning, Business risk-Concept

#### **Forms of Business organizations**

Sole Proprietorship-Concept, merits and limitations, Partnership-Concept, types, merits and limitation of partnership, registration of a partnership firm, partnership deed. Types of partners. Hindu Undivided Family Business: Concept. Cooperative Societies-Concept, merits, and limitations. Company - Concept, merits and limitations; Types: Private, Public and One Person Company - Concept. Formation of company - stages, important documents to be used in formation of a company. Choice of form of business organization

#### **Public, Private and Global Enterprises**

Public sector and private sector enterprises – Concept. Forms of public sector enterprises: Departmental Undertakings, Statutory. Corporations and Government Company. Global Enterprises – Feature. Public private partnership – concept

#### **Business Services**

Business services – meaning and types. Banking: Types of bank accounts - savings, current, recurring, fixed deposit and multiple option deposit account. Banking services with particular reference to Bank Draft, Bank Overdraft, Cash credit. E-Banking meaning, Types of digital payments. Insurance – Principles. Types – life, health, fire and marine insurance – concept. Postal Service-Mail, Registered Post, parcel, Speed Post, Courier-meaning

#### **Emerging Modes of Business**

E-business: concept, scope and benefits

#### **Social Responsibility of Business and Business Ethics**

Concept of social responsibility. Case of social responsibility. Responsibility towards owners, investors, consumers, employees, government and community. Role of business in environment protection. Business Ethics - Concept and Elements.

#### **Finance and Trade-Sources of Business Finance**

Concept of business finance. Owners' funds- equity shares, preferences share, retained earnings. Borrowed funds: debentures and bonds, loan from financial institution and commercial banks, public deposits, trade credit, Inter Corporate Deposits (ICD).

## **Small Business and Enterprises**

Entrepreneurship Development (ED): Concept, Characteristics and Need. Process of Entrepreneurship Development: Start-up India Scheme, ways to fund start-up. Intellectual Property Rights and Entrepreneurship. Small scale enterprise as defined by MSMED Act 2006 (Micro, Small and Medium Enterprise Development Act). Role of small business in India with special reference to rural areas. Government schemes and agencies for small scale industries: National Small Industries Corporation (NSIC) and District Industrial Centre (DIC) with special reference to rural, backward areas.

## **Internal Trade**

Internal trade - meaning and types services rendered by a wholesaler and a retailer. Types of retail-trade-Itinerant and small scale fixed shops retailers. Large scale retailers-Departmental stores, chain stores – concept. GST (Goods and Services Tax): Concept and key-features.

## **International trade:**

Concept and benefits. Export trade - Meaning and procedure. Import Trade - Meaning and procedure. Documents involved in International Trade; indent, letter of credit, shipping order, shipping bills, mate's receipt (DA/DP). World Trade Organization (WTO) meaning and objectives.

## **Nature and Significance of Management**

Management - concept, objectives, and importance. Management as Science, Art and Profession. Levels of Management. Management functions-planning, organizing, staffing, directing and controlling. Coordination- concept and importance.

## **Principles of Management**

Principles of Management- concept and significance. Fayol's principles of management. Taylor's Scientific management- principles and techniques.

## **Business Environment**

Business Environment- concept and importance Dimensions of Business Environment- Economic, Social, Technological, Political and Legal. Demonetization - concept and features.

## **Planning**

Concept, importance and limitation. Planning process. Single use and standing plans. Objectives, Strategy, Policy, Procedure, method Rule, budget and Programme.

## **Organising**

Concept and importance. Organising Process. Structure of organisation- functional and divisional concept. Formal and informal organisation- concept. Delegation: concept, elements and importance. Decentralization: concept and importance.

## **Staffing**

Concept and importance of staffing. Staffing as a part of Human Resource Management concept. Staffing process. Recruitment process. Selection – process. Training and Development - Concept and importance, Methods of training - on the job and off the job - vestibule training, apprenticeship training and internship training.

## **Directing**

Concept and importance. Elements of Directing. Motivation - concept, Maslow's hierarchy of needs, Financial and non-financial incentives. Leadership - concept, styles - authoritative, democratic and laissez faire. Communication - concept, formal and informal communication; barriers to effective communication, how to overcome the barriers.

**Controlling**

Controlling - Concept and importance. Relationship between planning and controlling. Steps in process of control.

**Financial Management**

Concept, role and objectives of Financial Management. Financial decisions: investment, financing and dividend- Meaning and factors affecting. Financial Planning - concept and importance. Capital Structure - concept and factors affecting capital structure. Fixed and Working Capital - Concept and factors affecting their requirements.

**Financial Markets**

Financial Markets: Concept. Money Market: Concept. Capital market and its types (primary and secondary). Stock Exchange - Functions and trading procedure. Securities and Exchange Board of India(SEBI)-objectives and functions

**Marketing**

Marketing - Concept, functions and philosophies. Marketing Mix - Concept and elements. Product - branding, labelling and packaging - Concept. Price - Concept, Factors determining price. Physical Distribution - concept, components and channels of distribution. Promotion - Concept and elements; Advertising, Personal Selling, Sales Promotion and Public Relations

**Consumer Protection**

Concept and importance of consumer protection. The Consumer Protection Act, 2019: Meaning of consumer. Rights and responsibilities of consumers Who can file a complaint? Redressal machinery Remedies available. Consumer awareness - Role of consumer organizations and Non-Governmental Organizations (NGOs)

## Syllabus for the post of PGT - Economics

**Subject specific syllabus includes the concepts of NCERT/CBSE syllabus and Text Books (Classes XI & XII), however, the questions will be testing the depth of understanding and application of these concepts at the level of Post- Graduation.**

### **Introduction**

Meaning, scope, functions and importance of statistics in Economics

### **Collection, Organisation and Presentation of data**

- Collection of data - sources of data - primary and secondary; how basic data is collected with concepts of Sampling; methods of collecting data; some important sources of secondary data: Census of India and National Sample Survey Organisation.
- Organisation of Data: Meaning and types of variables; Frequency Distribution.
- Presentation of Data: Tabular Presentation and Diagrammatic Presentation of Data: (i) Geometric forms (bar diagrams and pie diagrams), (ii) Frequency diagrams (histogram, polygon and Ogive) and (iii) Arithmetic line graphs (time series graph).

### **Statistical Tools and Interpretation**

- Measures of Central Tendency- Arithmetic mean, median and mode
- Correlation – meaning and properties, scatter diagram; Measures of correlation - Karl Pearson's method (two variables ungrouped data) Spearman's rank correlation.
- Introduction to Index Numbers - meaning, types - wholesale price index, consumer price index and index of industrial production, uses of index numbers; Inflation and index numbers.

### **Introduction to Microeconomics**

- Meaning of microeconomics and macroeconomics; positive and normative economics
- What is an economy? Central problems of an economy: what, how and for whom to produce; concepts of production possibility frontier and opportunity cost.

### **Consumer's Equilibrium and Demand**

- Consumer's equilibrium - meaning of utility, marginal utility, law of diminishing marginal utility, conditions of consumer's equilibrium using marginal utility analysis.
- Indifference curve analysis of consumer's equilibrium-the consumer's budget (budget set and budget line), preferences of the consumer (indifference curve, indifference map) and conditions of consumer's equilibrium.
- Demand, market demand, determinants of demand, demand schedule, demand curve and its slope, movement along and shifts in the demand curve; price elasticity of demand - factors affecting price elasticity of demand; measurement of price elasticity of demand - percentage-change method and total expenditure method.

### **Producer Behaviour and Supply**

- Meaning of Production Function – Short-Run and Long-Run
- Total Product, Average Product and Marginal Product.
- Returns to a Factor
- Cost: Short run costs - total cost, total fixed cost, total variable cost; Average cost; Average fixed cost, average variable cost and marginal cost-meaning and their relationships.
- Revenue - total, average and marginal revenue - meaning and their relationship.
- Producer's equilibrium-meaning and its conditions in terms of marginal revenue marginal cost. Supply, market supply, determinants of supply, supply schedule, supply curve and its slope, movements along and shifts in supply curve, price elasticity of supply; measurement of price elasticity of supply - percentage-change method.

## **Forms of Market and Price Determination under Perfect Competition with simple applications.**

- Perfect competition - Features; Determination of market equilibrium and effects of shifts in demand and supply.
- Simple Applications of Demand and Supply: Price ceiling, price floor.

## **National Income and Related Aggregates**

- Basic concepts in macroeconomics: consumption goods, capital goods, final goods, intermediate goods; stocks and flows; gross investment and depreciation.
- Circular flow of income (two sector model); Methods of calculating National Income - Value Added or Product method, Expenditure method, Income method.
- Aggregates related to National Income: Gross National Product (GNP), Net National Product (NNP), Gross Domestic Product (GDP) and Net Domestic Product (NDP) - at market price, at factor cost; Real and Nominal GDP.
- GDP and Welfare

## **Money and Banking**

- Money - meaning and functions, supply of money - Currency held by the public and net demand deposits held by commercial banks.
- Money creation by the commercial banking system.
- Central bank and its functions (example of the Reserve Bank of India): Bank of issue, Govt. Bank, Banker's Bank, Control of Credit through Bank Rate, CRR, SLR, Repo Rate and Reverse Repo Rate, Open Market Operations, Margin requirement.

## **Determination of Income and Employment**

- Aggregate demand and its components.
- Propensity to consume and propensity to save (average and marginal).
- Short-run equilibrium output; investment multiplier and its mechanism.
- Meaning of full employment and involuntary unemployment.
- Problems of excess demand and deficient demand; measures to correct them - changes in government spending, taxes and money supply.

## **Government Budget and the Economy**

- Government budget - meaning, objectives and components.
- Classification of receipts - revenue receipts and capital receipts;
- Classification of expenditure - revenue expenditure and capital expenditure.
- Balanced, Surplus and Deficit Budget - measures of government deficit.

## **Balance of Payments**

- Balance of payments account - meaning and components;
- Balance of payments - Surplus and Deficit
- Foreign exchange rate - meaning of fixed and flexible rates and managed floating.
- Determination of exchange rate in a free market, Merits and demerits of flexible and fixed exchange rate. Managed Floating exchange rate system

## **Development Experience (1947-90) and Economic Reforms since 1991:**

- A brief introduction of the state of Indian economy on the eve of independence. Indian economic system and common goals of Five Year Plans.
- Main features, problems and policies of agriculture (institutional aspects and new agricultural strategy), industry (IPR 1956; SSI - role & importance) and foreign trade.
- Economic Reforms since 1991:

Features and appraisals of liberalisation, globalisation and privatisation (LPG policy);  
Concepts of demonetization and GST

### **Current challenges facing Indian Economy**

- Human Capital Formation: How people become resource; Role of human capital in economic development; Growth of Education Sector in India
- Rural development: Key issues - credit and marketing - role of cooperatives; agricultural diversification; alternative farming - organic farming
- Employment: Growth and changes in work force participation rate in formal and informal sectors; problems and policies
- Sustainable Economic Development: Meaning, Effects of Economic Development on Resources and Environment, including global warming

### **Development Experience of India:**

- A comparison with neighbours
- India and Pakistan
- India and China
- Issues: economic growth, population, sectoral development and other Human Development Indicators



## Syllabus for the post of PGT - Geography

**Subject specific syllabus includes the concepts of NCERT/CBSE syllabus and Text Books (Classes XI & XII), however, the questions will be testing the depth of understanding and application of these concepts at the level of Post- Graduation.**

### **Geography as a Discipline**

- Geography as an integrating discipline, as a science of spatial attributes
- Branches of Geography: Physical Geography and Human Geography

### **The Earth**

- Origin and evolution of the earth
- Interior of the earth Earthquakes and volcanoes: causes, types and effects
- Distribution of oceans and continents : Wegener's continental drift theory and plate tectonics

### **Landforms**

- Geomorphic processes: weathering; mass wasting; erosion and deposition; soil-formation
- Landforms and their evolution- Brief erosional and depositional features

### **Climate**

- Atmosphere- composition and structure; elements of weather and climate
- Solar Radiation-Insolation-angle of incidence and distribution; heat budget of the earth-heating and cooling of atmosphere (conduction, convection, terrestrial radiation and advection); temperature- factors controlling temperature; distribution of temperature-horizontal and vertical; inversion of temperature
- Atmospheric circulation and weather systems - Pressure-pressure belts; winds-planetary, seasonal and local; air masses and fronts; tropical and extra tropical cyclones
- Water in the atmosphere-Precipitation- evaporation; condensation-dew, frost, fog, mist and cloud; rainfall-types and world distribution
- World Climate and Global Concerns

### **Water (Oceans)**

- Basics of Oceanography
- Oceans - distribution of temperature and salinity
- Movements of ocean water-waves, tides and currents; submarine reliefs

### **Life on the Earth**

- Biosphere - importance of plants and other organisms; biodiversity and conservation

### **India-Physical Environment**

- India : Location, space relations, India's place in the world

### **Physiography**

- Structure and Relief; Physiographic Divisions
- Drainage systems: Concept of river basins, watershed; the Himalayan and the Peninsular rivers

### **Climate, Vegetation and Soil**

- Weather and climate - spatial and temporal distribution of temperature, Indian monsoon: mechanism, onset and withdrawal
- Natural vegetation-forest types and distribution; wild life; conservation; biosphere reserves

## **Hazards and Disasters: Causes, Consequences and Management**

- Floods, Cloudbursts
- Droughts: types and impact
- Earthquakes and Tsunami Cyclones: features and impact
- Landslides

## **Fundamentals of Maps**

- Geo spatial data, Concept of Geographical data matrix; Point, line, area data
- Maps - types; scales-types; construction of simple linear scale, measuring distance; finding direction and use of symbols
- Map projection- Latitude, longitude and time, typology, construction and properties of projection: Conical with one standard parallel and Mercator's projection.

## **Topographic and Weather Maps**

- Study of topographic maps (1 : 50,000 or 1 : 25,000 Survey of India maps); contour cross section and identification of landforms-slopes, hills, valleys, waterfall, cliffs; distribution of settlements
- Satellite imageries, stages in remote sensing data- acquisition, platform and sensors and data products, (photographic and digital)

## **People**

- The World Population- distribution, density and growth
- Population change - Components of population change, Demographic Transition
- Human development-concept; selected indicators, international comparisons
- Population: distribution, density and growth; composition of population - linguistic, religious; sex, rural-urban and occupational-regional variations in growth of population

## **Human Activities**

- Primary activities - concept and changing trends; gathering, pastoral, mining, subsistence agriculture, modern agriculture; people engaged in agricultural and allied activities - some examples from selected countries
- Secondary activities- concept; manufacturing: types - household, small scale, large scale; agro based and mineral based industries;
- Tertiary activities - concept; trade, transport and tourism; services; people engaged in tertiary activities
- Quaternary activities- concept; people engaged in quaternary activities - case study from selected countries

## **Human Settlements**

- Rural settlements - types and distribution
- Urban settlements - types, distribution and functional classification

## **Transport, Communication and Trade**

- Land transport - roads, railways; trans- continental railways Water transport- inland waterways; major ocean routes
- Air transport- Intercontinental air routes Oil and gas pipelines
- Satellite communication and cyber space- importance and usage for geographical information; use of GPS
- International trade- bases and changing patterns; ports as gateways of international trade; role of WTO in international trade

## **Resources and Development**

- Land resources- general land use; agricultural land use; geographical conditions and distribution of major crops (Wheat, Rice, Tea, Coffee, Cotton, Jute, Sugarcane and Rubber); agricultural development and problems
- Water resources-availability and utilization- irrigation, domestic, industrial and other uses; scarcity of water and conservation methods-rain water harvesting and watershed management
- Mineral and energy resources- distribution of metallic (Iron ore, Copper, Bauxite, Manganese); non-metallic (Mica, Salt) minerals; conventional (Coal, Petroleum, Natural gas and Hydroelectricity) and non-conventional energy sources (solar, wind, biogas) and conservation
- Planning in India- target group area planning(case study); idea of sustainable development (case study)

## **Transport, Communication and International Trade**

- Transport and communication-roads, railways, waterways and airways: oil and gas pipelines; Geographical information and communication net works
- International trade- changing pattern of India's foreign trade; sea ports and their hinterland and airports

## **Geographical Perspective on selected issues and problems**

- Environmental pollution; urban-waste disposal
- Urbanization, rural-urban migration; problems of slums
- Land degradation

## **Syllabus for the post of PGT - History**

**Subject specific syllabus includes the concepts of NCERT/CBSE syllabus and Text Books (Classes XI & XII), however, the questions will be testing the depth of understanding and application of these concepts at the level of Post- Graduation.**

### **Writing and City Life**

Iraq, 3rd millennium BCE

- Growth of towns
- Nature of early urban societies
- Historians' Debate on uses of writing

### **An Empire across Three Continents**

Roman Empire, 27 BCE to 600 CE

- Political evolution
- Economic Expansion
- Religion-culture foundation
- Late Antiquity
- Historians' view on the Institution of Slavery

### **NOMADIC EMPIRES**

The Mongol, 13th to 14th century

- The nature of nomadism
- Formation of empires
- Conquests and relations with other states
- Historians' views on nomadic societies and state formation

### **The Three Orders.**

Western Europe 13th - 16th century

- Feudal society and economy
- Formation of state
- Church and society
- Historians' views on decline of feudalism

### **Changing Cultural Traditions**

Europe 14th -17th century

- New ideas and new trends in literature and arts
- Relationship with earlier ideas
- The contribution of West Asia
- Historians' viewpoint on the validity of the notion 'European Renaissance'

### **Displacing Indigenous People**

North America and Australia, 18th to 20th century

- European colonists in North America and Australia
- Formation of White Settler societies
- Displacement and repression of local people
- Historians' viewpoint on the impact of European settlement on indigenous population

### **Paths to Modernization**

East Asia, late 19th to 20th century

- Militarization and economic growth in Japan
- China and the communist alternative
- Historians' Debate on the meaning of modernization

## **BRICKS, BEADS AND BONES**

### **The Harappan Civilization**

- Broad overview: Early urban centers
- Story of discovery: Harappan civilization
- Excerpt: Archaeological report on a major site

## **KINGS, FARMERS AND TOWNS:**

- Early States and Economies (c. 600 BCE-600 CE)
- Broad overview: Political and economic History from the Mauryan to the Gupta period
- Story of discovery: Inscriptions and the Decipherment of the script. Shifts in the Understanding of political and economic history.
- Excerpt: Ashokan inscription and Gupta period land grant

## **KINSHIP, CASTE AND CLASS**

### **Early Society Societies (C. 600 BCE-600 CE)**

- Broad overview: Social Histories: Using the Mahabharata
- Issues in social history, including caste, class, kinship and gender
- Story of discovery: Transmission and publications of the Mahabharat
- Excerpt: from the Mahabharata, illustrating how it has been used by historians.

## **THINKERS, BELIEFS AND BUILDINGS**

### **Cultural Developments (c. 600 BCE - 600 CE)**

- Broad overview: A History of Buddhism: Sanchi Stupa a) A brief review of religious histories of Vedic religion, Jainism, Vaishnavism, Shaivism (Puranic Hinduism) b) Focus on Buddhism.
- Story of discovery: Sanchi stupa. Excerpt: Reproduction of sculptures from Sanchi.

## **THROUGH THE EYES OF TRAVELLERS**

### **Perceptions of Society (tenth to seventeenth century)**

- Broad Overview: outlines of social and cultural life as they appear in traveller's account.
- Story of their writings: A discussion of where they travelled, what they wrote and for whom they wrote.
- Excerpts: from Al Biruni, Ibn Battuta, Francois Bernier.

## **BHAKTI -SUFİ TRADITIONS:**

### **Changes in Religious Beliefs and Devotional Texts (eighth to eighteenth centuries)**

- Broad overview: a. Outline of religious developments during this period saints. b. Ideas and practices of the Bhakti-Sufi
- Story of Transmission: How Bhakti-Sufi compositions have been preserved.
- Excerpt: Extracts from selected Bhakti-Sufi works

## **AN IMPERIAL CAPITAL: VIJAYANAGARA(fourteenth to sixteenth centuries)**

- Broad Over View: New Architecture: Hampi a. Outline of new buildings during Vijayanagar period-temples, forts, irrigation facilities. b. Relationship between architecture and the political system
- Story of Discovery: Account of how Hampi was found.
- Excerpt: Visuals of buildings at Hampi

## **PEASANTS, ZAMINDARS AND THE STATE:**

Agrarian Society and the Mughal Empire (c. sixteenth-seventeenth centuries)

- Broad overview: The Aini-Akbari a. Structure of agrarian relations in the 16th and 17th centuries. b. Patterns of change over the period.
- Story of Discovery: Account of the compilation and translation of Ain I Akbari
- Excerpt: from the Ain-i-Akbari.

## **COLONIALISM AND THE COUNTRYSIDE: Exploring Official Archives**

- Broad overview: Colonialism and Rural Society: Evidence from Official Reports a) Life of zamindars, peasants and artisans in the late 18th century b). Permanent Settlement, Santhals and Paharias
- Story of official records: An account of why official Investigations in to rural societies were undertaken and the types of records and reports produced.
- Excerpts: From Fifth Report

## **REBELS AND THE RAJ: 1857 Revolt and its Representations**

- Broad overview: a. The events of 1857-58. b. Vision of Unity c. How these events were recorded and narrated. Focus: Lucknow
- Excerpts: Pictures of 1857.
- Extracts from contemporary accounts.

## **MAHATMA GANDHI AND THE NATIONALIST MOVEMENT:**

- Civil Disobedience and Beyond Broad overview: a. The Nationalist Movement 1918 - 48. b. The nature of Gandhian politics and leadership.
- Focus: Mahatma Gandhi and the three movements and his last days as “finest hours”
- Excerpts: Reports from English and Indian language newspapers and other contemporary writings.

## **FRAMING THE CONSTITUTION:**

- The Beginning of a New Era Broad overview: The Making of the Constitution an overview: a. Independence and then new nation state. b. The making of the Constitution
- Focus: The Constituent Assembly Debates
- Excerpts: from the debates

### Syllabus for the post of PGT - English

**Subject specific syllabus includes the concepts of NCERT/CBSE syllabus and Text Books (Classes XI & XII), however, the questions will be testing the depth of understanding and application of these concepts at the level of Post- Graduation.**

- Reading: Unseen passage (Factual, descriptive or literary) to assess comprehension, interpretation inference and vocabulary, Unseen case-based passage with verbal/visual inputs like statistical data, charts etc., Note Making and Summarization based on a passage.
- **Creative Writing Skills:** Notice, Formal/Informal Invitation and Reply, Letters based on verbal/visual input, Article/ Report Writing, descriptive and analytical in nature, based on verbal inputs. Classified Advertisements, Poster, Writing a Speech in 120-150 words based on verbal/ visual clues related to some contemporary / age-appropriate topic, Debate on contemporary topical issues based on visual/verbal inputs
- **Grammar:** Questions on Gap filling (Tenses, Clauses), Questions on re-ordering/transformation of sentences.
- The Portrait of a Lady , A Photograph , “We’re Not Afraid to Die... if we can be together, Discovering Tut: the Saga Continues;, The Laburnum Top , The Voice of the Rain , Childhood , The Adventure; Silk Road , Father to Son
- The Summer of the Beautiful White Horse , The Address , Mother’s Day , Birth , The Tale of Melon City
- The Last Lesson , Lost Spring , Deep Water, The Rattrap , Índigo , Poets and Pancakes , The Interview , Going Places , My Mother at Sixty-Six , Keeping Quiet , A Thing of Beauty , A Roadside Stand , Aunt Jennifer’s Tigers, The Third Level ; The Tiger King, Journey to the end of the Earth , The Enemy , On the Face of It , Memories of Childhood, The Cutting of My Long Hair , We Too are Human Beings

विषय -विशेष पाठ्यक्रम में एन सी आर टी / सी बी एस ई पाठ्यक्रम में प्रदत्त एवं कक्षा ११ वीं और १२ वीं की पुस्तकों में अंतर्निहित अवधारणा/संकल्पना समिलित है, हालाँकि प्रश्नों के माध्यम से उपरोक्त अवधारणाओं और अनुप्रयोगों की स्नातकोत्तर स्तर की गहन समझ का आकलन किया जाएगा.

<p>पाठ्यपुस्तक - आरोह-भाग 1, एनसीईआरटी, नईदिल्लीद्वाराप्रकाशित</p> <p>गद्यखंड:</p> <ol style="list-style-type: none"> <li>1. प्रेमचंद: नमक का दरोगा</li> <li>2. कृष्णा सोबती: मियाँ नसीरुद्दीन</li> <li>3. सत्यजित राय: अपू के साथ ढाई साल</li> <li>4. बाल मुकुंद गुप्त: विदाई-संभाषण</li> <li>5. शेखर जोशी: गलता लोहा</li> <li>6. मन्नू भंडारी: रजनी</li> <li>7. कृश्न चंदर:जामुन का पेड़</li> <li>8. जवाहर लाल नेहरू: भारत माता</li> </ol> <p>काव्यखंड:</p> <ol style="list-style-type: none"> <li>1.कबीर : हम तौ एक एक करि जानां।</li> <li>2.मीरा:</li> <li>1.मेरे तो गिरधर गोपाल, दूसरो न कोई</li> <li>2.भवानी प्रसाद मिश्र: घर की याद</li> <li>3.त्रिलोचन: चम्पा काले-काले अच्छर नहीं चीन्हती</li> <li>4.दुष्यंत कुमार: ग़ज़ल</li> <li>5.अक्कमहादेवी: <ul style="list-style-type: none"> <li>• हे भूख! मत मचल</li> <li>• हे मेरेजूही के फूल जैसे ईश्वर;</li> </ul> </li> <li>6.अवतार सिंह पाश: सबसे खतरनाक;</li> <li>7.निर्मला पुतुल: आओ, मिल कर बचाएँ।</li> </ol> <p>सहायक पाठ्यपुस्तक - वितान-भाग 1, एनसीईआरटी, नई दिल्ली द्वारा प्रकाशित</p> <ol style="list-style-type: none"> <li>1.कुमार गंधर्व: भारतीय गायिकाओं में बेजोड़: लतामंगेशकर</li> <li>2.अनुपम मिश्र: राजस्थान की रजत बूँदें</li> <li>3.बेबीहलदार: आलो-आँधारि</li> </ol>	<p>पाठ्यपुस्तक - आरोह-भाग2, एनसीईआरटी, नई दिल्ली द्वारा प्रकाशित</p> <p>काव्यखंड:</p> <p>हरिवंश राय बच्चन: 1. आत्मपरिचय</p> <p>2. एकगीत</p> <p>आलोक धन्वा: पतंग</p> <p>कुँवर नारायण: 1. कविता के बहाने</p> <p>2. बात सीधी थीपर</p> <p>रघुवीर सहाय : कैमरे में बंद अपाहिज</p> <p>शमशेर बहादुर सिंह: उषा</p> <p>सूर्यकांत त्रिपाठी निराला : बादल राग</p> <p>तुलसीदास:</p> <ol style="list-style-type: none"> <li>1.कवितावली (उत्तरकांड से)</li> <li>2.लक्ष्मण-मूर्च्छा और राम का विलाप</li> </ol> <p>फ़िराक़ गोरखपुरी:</p> <ol style="list-style-type: none"> <li>1. रुबाइयाँ</li> </ol> <p>उमाशंकर जोशी :</p> <ol style="list-style-type: none"> <li>1. छोटा मेरा खेत</li> <li>2.बगुलों के पंख</li> </ol> <p>गद्यखंड:</p> <p>महादेवी वर्मा :</p> <p>भक्तिन</p> <p>जैनेंद्र कुमार :बाज़ार दर्शन</p> <p>धर्मवीर भारती : काले मेघा पानी दे</p> <p>फणीश्वर नाथ रेणु: पहलवान की ढोलक</p> <p>हज़ारी प्रसाद द्विवेदी :शिरीष के फूल</p> <p>बाबा साहेब भीमराव आम्बेडकर:</p>
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	<p>1. श्रम विभाजन और जाति-प्रथा</p> <p>2. मेरी कल्पना का आदर्श समाज</p> <p>सहायक पाठ्य पुस्तक- वितान-भाग2, एनसीईआरटी, नई दिल्ली द्वारा प्रकाशित</p> <p>1. मनोहर श्याम जोशी: सिल्वर वैडिंग ;</p> <p>2. आनंद यादव: जूझ</p> <p>3. ओम थानवी: अतीत में दबे पाँव</p>
<p>बिम्ब, अलंकार, छंद तथा काव्य-रूप</p> <p>कोड-मिक्सिंग तथा कोड-स्विचिंग,</p> <p>पद तथा पदक्रम- संज्ञा एवं संज्ञा-भेद, लिंग, वचन, कारक; सर्वनाम एवं सर्वनाम-भेद; विशेषण एवं विशेषण-भेद, प्रविशेषण; क्रिया एवं क्रिया-भेद, वाच्य; अव्यय एवं अव्यय-भेद; निपात,</p> <p>शब्द-भंडार और शब्द निर्माण-शब्दों का वर्गीकरण</p> <p>स्रोत ,उत्पत्ति या इतिहास के आधार पर – तत्सम ,तद्भव,देशज ,आगत( विदेशज ,)संकर</p> <p>रचना के आधार पर – मूल्यारूढ़ शब्द ,व्युत्पन्न शब्द -यौगिक ,योगरूढ़</p> <p>अर्थ के आधार पर – पर्यायवाची ,विलोमार्थी ,एकार्थी ,अनेकार्थी ,श्रुति समभिन्नार्थक शब्द</p> <p>शब्दनिर्माण - उपसर्ग,प्रत्यय,समास,युग्मशब्द, पुनरुक्तशब्द</p>	
<p>3. अभिव्यक्ति और माध्यम, एनसीईआरटी, नई दिल्ली द्वारा प्रकाशित</p> <p>जनसंचार माध्यम</p> <p>पत्रकारिता के विविध आयाम</p> <p>विभिन्न माध्यमों के लिए लेखन</p> <p>पत्रकारीय लेखन के विभिन्न रूप और लेखन प्रक्रिया</p> <p>विशेष लेखन-स्वरूप और प्रकार</p> <p>कैसे बनती है कविता</p> <p>नाटक लिखने का व्याकरण</p> <p>डायरी लिखने की कला</p> <p>कथा-पटकथा</p> <p>कैसे करें कहानी का नाट्य रूपांतरण</p> <p>कैसे बनता है रेडियो नाटक</p> <p>नए और अप्रत्याशित विषयों पर लेखन</p>	

कार्यालयी लेखन और प्रक्रिया

स्ववृत्त लेखन और रोजगार संबंधी आवेदन पत्र

शब्दकोश: संदर्भ ग्रंथों की उपयोगी विधि और परिचय

## Syllabus for the post of PGT -Biotechnology

**Subject specific syllabus includes the concepts of NCERT/CBSE syllabus and Text Books (Classes XI & XII), however, the questions will be testing the depth of understanding and application of these concepts at the level of Post- Graduation.**

**Introduction to Bio-technology:** Historical perspectives, scope and importance, commercial potential , interdisciplinary challenge, a quantitative approach-scale up – stages in commercialization of product and process, the fermenter , aseptic operation. Manufacturing quality control, good manufacturing practices, good laboratory practices, product safety, bio safety principles-environment and health risk , assessment, bio safety regulatory guidelines and controlling agency, environmental law for hazardous drugs , microbes and GMO'S , Biotechnology related issues of Public concern, Bioethics. Marketing, Biotechnology in India and global trends.

**Fundamentals of Biochemical engineering**-Concept of pH , buffer , physical variables , dimensions and units , measurement conventions , physical and chemical properties, data , stoichiometry , errors in data and calculation, absolute and relative un certainty and types of error statistical analysis presentation of experimental data , data analysis , trends , testing mathematical models, goodness to fit , use of graph paper with logarithmic coordination and plotting of data process flow diagrams, material balance, fluid flow and mixing , mass transfer , heat transfer, unit operations, homogenous reactions , microbial growth , substrates utilization and product formation kinetics, reactor engineering – rheology of fermentation fluids , scale up concepts, design of fermenting media, aseptic transfer, various microbial and enzyme reactors, instrumentation in bio reactors.

**Biotechnology and Society**-Public perception of Biotechnology intellectual property, patents, reading a patent, International scenario, National scenario, Varietals protection, ethical issues in agriculture and health care.

**Biochemistry: Biomolecules**- Structure and Dynamics; Thermodynamics: concept of free energy, entropy Building blocks of carbohydrates – sugars and their derivatives , chemical properties of sugar , polysaccharides – glycogen , cellulose, chitin etc. Building blocks of proteins – Amino acids, Chemical properties of amino acids, regulation of amino acid metabolism and inborn errors of metabolism determination of sequencing of amino acids , fragmentation of polypeptide chain , 3D structure of proteins, secondary , tertiary and quaternary structure of proteins, vitamins and enzymes. Lipids –simple fatty acids , Sphingosine, Glycerol and cholesterol and their chemical properties , lipid metabolism and its regulation. Nucleic acids- Nucleotides, chemical properties , optical activities and stereo chemistry of bio molecules, polarimetry , conformations and configuration, RNA, DNA, 3D model of DNA , chromosome structure , circular and super coiled DNA. Biochemical transformations-carbohydrates metabolism-glycolytic path way, krebs cycle, homo fermentative path way. KH , PPP, photosynthesis- light reaction Calvin cycle, nitrogen fixation , nitrogen cycle, nitrogenase , gluconeogenesis, electron transport and oxidative phosphorylation , precursor-product relationship, supramolecular assembly, biomolecular database, biomembranes, structure and function of liposomes and their applications

### Techniques, Instrumentation and principles

Techniques based on molecular weight or size- Centrifugation and ultra centrifugation, gel permeation , osmotic potential. Techniques based on polarity- Ion exchange chromatography, electrophoresis, isoelectric focusing , hydro phobic interaction , partition chromatography. Techniques based on spectroscopy- Colorimetry, UV visible , spectrophotometry, fluorescence , spectroscopy , x-ray crystallography , mass spectrometry , radio isotopes techniques; Techniques based on solubility – Salt precipitation , precipitation with organic solvent.

**Cellular techniques**- Microscopy-LM,TEM,SEM cell sorting , cell fractionation , cell growth determination , electronic particle counter, culture based counting methods **Genetical techniques**- Chromosomal techniques- Staining , banding, pattern, Karyotyping, chromosomal painting. Mutagenic techniques- Bacterial and seed mutagenesis , recombination in bacteria, conjugation, transduction, breeding methods in plants, pedigree analysis, DNA isolation.

**Cell Biology: Cell structure and components**- Cell membrane – composition, Structure, membrane , associated receptors, artificial membrane, membrane proteins, principals of membrane organization, cell junction, membrane lipids. Cell organelles – Golgi bodies, Endoplasmic reticulum, lysosomes, peroxisomes, ribosomes, internalisation of macro molecules , endo and exocytosis , mitochondrial structure and oxidative phosphorylation. Cytoskeleton- Micro tubules , micro filaments, lattice and cytosol ;Nucleus –nuclear envelope , nucleolus , chromosome tissue and organs , evolution and population , speciation , biodiversity , adaptation, natural selection, organization of life, size and complexity , interaction with environment .**Cell growth and development** - Cell division, cell cycles, cell communication and signal transduction , movement, nutrition, gaseous exchange , internal transport, maintaining the internal environment, reproduction, animal and plant development, immune

response, apoptosis, plant-pathogen relation, secondary metabolism, defence strategy in microbes and insects.

## **Genetics and Molecular Biology**

**Principles of Genetics-** Mendelian genetics, role of chromosome in inheritance, multiple alleles , linkage and crossing over , genetic recombination, genetic mapping, gene interaction , sexed linked inheritance , extra nuclear inheritance, quantitative inheritance, genes at the population level, discovery of DNA as genetic material-Griffiths experiment, Hershey and Chase experiment, mutagenesis , types of mutations, genome, chromosome and gene mutations, molecular mechanism of mutation , DNA repair , genetic disorder, transposons, animal and plant breeding.

**Genome function-** Genome organization, sequencing DNA replication, fine structure of gene, from gene to protein, transcription , genetic code , translation, regulation of gene expression, genetic basis of development, genetic of cancer, immuno genetics, evolutionary genetics.

## **Protein and gene manipulation**

**Protein Structure and engineering.**-3D shape of proteins, non covalent bonds, hydrogen bonds, van der waals forces, hydro phobic interaction. Structure function relationships in proteins – Chymotrypsin, molecular disease. protein finger printing, 2D gel electrophoresis, purification of proteins, characterization of proteins , proteins based products, mass spectrometry, blood products and vaccine , therapeutic antibodies and enzymes, hormones and growth factor, regulatory factor , analytical application , industrial enzymes , functional non catalytic proteins, nutraceutical proteins, designing proteins, proteomics, genes and proteins type of proteomics .

**Recombinant DNA Technology** -Tools of recombinant DNA technology, restriction enzymes, making of recombinant DNA , DNA library, introduction of recombinant DNA into host cells-plasmid , cosmid, vectors, lambda, bacteriophage , identification of recombinants , PCR, DNA probes, hybridization techniques , DNA sequencing, site directed mutagenesis, cloning strategies.

**Genomics and Bioinformatics-** Structural and functional genomics, genome sequencing projects, genetic mapping, gene prediction and counting , genome similarity, SNPs and comparative genomics , functional genomics-micro array techniques , fluorescence , in situ hybridization , comparative DNA hybridisation, history of bio informatics, sequences and nomenclature , DNA and protein sequences, information sources-major databases, blast family search tools, resources for gene level sequences , analysis using bio informatics tools.

## **Cell culture technology**

**Microbial cell culture and its applications**-nutrients , energy sources, sterilization procedures, environment for microbial growth, aeration and mixing , equipments for culture-bioreactors, Types of microbial culture, measurement and kinetics of microbial growth, scale up of microbial process, isolation of microbial products, strain isolation and improvement, application of microbial culture technology bioethics.

**Plant Cell culture and applications-** Cell and tissue culture techniques- Nutrient media, types of cultures, plant regeneration pathways, application of cell and tissue culture, gene transfer methods in plants, transgenic plants with beneficial traits, stress tolerance, herbicide tolerance, insect resistance, transgenic plant as bio reactor, diagnostics in agriculture and molecular breeding, morphological and molecular markers , bioethics.

**Animal cell culture and applications-** Primary cell culture, secondary cell culture and lines, types of cell lines , physical environment , osmolality , media , pH temperature cryopreservation, equipments required for animal cell culture, carbon dioxide incubators, Characterisation of cell lines- Scale up of animal culture, applications of animal cell culture- Tissue plasminogen activator, factor VIII , erythropoietin, hybridoma technology, mono clonal antibodies, therapeutic antibodies, stem cell technology- morphological approach, in vitro clonal assay, long term marrow culture, embryonic stem culture, cell and tissue engineering , bioethics in animal genetic engineering.

## **Immunology**

Immune system , molecules of immune system, immuno globulins , MHCs, cytokines, T cell receptor, generation of antibodies and T cell receptor diversity , complement system, humoral and cell mediated immunity, immune regulation, vaccines , hybridoma, immuno deficiencies, AIDS, transplantation immunity and cancer.

## **Applied Biotechnology**

Biotechnology industry , Bioinformatics, molecular technology for diagnosis of genetic disorders, onco viruses and immunity, lymphocyte, homeostasis, viral induced modulation of host immune response, HLA polymorphism, induction and maturation of B cells, safe limits for radiation determined , radiation carcinogenesis.

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## **Subject specific syllabus for TGTs**

### **Direct Recruitment (2022)**

**Subject specific syllabus includes the concepts of NCERT/CBSE syllabus and Text Books (Classes VI to X) as indicated under respective subject headings.**

**However, the questions will be testing the depth of understanding and application of these concepts at the level of Graduation.**

- Mathematics
- Science
- Social Science
- English
- Hindi
- Sanskrit

## Syllabus for the post of TGT - Mathematics

**Subject specific syllabus includes the concepts of NCERT/CBSE syllabus and Text Books (Classes VI to X), however, the questions will be testing the depth of understanding and application of these concepts at the level of Graduation.**

### REAL NUMBERS

- Review of representation of natural numbers, integers, and rational numbers on the number line. Rational numbers as recurring/ terminating decimals. Operations on real numbers.
- Examples of non-recurring/non-terminating decimals. Existence of non-rational numbers (irrational numbers) such as  $\sqrt{2}$ ,  $\sqrt{3}$ , and their representation on the number line. Explaining that every real number is represented by a unique point on the number line and conversely, viz. every point on the number line represents a unique real number.
- Definition of nth root of a real number.
- Rationalization of real numbers of the type  $\frac{1}{a+b\sqrt{x}}$  and  $\frac{1}{\sqrt{x}+\sqrt{y}}$  their combinations where x and y are natural number and a and b are integers.
- Laws of exponents with integral powers. Rational exponents with positive real bases
- Fundamental Theorem of Arithmetic statements after reviewing work done earlier and after illustrating and motivating through examples, Proofs of irrationality of  $\sqrt{2}, \sqrt{3}, \sqrt{5}$

### POLYNOMIALS

- Definition of a polynomial in one variable, with examples and counter examples.
- Coefficients of a polynomial, terms of a polynomial and zero polynomial.
- Degree of a polynomial. Constant, linear, quadratic and cubic polynomials. Monomials, binomials, trinomials. Factors and multiples.
- Zeros of a polynomial. Relationship between zeros and coefficients of quadratic polynomials.
- Remainder Theorem with examples, Factor Theorem.
- Factorization of  $ax^2 + bx + c$ ,  $a \neq 0$  where a, b and c are real numbers, and of cubic polynomials using the Factor Theorem.
- The algebraic expressions and identities. Verification of identities:  
 $(x + y + z)^2 = x^2 + y^2 + z^2 + 2xy + 2yz + 2zx$   
 $(x \pm y)^3 = x^3 \pm y^3 \pm 3xy(x \pm y)$   
 $x^3 \pm y^3 = (x \pm y)(x^2 \mp xy + y^2)$   
 $x^3 + y^3 + z^3 - 3xyz = (x + y + z)(x^2 + y^2 + z^2 - xy - yz - zx)$  and their use in factorization of polynomials.

### LINEAR EQUATIONS IN TWO VARIABLES

Linear equations in one variable. Introduction to the equation in two variables. Focus on linear equations of the type  $ax + by + c = 0$ . Explain that a linear equation in two variables has infinitely many solutions and justify their being written as ordered pairs of real numbers, plotting them and showing that they lie on a line.

## PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

Pair of linear equations in two variables and graphical method of their solution, consistency/inconsistency. Algebraic conditions for number of solutions. Solution of a pair of linear equations in two variables algebraically - by substitution, by elimination. Simple situational problems.

## QUADRATIC EQUATIONS

Standard form of a quadratic equation  $ax^2 + bx + c = 0$ , ( $a \neq 0$ ). Solutions of quadratic equations (only real roots) by factorization, and by using quadratic formula. Relationship between discriminant and nature of roots.

## ARITHMETIC PROGRESSIONS

Arithmetic Progression,  $n$ th term and sum of the first  $n$  terms of A.P. and their application in solving daily life problems.

## COORDINATE GEOMETRY

The Cartesian plane, coordinates of a point, names and terms associated with the coordinate plane, notations. Graphs of linear equations. Distance formula. Section formula (internal division)

## INTRODUCTION TO EUCLID'S GEOMETRY

History - Geometry in India and Euclid's geometry. Euclid's method of formalizing observed phenomenon into rigorous Mathematics with definitions, common/obvious notions, axioms/postulates and theorems. The five postulates of Euclid. Showing the relationship between axiom and theorem, for example: (Axiom) 1. Given two distinct points, there exists one and only one line through them. (Theorem) 2. (Prove) Two distinct lines cannot have more than one point in common.

## LINES AND ANGLES

- If a ray stands on a line, then the sum of the two adjacent angles so formed is 180 degrees and the converse.
- If two lines intersect, vertically opposite angles are equal.
- Lines which are parallel to a given line are parallel.

## TRIANGLES

- Two triangles are congruent if any two sides and the included angle of one triangle is equal to any two sides and the included angle of the other triangle (SAS Congruence).
- Two triangles are congruent if any two angles and the included side of one triangle is equal to any two angles and the included side of the other triangle (ASA Congruence).
- Two triangles are congruent if the three sides of one triangle are equal to three sides of the other triangle (SSS Congruence).
- Two right triangles are congruent if the hypotenuse and a side of one triangle are equal (respectively) to the hypotenuse and a side of the other triangle. (RHS Congruence)
- The angles opposite to equal sides of a triangle are equal.

- The sides opposite to equal angles of a triangle are equal.
- If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.
- If a line divides two sides of a triangle in the same ratio, the line is parallel to the third side.
- If in two triangles, the corresponding angles are equal, their corresponding sides are proportional and the triangles are similar.
- If the corresponding sides of two triangles are proportional, their corresponding angles are equal and the two triangles are similar.
- If one angle of a triangle is equal to one angle of another triangle and the sides including these angles are proportional, the two triangles are similar.

## QUADRILATERALS

- The diagonal divides a parallelogram into two congruent triangles.
- In a parallelogram opposite sides are equal, and conversely.
- In a parallelogram opposite angles are equal, and conversely.
- A quadrilateral is a parallelogram if a pair of its opposite sides is parallel and equal.
- In a parallelogram, the diagonals bisect each other and conversely.
- In a triangle, the line segment joining the mid points of any two sides is parallel to the third side and in half of it and (motivate) its converse.

## CIRCLES

- Equal chords of a circle subtend equal angles at the center and (motivate) its converse.
- The perpendicular from the center of a circle to a chord bisects the chord and conversely, the line drawn through the center of a circle to bisect a chord is perpendicular to the chord.
- Equal chords of a circle (or of congruent circles) are equidistant from the center (or their respective centers) and conversely.
- The angle subtended by an arc at the center is double the angle subtended by it at any point on the remaining part of the circle.
- Angles in the same segment of a circle are equal.
- If a line segment joining two points subtends equal angle at two other points lying on the same side of the line containing the segment, the four points lie on a circle.
- The sum of either of the pair of the opposite angles of a cyclic quadrilateral is  $180^\circ$  and its converse.
- Tangent to a circle at, point of contact
- The tangent at any point of a circle is perpendicular to the radius through the point of contact.
- The lengths of tangents drawn from an external point to a circle are equal.

## AREAS

Area of a triangle using Heron's formula, Area of sectors and segments of a circle. Problems based on areas and perimeter / circumference of the above said plane figures. (In calculating area of segment of a circle, problems should be restricted to central angle of  $60^\circ$ ,  $90^\circ$  and  $120^\circ$ ).



## **SURFACE AREAS AND VOLUMES**

Surface areas and volumes of spheres (including hemispheres) and right circular cones. Surface areas and volumes of combinations of any two of the following: cubes, cuboids, spheres, hemispheres and right circular cylinders/cones

## **STATISTICS**

Bar graphs, histograms (with varying base lengths), and frequency polygons. Mean, median and mode of grouped data

## **PROBABILITY**

Classical definition of probability. Simple problems on finding the probability of an event.

## **TRIGONOMETRY**

Trigonometric ratios of an acute angle of a right-angled triangle. Proof of their existence (well defined); motivate the ratios whichever are defined at  $0^\circ$  and  $90^\circ$ . Values of the trigonometric ratios of  $30^\circ$ ,  $45^\circ$  and  $60^\circ$ . Relationships between the ratios.

## **TRIGONOMETRIC IDENTITIES**

Proof and applications of the identity  $\sin^2 A + \cos^2 A = 1$ . Only simple identities to be given.

## **HEIGHTS AND DISTANCES:**

Angle of elevation, Angle of Depression. Simple problems on heights and distances. Problems should not involve more than two right triangles. Angles of elevation / depression should be only  $30^\circ$ ,  $45^\circ$ , and  $60^\circ$

## Syllabus for the post of TGT - Science

**Subject specific syllabus includes the concepts of NCERT/CBSE syllabus and Text Books (Classes VI to X), however, the questions will be testing the depth of understanding and application of these concepts at the level of Graduation.**

### **Matter-Nature and Behaviour**

Definition of matter; solid, liquid and gas; characteristics - shape, volume, density; change of state melting (absorption of heat), freezing, evaporation (cooling by evaporation), condensation, sublimation.

### **Nature of matter:**

Elements, compounds and mixtures. Heterogeneous and homogenous mixtures, colloids and suspensions. Physical and chemical changes (excluding separating the components of a mixture).

### **Particle nature and their basic units:**

Atoms and molecules, Law of Chemical Combination, Chemical formula of common compounds, Atomic and molecular masses.

### **Structure of atoms:**

Electrons, protons and neutrons, Valency, Atomic Number and Mass Number, Isotopes and Isobars.

### **Chemical reactions:**

Chemical equation, Balanced chemical equation, implications of a balanced chemical equation, types of chemical reactions: combination, decomposition, displacement, double displacement, precipitation, endothermic exothermic reactions, oxidation and reduction.

### **Acids, bases and salts:**

Their definitions in terms of furnishing of  $H^+$  and  $OH^-$  ions, General properties, examples and uses, neutralization, concept of pH scale (Definition relating to logarithm not required), importance of pH in everyday life; preparation and uses of Sodium Hydroxide, Bleaching powder, Baking soda, Washing soda and Plaster of Paris.

### **Metals and nonmetals:**

Properties of metals and non-metals; Reactivity series; Formation and properties of ionic compounds; Basic metallurgical processes; Corrosion and its prevention.

### **Carbon compounds:**

Covalent bonding in carbon compounds. Versatile nature of carbon. Homologous series. Nomenclature of carbon compounds containing functional groups (halogens, alcohol, ketones, aldehydes, alkanes and alkynes), difference between saturated hydrocarbons and unsaturated hydrocarbons. Chemical properties of carbon compounds (combustion, oxidation, addition and substitution reaction). Ethanol and Ethanoic acid (only properties and uses), soaps and detergents.

### **Cell - Basic Unit of life :**

Cell as a basic unit of life; prokaryotic and eukaryotic cells, multi cellular organisms; cell membrane and cell wall, cell organelles and cell inclusions; chloroplast, mitochondria, vacuoles, endoplasmic reticulum, Golgi apparatus; nucleus, chromosomes - basic structure, number.

**Tissues, Organs, Organ System, Organism:**

Structure and functions of animal and plant tissues (only four types of tissues in animals; Meristematic and Permanent tissues in plants).

**Life processes:**

'Living Being'. Basic concept of nutrition, respiration, transport and excretion in plants and animals.

**Control and co-ordination in animals and plants:**

Tropic movements in plants; Introduction of plant hormones; Control and co-ordination in animals: Nervous system; Voluntary, involuntary and reflex action; Chemical co-ordination: animal hormones.

**Reproduction:**

Reproduction in animals and plants (asexual and sexual) reproductive health – need and methods of family planning. Safe sex vs HIV/AIDS. Child bearing and women's health.

**Heredity and Evolution:**

Heredity; Mendel's contribution-Laws for inheritance of traits: Sex determination: brief introduction evolution.

**Motion:**

Distance and displacement, velocity; uniform and non-uniform motion along a straight line; acceleration, distance-time and velocity-time graphs for uniform motion and uniformly accelerated motion, elementary idea of uniform circular motion.

**Force and Newton's laws :**

Force and Motion, Newton's Laws of Motion, Action and Reaction forces, Inertia of a body, Inertia and mass, Momentum, Force and Acceleration.

**Gravitation:**

Gravitation; Universal Law of Gravitation, Force of Gravitation of the earth (gravity), Acceleration due to Gravity; Mass and Weight; Freefall.

**Floatation:**

Thrust and Pressure. Archimedes' Principle; Buoyancy.

**Work, Energy and Power:**

Work done by a Force, Energy, power; Kinetic and Potential energy; Law of conservation of energy).

**Sound:**

Nature of sound and its propagation in various media, speed of sound, range of hearing in humans; ultra sound; reflection of sound; echo.

## **Effects of Current**

Electric current, potential difference and electric current. Ohm's law; Resistance, Resistivity, Factors on which the resistance of a conductor depends. Series combination of resistors, parallel combination of resistors and its applications in daily life. Heating effect of electric current and its applications in daily life. Electric power, Interrelation between P, V, I and R.

## **Magnetic effects of current**

Magnetic field, field lines, field due to a current carrying conductor, field due to current carrying coil or solenoid; Force on current carrying conductor, Fleming's Left Hand Rule, Electric Motor, Electromagnetic induction. Induced potential difference, Induced current. Fleming's Right Hand Rule, Electric Generator, Direct current. Alternating current: frequency of AC. Advantage of AC over DC. Domestic electric circuits.

## **Food Production**

Plant and animal breeding and selection for quality improvement and management; Use of fertilizers and manures; Protection from pests and diseases; Organic farming.

## **Natural Phenomena**

Reflection of light by curved surfaces; Images formed by spherical mirrors, centre of curvature, principal axis, principal focus, focal length, mirror formula (Derivation not required), magnification. Refraction; Laws of refraction, refractive index. Refraction of light by spherical lens; Image formed by spherical lenses; Lens formula (Derivation not required); Magnification. Power of a lens. Functioning of a lens in human eye, defects of vision and their corrections, applications of spherical mirrors and lenses. Refraction of light through a prism, dispersion of light, scattering of light, applications in daily life

## **Our environment:**

Eco-system, Environmental problems, Ozone depletion, waste production and their solutions. Biodegradable and non-biodegradable substances.

## Syllabus for the post of TGT – Social Science

**Subject specific syllabus includes the concepts of NCERT/CBSE syllabus and Text Books (Classes VI to X), however, the questions will be testing the depth of understanding and application of these concepts at the level of Graduation.**

### **Events and Processes:**

#### **I. The French Revolution:**

- French Society During the Late Eighteenth Century
- The Outbreak of the Revolution
- France Abolishes Monarchy and Becomes a Republic
- Did Women have a Revolution?
- The Abolition of Slavery
- The Revolution and Everyday Life

#### **II. Socialism in Europe and the Russian Revolution:**

- The Age of Social Change
- The Russian Revolution
- The February Revolution in Petrograd
- What Changed after October?
- The Global Influence of the Russian Revolution and the USSR

#### **III. Nazism and the Rise of Hitler:**

- Birth of the Weimar Republic
- Hitler's Rise to Power
- The Nazi World view
- Youth in Nazi Germany
- Ordinary People and the Crimes Against Humanity

### **Livelihoods, Economies and Societies:**

#### **IV. Forest Society and Colonialism:**

- Why Deforestation?
- The Rise of Commercial Forestry
- Rebellion in the Forest
- Forest Transformations in Java

#### **V. Pastoralists in the Modern World:**

- Pastoral Nomads and their Movements
- Colonial Rule and Pastoral Life
- Pastoralism in Africa

### **Contemporary India – I**

#### **1. India**

- Location
- Size
- India and the World
- India's Neighbours

## **2. Physical Features of India:**

- Major Physiographic Divisions–Himalayan Mountains, Northern Plains, Peninsular Plateau, Indian Desert, Coastal Plains, Islands

## **3. Drainage:**

- Concept
- Drainage Systems in India
- The Himalayan Rivers-Ganga and Brahmaputra River System
- The Peninsular Rivers- Narmada Basin, Tapti Basin, Godavari Basin, Mahanadi Basin, Krishna Basin, Kaveri Basin
- Lakes
- Role of Rivers in the Economy
- River Pollution

## **4. Climate:**

- Concept
- Climatic Controls
- Factors influencing India's climate –Latitude, Altitude, Pressure and Winds
- The Seasons–Cold Weather Season, Hot Weather Season, Advancing Monsoon, Retreating / Post Monsoons
- Distribution of Rainfall
- Monsoon as a unifying bond

## **5. Natural Vegetation and Wild Life:**

- Types of Vegetation–Tropical Evergreen Forests, Tropical Deciduous Forests, Thorn Forests and Shrubs, Montane Forests, Mangrove Forests
- Wild Life

## **6. Population:**

- Population Size and Distribution–India's Population Size and Distribution by Numbers, India's Population Distribution by Density
- Population Growth and Processes of Population Change–Population Growth, Processes of Population Change/Growth

## **Democratic Politics – I**

### **1. What is Democracy? Why Democracy?**

- What is Democracy?
- Features of Democracy
- Why Democracy?
- Broader Meanings of Democracy

### **2. Constitutional Design:**

- Democratic Constitution in South Africa
- Why do we need a Constitution?
- Making of the Indian Constitution
- Guiding Values of the Indian Constitution

### **3. Electoral Politics:**

- Why Elections?
- What is our System of Elections?
- What makes elections in India democratic?

### **4. Working of Institutions:**

- How is the major policy decision taken?
- Parliament
- Political Executive
- The Judiciary

### **5. Democratic Rights:**

- Life without Rights
- Rights in a Democracy
- Rights in the Indian Constitution
- Expanding scope of rights

## **Economics**

### **1. The Story of Village Palampur:**

- Overview
- Organization of Production
- Farming in Palampur
- Non-farm activities in Palampur

### **2. People as Resource:**

- Overview
- Economic Activities by Men and Women
- Quality of Population
- Unemployment

### **3. Poverty as a Challenge:**

- Overview
- Two typical cases of Poverty
- Poverty as seen by Social Scientists
- Poverty Estimates
- Vulnerable Groups
- Interstate Disparities
- Global Poverty Scenario
- Causes of Poverty
- Anti-Poverty measures
- The Challenges Ahead

### **4. Food Security in India:**

- Overview
- What is Food Security?
- Why Food Security?
- Who are food insecure?
- Food Security in India
- What is Buffer Stock?

- What is the Public Distribution System?
- Current Status of Public Distribution System
- Role of Cooperatives in food security

## **India and the Contemporary World - II**

### **Events and Processes:**

#### **1. The Rise of Nationalism in Europe:**

- The French Revolution and the Idea of the Nation
- The Making of Nationalism in Europe
- The Age of Revolutions: 1830-1848
- The Making of Germany and Italy
- Visualizing the Nation
- Nationalism and Imperialism

#### **2. Nationalism in India:**

- The First World War, Khilafat and Non - Cooperation
- Differing Strands within the Movement
- Towards Civil Disobedience
- The Sense of Collective Belonging

### **Livelihoods, Economies and Societies:**

#### **3. The Making of a Global World:**

- The Pre-modern world
- The Nineteenth Century (1815-1914)
- The Inter war Economy
- Rebuilding a World Economy: The Post-War Era

#### **4. The Age of Industrialization:**

- Before the Industrial Revolution
- Hand Labour and Steam Power
- Industrialization in the Colonies
- Factories Come Up
- The Peculiarities of Industrial Growth
- Market for Goods

### **Everyday Life, Culture and Politics:**

#### **5. Print Culture and the Modern World:**

- The First Printed Books
- Print Comes to Europe
- The Print Revolution and its Impact
- The Reading Mania
- The Nineteenth Century
- India and the World of Print
- Religious Reform and Public Debates
- New Forms of Publication
- Print and Censorship



## Contemporary India – II

### 1. Resources and Development:

- Concept
- Development of Resources
- Resource Planning – Resource Planning in India, Conservation of Resources
- Land Resources
- Land Utilization
- Land Use Pattern in India
- Land Degradation and Conservation Measures
- Soil as a Resource - Classification of Soils, Soil Erosion and Soil Conservation

### 2. Forest and Wildlife

- Conservation of forest and wildlife in India
- Types and distribution of forests and wildlife resources
- Community and Conservation

### 3. Water Resources:

- Water Scarcity and The Need for Water Conservation and Management
- Multi-Purpose River Projects and Integrated Water Resources Management
- Rainwater Harvesting

### 4. Agriculture:

- Types of Farming – Primitive Subsistence, Intensive Subsistence,
- Commercial
- Cropping Pattern – Major Crops, Food Crops other than Grains, Non Food Crops, Technological and Institutional Reforms
- Food Security (excluding impact of globalization on agriculture)

### 5. Minerals and Energy Resources

- What is a mineral?
- Mode of occurrence of Minerals – Where are these minerals found?, Ferrous Minerals, Non-Ferrous Minerals, Non-Metallic Minerals, Rock Minerals
- Conservation of Minerals
- Energy Resources – Conventional Sources of Energy, Non-Conventional Sources of Energy
- Conservation of Energy Resources

### 6. Manufacturing Industries:

- Importance of Manufacturing – Industrial Location (excluding Industry Market Linkage), Agro based Industry (excluding Cotton Textiles, Jute Textiles, Sugar Industry), Mineral based Industries (excluding Iron Steel Industry, Cement Industry), Industrial Pollution and Environmental Degradation, Control of Environmental Degradation

### 7. Life Lines of National Economy:

- Roadways
- Railways
- Pipelines
- Waterways
- Major Seaports

- Airways
- Communication
- International Trade
- Tourism as a Trade

## **Democratic Politics – II**

### **1. Power Sharing:**

- Belgium and Sri Lanka
- Majoritarianism in Sri Lanka
- Accommodation in Belgium
- Why power sharing is desirable?
- Forms of Power Sharing

### **2. Federalism:**

- What is Federalism?
- What make India a Federal Country?
- How is Federalism practiced?
- Decentralization in India

### **3. Gender, Religion and Caste:**

- Gender and Politics - Public/Private division, Women's political representation
- Religion, Communalism and Politics –Communalism, Secular State
- Caste and Politics - Caste inequalities, Caste in politics, Politics in caste

### **4. Political Parties:**

- Why do we need Political Parties? –
- Meaning, Functions, Necessity
- How many parties should we have?
- National Parties
- State Parties
- Challenges to Political Parties
- How can Parties be reformed?

### **5. Outcomes of Democracy:**

- How do we assess democracy's outcomes?
- Accountable, responsive and legitimate government
- Economic growth and development
- Reduction of inequality and poverty
- Accommodation of social diversity
- Dignity and freedom of the citizens

## **Understanding Economic Development**

### **1. Development:**

- What Development Promises – Different People, Different Goals
- Income and Other Goals
- National Development
- How to compare different countries or states?
- Income and other criteria
- Public Facilities
- Sustainability of Development

## **2. Sectors of the Indian Economy:**

- Sectors of Economic Activities
- Comparing the three sectors
- Primary, Secondary and Tertiary Sectors in India
- Division of sectors as organized and unorganized
- Sectors in terms of ownership: Public and Private Sectors

## **3. Money and Credit:**

- Money as a medium of exchange
- Modern forms of Money
- Loan activities of Banks
- Two different Credit situations
- Terms of Credit
- Formal Sector Credit in India
- Self Help Groups for the Poor

## **4. Globalization and the Indian Economy:**

- Production across countries
- Inter linking production across countries
- Foreign Trade and integration of markets
- What is Globalization?
- Factors that have enabled Globalization
- World Trade Organization
- Impact of Globalization in India
- The Struggle for a fair Globalization

## **5. Consumer Right**

## Syllabus for the post of TGT - English

**Subject specific syllabus includes the concepts of NCERT/CBSE syllabus and Text Books (Classes VI to X), however, the questions will be testing the depth of understanding and application of these concepts at the level of Graduation.**

- Who Did Patrick's Homework?, How the Dog Found Himself a New Master?, Taro's Reward, An Indian-American Woman in Space: Kalpana Chawla , A Different Kind of School , Who I Am (Part-1) Fair Play ,The Banyan Tree , A House, A Home, The Kite, The Quarrel, Beauty, Where Do All The Teachers Go ?,The Wonderful Words, Vocation.
- A pact with the Sun (Supplementary Reader) : A tale of two birds,The Friendly Mongoose,The Shepherd's Treasure, Tansen, The Monkey and the Crocodile,The wonder called sleep,A pact with the Sun.
- Three Questions, The Squirrel, A Gift of Chappals, The Rebel, The Shed, Gopal and the Hilsa Fish, The Ashes that Made the Trees Bloom, Chivvy, Quality, Trees, Experts Detectives, Mystery of the talking fan,Invention of Vita Work,Dad and the Cat and the Tree,Meadow Surprises,Garden Shake.
- An Alien Hand (Supplementary Reader) : The Tiny Teacher, Bringing up Kari, Golu Grows a nose , Chandni, The Bear story, A Tiger in the House, An Alien Hand
- The Best Christmas Present in the World, The Tsumani, Glimpses of the Past, Bepin Babu, The Summit Within, The Ant and the Cricket, Geography Lesson, The Last Bargain, The School Boy, This is Jody's Fawn, The Duck and the Kangaroo, A visit to Cambridge, A short Monsoon Diary, On the grasshopper and the Cricket.
- How the Camel Got his Hump, Children at Work, The Selfish Giant, The Treasure Within, Princess September, The Fight, Jalebis.
- The Fun They Had, The Sound of Music, The Little Girl, A Truly Beautiful Mind, The Snake and the Mirror, My Childhood, Reach For The Top, Kathmandu, If I were You , The Road Not Taken, Wind, Rain on The Roof, The Lake Isle of Innisfree,A Legend of The Northland, No Men Are Foreign, On Killing a Tree, A Slumber Did My Spirit Seal,The Lost Child, The Adventures of Toto, Iswaran the Storyteller, In the Kingdom of Fools, The Happy Prince, The Last Leaf, A House is not a Home, The Beggar .
- Topics : A Letter to God, Nelson Mandela - Long Walk to Freedom, Two Stories About Flying, .From the Diary of Anne Frank, Glimpses of India, Mijbil the Otter, Madam Rides the Bus, The Sermon at Benares, The Proposal , Dust of Snow , Fire and Ice , A Tiger in the Zoo, .How to Tell Wild Animals,The Ball Poem, Amanda! ,The Trees,.Fog, The Tale of Custard the Dragon, For Anne Gregory, A Triumph of Surgery, The Thief's Story, The Midnight Visitor, A Question of Trust ,Footprints Without Feet ,The Making of a Scientist, The Necklace ,Bholi, The Book That Saved the Earth
- Grammar : Determiners, linking words, adverbs (place and types), tense forms, clauses, passivation, adjectives (comparative and superlative forms), modal auxiliaries, word order in sentence types, reported speech, Sequence of tenses, non-finites (infinitives, gerunds, participles, complex and compound sentences, phrasal verbs and prepositional phrases, cohesive devices, punctuation(semicolon, colon, dash, hyphen, parenthesis or use of brackets and exclamation mark).

## पाठ्यक्रम - TGT हिन्दी

विषय -विशेष पाठ्यक्रम में एन सी आर टी / सी बी एस ई पाठ्यक्रम में प्रदत्त एवं कक्षा ६ वीं और १० वीं की पुस्तकों में अंतर्निहित अवधारणा/संकल्पना समिलित है, हालाँकि प्रश्नों के माध्यम से उपरोक्त अवधारणाओं और अनुप्रयोगों की स्नातक स्तर की गहन समझ का आकलन किया जाएगा।

### खण्ड – क

1. हिन्दी भाषा और व्याकरण
2. वर्णव्यवस्था -वर्ण, मात्रा, अक्षर
3. वर्तनी तथा वर्तनी व्यवस्था – वर्ण स्तर पर, शब्द स्तर पर, वाक्य स्तर पर; वर्तनी की सामान्य अशुद्धियाँ
4. सन्धि भेद-स्वर सन्धि, व्यंजन सन्धि, विसर्ग सन्धि, हिन्दी की अपनी संधियाँ।
5. शब्द-भंडार और शब्द निर्माण-शब्दों का वर्गीकरण  
स्रोत, उत्पत्ति या इतिहास के आधार पर – तत्सम, तद्भव, देशज, आगत (विदेशज), संकर  
रचना के आधार पर – मूल या रूढ़ शब्द, व्युत्पन्न शब्द- यौगिक, योगरूढ़  
अर्थ के आधार पर – पर्यायवाची, विलोमार्थी, एकार्थी, अनेकार्थी, श्रुति समभिन्नार्थक शब्द  
शब्द निर्माण - उपसर्ग, प्रत्यय, समास, युग्म शब्द, पुनरुक्त शब्द
6. पद व्यवस्था - शब्द और पद  
पद के भेद –संज्ञा एवं संज्ञा-भेद, लिंग, वचन, कारक; सर्वनाम एवं सर्वनाम-भेद; विशेषण एवं विशेषण-भेद, प्रविशेषण; क्रिया एवं क्रिया-भेद, वाच्य; अव्यय एवं अव्यय-भेद
7. पद- परिचय - संज्ञा, सर्वनाम, विशेषण, क्रिया, अव्यय
8. वाक्य-व्यवस्था –  
वाक्य के अंग- उद्देश्य, विधेय;  
वाक्य रचना- वाक्य के अनिवार्य तथा ऐच्छिक घटक; पदबंध और उपवाक्य;  
वाक्य के प्रकार-रचना के आधार पर; अर्थ के आधार पर; वाक्य रचना की अशुद्धियाँ, वाक्य रूपांतरण
10. मुहावरे और लोकोक्तियाँ
11. अलंकार- अनुप्रास, पुनरुक्ति, यमक, उपमा, उत्प्रेक्षा, रूपक, अतिशयोक्ति, मानवीकरण

### खण्ड -ख

#### अवबोधन तथा रचनात्मक अभिव्यक्ति

-12पाठ-बोधन – अपठित पद्य एवं गद्य

#### 13. लिखित रचना –

अ -पत्र लेखन-प्रार्थना पत्र, आवेदन पत्र, बधाई पत्र, शुभकामना पत्र, निमंत्रण पत्र, संवेदना पत्र, शिकायती पत्र, समस्या-सम्बन्धी (प्रकाशनार्थ) पत्र

आ-अनुच्छेद लेखन, स्ववृत्त लेखन, संवाद लेखन, विज्ञापन लेखन, सूचना लेखन

<p><b>पाठ्यपुस्तक- वसंत, भाग-1</b></p> <ol style="list-style-type: none"> <li>1. वहचिड़ियाजो</li> <li>2. बचपन</li> <li>3. नादान दोस्त</li> <li>4. चाँद से थोड़ी सी गप्पें</li> <li>5. अक्षरों का महत्व</li> <li>6. पार नज़र के</li> <li>7. साथी हाथ बढ़ाना</li> <li>8. ऐसे – ऐसे</li> <li>9. टिकट अलबम</li> <li>10. झांसी की रानी</li> <li>11. जो देखकर भी नहीं देखते</li> <li>12. संसार पुस्तक है</li> <li>13. मैं सबसे छोटी होऊँ</li> <li>14. लोकगीत</li> <li>15. नौकर</li> <li>16. वन के मार्ग में</li> <li>17. साँस-साँस में बांस</li> </ol> <p><b>पूरक पाठ्य पुस्तक – बाल राम कथा</b></p> <ol style="list-style-type: none"> <li>1. अवध पुरी में राम</li> <li>2. जंगल और जनकपुर</li> <li>3. दो वरदान</li> <li>4. राम का वनगमन</li> <li>5. चित्रकूट में भरत</li> <li>6. दंडक वन में दस वर्ष</li> <li>7. सोने का हिरन</li> <li>8. सीता की खोज</li> <li>9. राम और सुग्रीव</li> <li>10. लंका में हनुमान</li> <li>11. लंका विजय</li> <li>12. राम का राज्याभिषेक</li> </ol>	<p><b>पाठ्य पुस्तक- वसंत, भाग-2</b></p> <ol style="list-style-type: none"> <li>1. हम पंछी उन्मुक्त गगन के</li> <li>2. दादीमाँ</li> <li>3. हिमालय की बेटियाँ</li> <li>4. कठपुतली</li> <li>5. मिठाई वाला</li> <li>6. रक्त और हमारा शरीर</li> <li>7. पापा खो गए</li> <li>8. शाम एक किशान</li> <li>9. चिड़िया की बच्ची</li> <li>10. अपूर्व अनुभव</li> <li>11. रहीम के दोहे</li> <li>12. कंचा</li> <li>13. एक तिनका</li> <li>14. खान पान की बदलती तस्वीर</li> <li>15. नीलकण्ठ</li> <li>16. भोर और बरखा</li> <li>17. वीर कुँवर सिंह</li> <li>18. संघर्ष के कारण मैं तुनक मिजाज हो गया</li> <li>19. आश्रम का अनुमानित व्यय</li> <li>20. विप्लव गायन</li> </ol> <p><b>पूरक पाठ्य पुस्तक – बाल महाभारत कथा</b></p>	<p><b>पाठ्यपुस्तक- वसंत, भाग-3:</b></p> <ol style="list-style-type: none"> <li>1. ध्वनि</li> <li>2. लाख की चूड़ियाँ</li> <li>3. बस की यात्रा</li> <li>4. दीवानों की हस्ती</li> <li>5. चिट्ठियों की अनूठी दुनिया</li> <li>6. भगवान के डाकिए</li> <li>7. क्या निराश हुआ जाए</li> <li>9. यह सब से कठिन समय नहीं</li> <li>10. कबीर की साखियाँ</li> <li>11. कामचोर</li> <li>12. जब सिनेमा ने बोलना सीखा</li> <li>13. सुदामा चरित</li> <li>14. जहाँ पहिया है</li> <li>15. अकबरी लोटा</li> <li>16. सूर के पद</li> <li>17. पानी की कहानी</li> <li>18. बाज़ और साँप</li> <li>19. टोपी</li> </ol> <p><b>पूरकपाठ्यपुस्तक - भारतकीखोज</b></p> <ol style="list-style-type: none"> <li>1. अहमद नगर का किला</li> <li>2. तलाश</li> <li>3. सिंधु घाटी सभ्यता</li> <li>4. युगों का दौर</li> <li>5. नयी समस्याएँ</li> <li>6. अंतिम दौर: एक</li> <li>7. अंतिम दौर: दो</li> <li>8. तनाव</li> <li>9. दो पृष्ठ भूमियाँ-भारतीय और अंग्रेजी</li> </ol>
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<p><b>पाठ्यपुस्तक- क्षितिजभाग1-</b></p> <ol style="list-style-type: none"> <li>1.दो बैलों की कथा</li> <li>2.ल्हासा की ओर</li> <li>3.उपभोक्तावाद की संस्कृति</li> <li>4.साँवले सपनों की याद</li> <li>5.नाना साहब की पुत्री देवी मैना को भस्म कर दिया गया</li> <li>6.प्रेम चंद के फटे जूते</li> <li>7.मेरे बचपन के दिन</li> <li>8.एक कुत्ता और एक मैना</li> <li>9.साखियाँ एवं सबद</li> <li>10.वाख</li> <li>11.सवैये</li> <li>12.कैदी और कोकोला</li> <li>13.ग्रामश्री</li> <li>14. चंद्र गहना से लौटती बेर</li> <li>15.मेघ आए</li> <li>16.यमराज की दिशा</li> <li>17.बच्चे काम पर जा रहे हैं</li> </ol> <p><b>पूरक पाठ्य पुस्तक-कृतिका भाग - 1</b></p> <ol style="list-style-type: none"> <li>1. इस जल प्रलय में</li> <li>2.मेरे संग की औरतें</li> <li>3.रीढ़ की हड्डी</li> <li>4.माटी वाली</li> <li>5.किस तरह आखिरकार मैं हिन्दी में आया</li> </ol>	<p><b>पाठ्य पुस्तक- क्षितिज भाग -2</b></p> <ol style="list-style-type: none"> <li>1.पद- ऊधौ तुम हो अति बड़भागी, मन की मन ही माँझ रही, हमारे हरि हरिल की लकरी, हरि है राजनीति पढ़ि आए</li> <li>2. राम-लक्ष्मण परशुराम संवाद</li> <li>3.सवैया - पाँयनिनूपुर ....., कवित - डारद्रुमपलना ....., कवित - फटकिसिलानि ...</li> <li>4.आत्मकथ्य</li> <li>5.उत्साह, अटनहीं रही है</li> <li>6.यह दंतुरित मुसकान , फसल</li> <li>7.छाया मत छूना</li> <li>8.कन्या दान</li> <li>9.संगतकार</li> <li>10.नेता जी का चश्मा</li> <li>11.बाल गोबिन भगत</li> <li>12.लखनवी अंदाज़</li> <li>13.मानवीयकरुणा की दिव्य चमक</li> <li>14.एक कहानी यह भी</li> <li>15.स्त्री-शिक्षा के विरोधी कुतर्कों का खंडन</li> <li>16.नौबतखाने में इबादत</li> <li>17.संस्कृति</li> </ol> <p><b>पूरक पाठ्यपुस्तक-कृतिका भाग -2</b></p> <ol style="list-style-type: none"> <li>1.माता का अँचल;</li> <li>2.ज़ॉर्ज पंचम की नाक;</li> <li>3.साना साना हाथ जोड़ि .....</li> <li>4.एही ठैया झुलनी हेरानी हो रामा;</li> <li>5.मैं क्यों लिखता हूँ।</li> </ol>	
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## पाठ्यक्रम - TGT संस्कृत

विषय-विशेष पाठ्यक्रम में एन सी आर टी / सी बी एस ई पाठ्यक्रम में प्रदत्त एवं कक्षा ६ वीं और १० वीं की पुस्तकों में अंतर्निहित अवधारणा/संकल्पना समिलित है, हालाँकि प्रश्नों के माध्यम से उपरोक्त अवधारणाओं और अनुप्रयोगों की स्नातक स्तर की गहन समझ का आकलन किया जाएगा.

रुचिरा, प्रथमोभागः, एन सी ई आर टी, नई दिल्ली द्वारा प्रकाशित

शब्दपरिचय:-I; शब्दपरिचय:-II; शब्दपरिचय:-III; विद्यालयः ; वृक्षाः ; समुद्रतटः ; बकस्यप्रतीकारः ; सूक्तिस्तबकः ; क्रीडास्पर्धा ; कृषिकाःकर्मवीराः ; दशमः त्वम् असि ; विमानयानं रचयाम ; अहह आः च ; कारक-विभक्ति-परिचयः, शब्दरूपाणि(अकारान्त-उकारांत पुँल्लिङ्गशब्दरूपाणि), धातुरूपाणि(लट्लकारे प्रथमपुरुषः, सर्वनामपदपरिचयः, संख्याज्ञानम् ।

रुचिरा, द्वितीयोभागः, एनसीईआरटी, नईदिल्ली द्वारा प्रकाशित

सुभाषितानि ; दुर्बुद्धिः विनश्यति ; स्वावलम्बनम् ; पण्डिता रमाबाई ; सदाचारः ; सङ्कल्पः सिद्धिदायकः ; त्रिवर्णःध्वजः ; अहमपि विद्यालयं गमिष्यामि; विश्वबन्धुत्वम्; समवायो हि दुर्जयः ; विद्याधनम् ; अमृतं संस्कृतम् ; लालनगीतम् ; परिशिष्टवर्णविचारः, कारकम्, शब्दरूपाणि, धातुरूपाणि च

रुचिरा, तृतीयोभागः, एनसीईआरटी, नईदिल्ली द्वारा प्रकाशित

सुभाषितानि ; बिलस्य वाणी न कदापि मे श्रुता ; डिजीभारतम् ; सदैव पुरतो निधेहि चरणम् ; कण्टकेनैव कण्टकम् ; गृहं शून्यं सुतां विना ; भारतजनताहम् ; संसारसागरस्य नायकाः ; सप्तभगिन्यः ; नीतिनवनीतम् ; सावित्रीबाईफुले ; कः रक्षति कः रक्षितः ; क्षितौ राजते भारतस्वर्णभूमिः ; आर्यभटः ; परिशिष्टमसन्धिः, कारकम्, शब्दरूपाणि(मातृ-अस्मद्-युष्मद्-स्वस्-राजन् च) ; धातुरूपाणि(पठ्-खाद्-इच्छ् च धातवः) ; प्रत्ययः(तुमुन्-क्त्वा-ल्यप् च) I

शेमुषी, प्रथमोभागः, एनसीईआरटी, नईदिल्ली द्वारा प्रकाशित

**भारतीवसन्तगीतिः** ; स्वर्णकाकः ; गोदोहनम् ; सूक्तिमौक्तिकम् ; भ्रान्तोबालः ; सिकतासेतुः ; जटायोः शौर्यम् ; पर्यावरणम् ; वाङ्मनः प्राणस्वरूपम् व्याकरणवीथिः, सन्धिः (स्वरः-दीर्घः, गुणः, वृद्धिः, यण्, अयादि ; व्यंजन-जश्त्वसंधिः, 'म्' स्थाने अनुस्वारः, ; विसर्गसंधिः- विसर्गस्य उत्त्वम्-रत्वम्) ; शब्दरूपाणि (बालक-कवि-साधु-पितृ-लता-नदी-मातृ-राजन-भवत्-विद्वस्-अस्मद्-युष्मद्-तत्-इदम्-किम्) धातुरूपाणि (पठ्-गम्-वद्-भू-क्रीड्-नी-दृश्-शक्-ज्ञा-अस्-कृ-दा-क्री-श्रु-पा-सेव्-लभ् ) ; कारकविभक्तयः ; प्रत्ययाः (क्त्वा-तुमुन्-ल्यप्-क्तवतु-शतृ-शानच्-क्त) ; संख्याज्ञानम् ; उपसर्गाः (द्वाविंशतिः ; अव्ययानि (स्थानबोधकानि:-अत्र-तत्र-अन्यत्र-सर्वत्र-यत्र-एकत्र-उभयत्र ; कालबोधकानि:-यदा-तदा-सर्वदा-एकदा-पुरा-अधुना-अद्य-श्वः-हयः ; प्रश्नबोधकानि:-किम्-कुत्र-कति-कदा-कुतः-कथम्-किमर्थम् ; अन्यानि:-च-अपि-यदि-तर्हि-यथा-तथा-सम्यक्-एव ) ; रचनाप्रयोग, ; पत्रलेखनं



शेमुषी, द्वितीयोभागः, एनसीईआरटी, नईदिल्ली द्वारा प्रकाशित

शुचिपर्यावरणम् ; बुद्धिर्बलवती सदा; शिशुलालनम् ; जननीतुल्यवत्सला ; सुभाषितानि ; सौहार्दप्रकृतेः  
शोभा ; विचित्रःसाक्षी ; सूक्तयः अन्योक्तयः  
व्याकरणवीथिः,

सन्धिः:(व्यंजन-वर्गीयप्रथमवर्णस्य तृतीयवर्णे परिवर्तनं, प्रथमवर्णस्य पञ्चमवर्णे परिवर्तनम् ; विसर्गसंधिः-  
विसर्गस्य उत्त्वम्-रत्वम्, विसर्गलोपः, विसर्गस्य स्थाने स्-श्-ष् ) ; अव्ययः:(उच्चैः-च-श्वः-हयः-अद्य-अत्र-तत्र-  
यत्र-कुत्र-इदानीम्-अधुना-सम्प्रति-साम्प्रतं-यदा-तदा-कदा-सहसा-वृथा-शनैः-अपि-कुतः-इतस्ततः-यदि-तर्हि-यावत्-  
तावत्),

प्रत्ययः (तद्धिताः-मतुप्-ठक्-त्व-तल् ; स्त्रीप्रत्ययौ-टाप्-डीप्), समासः (तत्पुरुषः-विभक्तिः, बहुब्रीहिः,  
अव्ययीभावः-अनु,उप,सह,निर्,प्रति,यथा, द्वन्द्वः-केवलम् इतरेतरः), वाच्यपरिवर्तनम् (केवलं लट्लकारे-  
कर्तृ,कर्म,क्रिया), रचनाप्रयोग, समयः , अशुद्धिः संशोधनं ; पत्रलेखनं

## **A. Subject specific syllabus for TGTs**

### **Direct Recruitment (2022)**

- Art Education
- Physical & Health Education
- Work experience

## **B. Subject specific syllabus**

### **Direct Recruitment (2022)**

- Librarian

The questions will be testing the depth of understanding and application of the concepts at the level of Graduation/Diploma.

## Syllabus for the post of TGT - Art Education

The questions will be testing the depth of understanding and application of the concepts at the level of Graduation.

### DRAWING AND PAINTING

#### HISTORY OF INDIAN ART

##### **I. Art of Indus Valley (Harappan and Mohenjo-daro) (2500 B.C. to 1500 B.C.)**

###### (1) Introduction

- (i) Period and Location.
- (ii) Extension: In about 1500 miles
  - (a) Harappa & Mohenjo-daro (Now in Pakistan)
  - (b) Ropar, Lothal, Rangpur, Alamgirpur, Kali Bangan, Banawali and Dhauwala Veera (in India)

###### (2) Study of following Sculptures and Terracottas:

- (i) Dancing girl (Mohenjo-daro)  
Bronze, 10.5 x 5 x 2.5 cm.  
Circa 2500 B.C.  
(Collection : National Museum, New Delhi).
- (ii) Male Torso (Harappa)  
Stone, 9.2 x 5.8 x 3 cms.  
Circa 2500 B. C.  
(Collection : National Museum, New Delhi).
- (iii) Mother Goddess (Mohenjo-daro) terracotta, 22 x 8 x 5 cm. Circa 2500 B.C.  
(Collection : National Museum, New Delhi).

###### (3) Study of following Seal:

- (i) Bull (Mohenjo-daro)  
Stone, 2.5 x 2.5 x 1.4 cm.  
Circa 2500 B.C.  
(Collection : National Museum, New Delhi).

###### (4) Study of following Decoration on earthen wares:

- (i) Painted earthen-ware (Jar) Mohenjo-daro  
(Collection : National Museum, New Delhi).

##### **II. Buddhist, Jain and Hindu Art.**

(3<sup>rd</sup> century B.C. to 8<sup>th</sup> century A.D.)

- (1) General Introduction to Art, during Mauryan, Shunga, Kushana & Gupta Period:
- (2) Study of following

###### Sculptures:

- (i) Lion Capital from Sarnath (Mauryan period)  
Polished sand stone,  
Circa 3<sup>rd</sup> Century B.C.  
(Collection: Sarnath Museum, U.P.)
- (ii) Chauri Bearer from Didar Ganj (Mauryan period)  
Polished sand – stone  
Circa 3<sup>rd</sup> Century B.C.  
(Collection: Patna Museum, Bihar)

- (iii) Bodhisattva head from Taxila (Gandhara Period)  
Stone, 27.5 x 20 x 15 c.m.  
Circa 2<sup>nd</sup> Century A.D.  
(Collection: National Museum, New Delhi)
  - (iv) Seated Buddha from Katra Tila  
Mathura – (Kushan Period)  
(Collection: Mathura Museum)
  - (v) Seated Buddha from Sarnath (Gupta Period)  
Stone  
Circa 5<sup>th</sup> Century AD  
(Collection: Sarnath Museum, U.P.)
  - (vi) Jain Tirathankara (Gupta period)  
Stone  
Circa 5<sup>th</sup> Century AD  
(Collection at State Museum, Lucknow U.P.)
- (3) Introduction to Ajanta  
Location, period, No. of caves, Chaitya and Vihara, Paintings and Sculptures subject matters and techniques etc.
- (4) Study of following  
Painting & Sculpture:
- (i) Padmapani Bodhisattva (Ajanta Cave No. I)  
Mural Painting  
Circa 5<sup>th</sup> Century A.D.
  - (ii) Mara Vijay (Ajanta Cave No. 26)  
Sculpture in stone  
Circa 5<sup>th</sup> Century A.D.

### III. Temples Sculpture, Bronzes and Indo-Islamic Architecture

Artistic aspects of Indian Temples

(6<sup>th</sup> Century A.D. to 13<sup>th</sup> Century A.D.)

- (1) Introduction to Temple Sculpture  
(6<sup>th</sup> Century A.D. to 13<sup>th</sup> Century A.D.)
- (2) Study of following Temple-Sculptures;
  - (i) Descent of Ganga (Pallava period, Mahabalipuram Tamilnadu), Stone Circa 7<sup>th</sup> Century A.D.
  - (ii) Ravana Shaking Mount Kailash (Rashtrakuta period, Ellora,
  - (iii) Trimurti (Elephanta, Maharashtra)  
Stone  
Circa 9<sup>th</sup> Century A.D.
  - (iv) Lakshmi Narayana (Kandariya Mahadev Temple) (Chandela; Period, Khajuraho, M.P.)  
Circa 10<sup>th</sup> Century A.D.
  - (V) Cymbal Player Sun Temple (Ganga Dynesty, Konark, Orissa) Circa 13<sup>th</sup> Century A.D.
  - (vi) Mother & Child (Vim la-Shah Temple, Solanki Dynesty, Dilwara, Mount Abu, Rajasthan) White marble.  
Circa 13<sup>th</sup> Century A.D.
- (3) Bronzes
  - (i) Introduction to Indian Bronzes
  - (ii) Method of casting (solid and hollow)
- (4) Study of following south Indian Bronzes:
  - (i) Nataraj (Thanjavur Distt., Tamilnadu)

Chola period (12<sup>th</sup> Century a.D.) (Collection:  
National Museum, New Delhi)

(ii) Devi (Uma)

Chola Period(12<sup>th</sup> Century a.D.)  
(Collection: National Museum, New Delhi)

(5) Artistic Aspects of the Indo-Islamic Architecture  
(i) Introduction

(6) Study of following architectures:

(i) Qutab Minar, Delhi

(ii) Taj Mahal, Agra

(iii) Gol Gumbaz of Bijapur

#### IV. The Rajasthani and Pahari Schools of Miniature painting (16<sup>th</sup> Century A.D to 19<sup>th</sup> Century A.D.)

Introduction to Indian Miniature Schools: Western-Indian, Pala, Rajasthani, Mughal,  
Central India, Deccan and Pahari.

(A) The Rajasthan; Schools

(1) Origin and Development

(2) Schools-Mewar, Bundi, Jodhpur, Bikaner, Kishangarh and Jaipur

(3) Main features of the Rajasthani & Pahari Schools.

(4) Study of the following Rajasthani Paintings:

Title	Painter	School
Maru-Ragini	Sahibdin	Mewar
Raja Ajniruddha Singh Heera	Utkal Ram	Bundi
Chaugan Players	Dana	Jodhpur
Krishna on swing	Nuruddin	Bikaner
Radha (Bani – Thani)	Nihal Chand	Kishangarh
Bharat meets Rama at Chitrakut	Guman	Jaipur

(B) The Pahari Schools:

(1) Origin and development

(2) Schools-Basohli and Kangra

(3) Main features of the Pahari School

(4) Study of the following pahari Paintings

Title	Painter	School
Krishna with Gopies		Basohli
Raga Megha		Kangra

#### V. The Mughal and Deccan Schools of Miniature Painting (16<sup>th</sup> Century AD to 19<sup>th</sup> Century A.D.)

The Mughal School

(A) (1) Origin and development

(2) Main features of the Mughal School

(3) Study of the following Mughal paintings

Title	Painter	School
Krishna lifting mount	Goverdhan	Miskin Akbar
Babur crossing the river sone	Jaganath	Akbar
Jahangir holding the picture of Madona	Abul Hassan	Jahangir
Falcon on a bird nest	Ustad Mansoor	Jahangir
Kabir and Raidas	Ustad Faquirullah Khan	Shahjahan
Marriage procession of Dara Shikoh	Haji Madni	Provincial Mughal(Oudh)

(B) The Deccan School

- (1) Origin and development
- (2) Main features of the Deccan School
- (3) Study of the following Deccan paintings

Title	Painter	School
Raga Hindola		Ahmednagar
Chand Bibi Playing Polo(Chaugan)		Gol Konda

**VI. The Bengal school and the Modern trends in Indian Art**

- (A)
- (1) A. New Era in Indian Art- an introduction  
B. Study of the following painting
    - (i) Rama Vanquishing the pride of the ocean-Raja Ravi Verma
  - (2) Evolution of the Indian national Flag (First – 1906, Middle – 1921 and Final 1947 stages): Study of the form and the colour scheme
- (B)
- (1) Introduction to the Bengal School of painting
    - (i) Origin and development of the Bengal School
    - (ii) Main Features of the Bengal school
  - (2) Contribution of Indian artists in the struggle for National Freedom Movement
  - (3) Study of the following paintings of the Bengal School
    - (i) Journey's End – Rabindranath Tagore
    - (ii) Parthasarthi – Nandlal Bose
    - (iii) Radhika – M.a.R. Chughtai
- (C) The Modern Trends in Indian Art
- Introduction
- (1) Study of the following Paintings:
- (i) Magician-Gaganendranath Tagore
  - (ii) Mother and child-Jamini Roy
  - (iii) Woman face-Rabindranath Tagore
  - (iv) Tree Girls-Amrita Sher Gill
- (2) Study of the following pieces of Sculpture:
- (i) Triumph of labour- D.P. Roychowdhury
  - (ii) Santhal Family-Ramkinker Vaish
- (3) Study of the following work of contemporary Indian Art'
- A Paintings
- (i) Mother Teresa-M.F. Hussain.
  - (ii) Birth of Poetry- K.K. Hebbar
  - (iii) Gossip- N.S. Bendre
  - (iv) Diagonal- Tyeb Mehta
- B Graphic Prints
- (i) Whirl Pool-Krishna Reddy
  - (ii) Children-Somnath Hore
  - (iii) Devi-Jyoti Bhatt
  - (iv) Of Walls-Anupam Sud
  - (v) Man, Woman and Tree K.G. Lakshman Goud

C        Sculptures

- (i)        Standing Woman-Dhanraj Bhagat
- (ii)       Cries Un-heard-Amar nath Sehgal
- (iii)      Ganesha-P.V. Jankiram
- (iv)      Figure- sankho Chaudhuri
- (v)      Chatturmukhi – Aekka Yada Giri Rao

Note:                    The names of artists and their art work as listed above are only suggestive and in no way exhaustive.

## **Syllabus for the post of TGT - Physical & Health Education**

**The questions will be testing the depth of understanding and application of the concepts at the level of Graduation.**

### **1. Concept of Physical Education**

Meaning and definition of physical education its aim and objectives, modern concept and scope of physical education need and importance of physical education , place of physical education in the total education process.

### **2. Physiological aspects of physical education**

Effect of exercise on :

Muscular system, circulatory system , respiratory system , Digestive system

### **3. Psychological Aspects of Physical Education**

Definition of Psychology and sports psychology , achievement and motivation and motivation in sports, sportsmanship and sports ethics

### **4. Physical Fitness and Wellness**

Meaning and importance of physical fitness and wellness, components of physical fitness and wellness , factors affecting physical fitness and wellness , principles of physical fitness development , mean of fitness development , aerobic activities – jogging , cycling calisthenics and Rhythmic exercises, participation in Games and sports , circuit Training.

### **5. Training Methods**

Meaning and concept of training warming up limbering down and their importance methods of training strength Development –Isometric, and Isokinetic Exercises, methods of Endurance Development-Continuous method, Interval Training and Fartlek, Methods of speed Development –Acceleration Runs and pace races.

### **6. Sociological Aspects of Physical Education**

Meaning of sociological and its Importance in physical education and sports. Games and sports as man IS cultural Heritage. Development of leadership qualities and group dynamics.

7. History of the game/sport (anyone game/sport of students choice), latest general rules of the game/sport (anyone game/sport of students choice), measurement of play field and specification of sport equipment, Fundamental skills of the game/port, Related sports terminologies , Important tournaments and venues, sports personalities, sports awards.



8. Health Education

Concepts and objectives of Health Education, Importance of Health Education, Principles of Health Education, Importance of Community participation for health promotion and welfare of individual, family and community.

9. Communicable Diseases

Meaning of communicable Diseases, Essential conditions for communicable Diseases to occur and disease process, common alert signals indicating on set of communicable Diseases , Mode of transmission, common symptoms and prevention of spread (transmission) of AIDS, Hepatitis B and Hepatitis C

10. Contemporary Health Problems

Abuse of alcohol, tobacco and drugs and the effects of abuse on individual, family and community. Effect of alcohol, tobacco and drugs on sportsperson, eating habits that cause obesity and its effect on health of individual

11. Health living

Concept of environment , scope of environment – living environment , work place environment and environment for leisure activities, Essential element of healthful environment - safe water, low level of noise , clean air, sanitary surrounding, low levels of radioactive radiations and absence of hazards responsible for accidents in (i) home and neighborhood n rural and urban areas (ii) school and work place (iii) during leisure time activities recreation and prevention of accidents related to transportation swimming and water sports, Disaster preparedness and health care during disasters.

12. Family Health Education

Meaning and functions of family and its importance as a social institution, needs and problems of adolescents and their management , Human reproduction – menstruation, conceptional and prenatal care, problems associated with pre-marital sex and teenage pregnancies , Preparation of marriage, Role of Parents in child care.

13. Prevention and first aid for common sports injuries

Soft Tissue injuries – sprain and strain , Bone Injuries, Joint Injuries.

## **Syllabus for the post of TGT - Work Experience**

**The questions will be testing the depth of understanding and application of the concepts at the level of Diploma.**

### **(1) Circuit Fundamentals**

Zero Reference Level - Chassis Ground - Ohm's Law - Formula Variations of Ohm's Law - Graphical Representation of Ohm's Law - Linear Resistor - Non-linear Resistor - Cells in Series and Parallel - Conventional Problems

### **(2) Resistive Circuits**

Series Circuit - Characteristics of a Series Circuit - The Case of Zero IR Drop - Polarity of IR Drops - Total Power - Series Aiding and Series Opposing Voltages - Proportional Voltage Formula in a Series Circuit Series Voltage Dividers - 'Opens' in a Series Circuit - 'Shorts' in a Series Circuit - Parallel Circuits - Laws of Parallel Circuits Special Case of Equal Resistances in all Branches - Special Case of Only Two Branches Any Branch Resistance - Proportional Current Formula - 'Opens' in a Parallel Circuit - 'Shorts' in a Parallel Circuit - Series-Parallel Circuits Analyzing Series Parallel Circuits - 'Opens' in Series-Parallel Circuits 'Shorts' in SeriesParallel Circuits - Voltage Division in a Complex Series-Parallel Circuit - Conventional Problems

### **(3) Kirchhoff's Laws**

General - Kirchhoffs Current Law Kirchhoffs Voltage Law - Determination of Algebraic Sign - Assumed Direction of Current Flow - Conventional Problems.

### **(4) Network Theorems**

General - Superposition Theorem - Ideal Constant-Voltage Source - Ideal Constant-current Source - Thevenin's Theorem - How to Thevenize a Circuit? - Norton's Theorem - How to Nortonise a Given Circuit - Maximum Power Transfer Theorem - Conventional Problems

### **(5) Passive Circuit Elements**

General - Resistors - Resistor Types - Wire-wound Resistors - Carbon Composition Resistors - Carbon Film Resistors - Cermet Film Resistors .Metal Film Resistors - Power Rating - Value Tolerance - Variable Resistors - Potentiometers and Rheostats - Fusible Resistors - Resistor Colour Code - Resistance Colour Bands - Resistors under Ten Ohm - Resistor Troubles - Checking Resistors with an Ohmmeter - Inductor - Comparison of Different Cores - Inductance of an Inductor - Another Definition of Inductance - Mutual Inductance - Coefficient of Coupling - Variable Inductors - Inductors in Series or Parallel without M - Series Combination with N - Stray Inductance - Energy Inductance - Energy Stored in a Magnetic Field - DC Resistance of a Coil - Troubles in Coils - Reactance Offered by a Coil - Impedance Offered by a Coil - Q-Factor of a Coil - Capacitors - Capacitor Connected to a Battery -Capacitance-Factors Controlling Capacitance - Types of Capacitors - Fixed Capacitors - Variable Capacitors - Voltage Rating of Capacitors - Stray Circuit Capacitance Leakage Resistance - Capacitors in Series - Two Capacitors in Series Capacitor's in Parallel - Two Capacitors in Parallel - Energy stored in e Capacitor - Troubles in Capacitors - Checking Capacitors with Ohmmeter - Charging of a Capacitor - Capacitor Connected Across an AC Source Capacitive Reactance

### **(6) Energy Sources**

Primary and Secondary Cells - Cell and Battery - Voltage and Current of a Cells - Cell life - Different Types of Dry Cells - Carbon Zinc Cell Alkaline Cell - Manganese Alkaline Cell - NickelCadmium Cell - Mercury Cell - Silver Oxide Cell - Lead Cells - Battery Rating - Testing Dry Cells - Photoelectric Devices - Photovoltaic Cell - Solar Cell Conventional Problems

### **(7) Magnetism and Electromagnetism**

Magnetic Materials- Ferrites - Types of Magnets - Demagnetizing or Degaussing -Magnetic Shielding - Magnetic Terms and Units - Ohm's Law for Magnetic Circuit - Transformer - Transformer Working - Transformer Impedance - Can a Transformer Operate on DC ? - RF Shielding - Autotransformer - Impedance Matching - Conventional Problems.

### **(8) A.C. Fundamentals**

Introduction - Types of Alternating Waveforms - The Basic AC Generator -Some Definitions - Characteristics of a Sine Wave - Audio an ,Radio Frequencies - Different Values of Sinusoidal Voltage and Current - Phase of an AC - Phase Difference - Vector Representation of an Alternating Quantity - AC Through Pure Resistance Only • AC Through Pure Inductance Only - AC Through Pure Capacitance Only - Non-sinusoidal Waveforms - Harmonics -Conventional Problems

### **(9) Series A.C. Circuits**

R-L Circuit - Q Factor of a Coil - Skin Effect - IR•C Circuit - Coupling Capacitor - R-L-C Circuit - Resonance in an R-L-C Circuit - Resonance Curve - Main Characteristics of Series Resonance - Bandwidth of a Tuned Circuit - Sharpness of Resonance - Tuning - Tuning Ratio - RaGio Tuning Dial- Parallel Resonance -Convectional Problem

### **(10) Time Constant**

Rise and Fall of Current In pure Resistance - Time :Constant at an R-L Circuit • Circuit Conditions - Inductive Kick - Time Constant of an RC circuit - Charging and Discharging of a Capacitor Decreasing Time Constant - Flasher -: Puke Response of an RC Circuit - Effect of Large and Short Time Constants - Square voltage Wave Applied to Short A. RC Circuit - Square Voltage Wave Applied to Long A, E.O circuit - Conventional Problems

### **(11) Timing Circuits and Filters**

What-is. a Tuning Circuit ? - Tuned Circuit - Operating Characteristics of a Tuning Circuit - Resonance - Actual Series Resonance - Is it Series or Parallel Resonance ? - Tuned Transformers - Double Tuned Transformers - Parallel Circuit - Coupled Circuits – Simple Coupled Circuits - Coefficient of Coupling - Filters Filter Definitions - Types of Filter Circuits - Low-pass Filter – High pass Filter - Bandpass Filter – Band stop Filter - Multisection Filter Circuits - Uses of Filters - Conventional Problems

### **(12) Solid State Physics**

Definition of Matter - Crystalline Solids - Unit Cell - atoms of Matter - Atom and Molecule - Atomic Structure - Atomic Number (Z) Atomic mass Number (A) - Electron Orbits or shells - Electron Distribution of Different Atoms Electron Sub orbits or Subshells - Valence Electrons Orbital Energy. - Normal, Excited and Ionized Atom. - Orbital Energies in hydrogen Atom - Energy Levels in an Isolated At W- Energy Bands in Solids - Bonds in Solids - Valence and Conduction Bands - Conduction in Solids - Hole Formation and its Movement Conductors, Semiconductors and Insulators - Types of Semiconductors - Intrinsic Semiconductors Extrinsic Semiconductors - Majority and Minority Charge Carriers - Mobile Charge Carriers and Immobile Torts - Drift Current in Good Conductors Drift Current in Intrinsic Semiconductors - Intrinsic Conduction -Conventional Problems

### **(13) The P-N Junction**

The P-N Junction - Formation of Depletion Layer Junction or Barrier Voltage (V<sub>B</sub>) - Effect of Temperature on Barrier Voltage - Forward Biased P-N Junction - Forward V/I Characteristics -Reverse Biased P-N Junction - Reverse Saturation Current (I<sub>s</sub> or I<sub>0</sub>) - Reverse V/ I Characteristic Combined Forward and Reverse V/I Characteristics - Junction Breakdown - Junction Capacitance

### **(14) P-N Junction Diode**

P-N Junction Diode - Diode Ratings or Specifications - Diode Testing The Ideal Diode -The Real Diode - Diode Circuits with DC and A Voltage Sources - Diode Fabrication- Grown Junction - Alloy Junction Diffused Junction Epitaxial Junction - Point Contact Junction - Clippers and Campers - Clippers - Some Clipping Circuits - Clampers Summary of Clamping Circuits - Conventional Problems Questions.

### **(15) Special Diodes**

Zener Diode - Voltage Regulation Zener Diode as Peak Clipper - Meter Protection – Tunneling Effect - Tunnel Diode - Tunnel Diode Oscillator Varactor - PIN Diode - Schottky Diode - Step Recovery Diode Thermistors -Conventional Problems

### **(16) Optoelectronic Devices**

Light Emitting Diode (LED) - Photoemissive Devices - Photomultiplier Tube - Photovoltaic Devices - Bulk Type Photoconductive Cells - Photodiodes -P-N Junction Photodiode - PIN Photodiode - Avalanche Photodiode

### **(17) DC Power Supplies**

Introduction - Unregulated Power Supply - Regulated Power Supply Steady and Pulsating DC Voltages - Rectifiers Half-wave Rectifier Full-wave Rectifier - Full-wave Bridge Rectifier - Filters - Series Inductor Filter - Shunt Capacitor Filter - Effect of Increasing Filter Capacitance - LC Filter - The CLC or Pi Filter - Bleeder Resistor - Voltage Regulation Zener Diode Shunt Regulator - Transistor, Series Voltage Regulator - Controlled Transistor Series Regulator - Transistor Shunt Voltage Regulator Transistor Current Regulator - Voltage Dividers - Complete Power Supply - Voltage Multipliers - Half-wave Voltage Doubler - Full-wave Voltage Doubler - Voltage Tripler and Quadrupler Circuits - Troubleshooting Power Supplies - Controlled Rectification - Output Waveforms for Different Firing Angles - Output Voltage and Current Values in Controlled Rectifiers Average Values for FW Controlled Rectifier - Silicon Controlled Rectifier (SCR) - Pulse Control of SCR - 90° Phase- Control of SCR - 180° Phase Contr,gi of SCR - SCR Controlled Circuit - UJT Controlled Circuit Conventional Problems

### **(18) The Basic Transistor**

The Bipolar Junction Transistor - Transistor Biasing -Important Biasing Rule - Transistor Currents - Summing Up - Transistor Circuit Configurations - CB Configuration - CE Configuration -Relations between  $\alpha$  and  $\beta$  - CC Configuration - Relations between Transistor Currents - Leakage Currents in a Transistor - Thermal Runaway - Conventional Problems

### (19) Transistor Characteristics and Approximations

Transistor Static Characteristics - Common Base Test Circuit - Common Base Static - Characteristics - Common Emitter Test Circuit - Common Emitter Static Characteristics - Common Collector Static Characteristics - Different Ways of Drawing Transistor Circuits - Common Base Formulas Common Emitter Formulas - Common Collector Formulas - The Beta Rule - Importance of  $V_{ce}$  - Cut-off and Saturation Points - Normal DC Voltage Transistor Indications - Transistor Fault Location - Solving Universal Stabilization Circuit - Notation for Voltages and Currents - Increase / Decrease Notation - Applying AC to a DC Biased Transistor - Transistor AC/DC Analysis - Conventional problems

### (20) Load Lines and DC Bias Circuits

DC Load Line - Q-point and Maximum Undistorted Output - Need for Biasing a Transistor - Factors Affecting Bias Variations - Stability Factor - Beta Sensitivity - Stability Factor for CB and OF Circuits - Different Methods for Transistor Biasing - Base Bias - Base Bias with Emitter Feedback - Base Bias with Collector Feedback - Base Bias with Collector and Emitter Feedbacks - Voltage Divider Bias - Load Line and Output Characteristics - AC Load Line - Conventional Problems'

### (21) Transistor Equivalent Circuits and Mode

General DC Equivalent Circuit - AC Equivalent Circuit - equivalent Circuit of a CB Amplifier - Effect of Source Resistance  $R_S$  on Voltage Gain - Equivalent circuit of a CE Amplifier - Effect of Source Resistance  $R_S$  - Equivalent Circuit of a CC Amplifier - Low-frequency Model or Representation - General - T-Model - Formulas for T-Model - Equivalent of a CB Circuit - Equivalent of a CB Circuit - T-Equivalent of a CE Circuit What are h-parameters? - The h-parameter Formulas for Notation for Transistors - The h-parameters of an Ideal Transistor -, The h-parameters of an Ideal CB Transistor - The h-parameters of an Ideal CE, Transistor - Approximate Hybrid Equivalent Circuits Typical Values of Transistor h-parameters - Hybrid Formulas for Transistor Amplifier - Approximate Hybrid Formulas - Conventional Problems

### (22) Single- Stage Transistor Amplifiers

Classification of Amplifiers - Common Base (CB) Amplifier - Various Gains of a CB Amplifier - Characteristics of a CB Amplifier - Characteristics of a CE Amplifier - Common Collector (CC) Amplifier - Various Gains of a CC Amplifier - Characteristics of a CC Amplifier - Uses - Comparison of Amplifier Configurations - Amplifier Classification Based on Biasing Condition - Graphic Representation Class A Amplifiers - Power Distribution in a class A Amplifier - Power Rectangle - Power Efficiency Maximum AC Power in Load - Transformer-coupled, Class A Amplifier Class B Amplifier - Power Relations for Class B Operation - Maximum Values - Class -B Push -Pull Amplifier - Crossover Distortion - Power Efficiency of Push-Pull Amplifiers - Complementary Symmetry Push-Pull Class-B Amplifier - Class C Amplifier - Tuned Amplifier - Distortion in Amplifier - Non-linear Distortion - Intermodulation Distortion - Frequency Distortion - Phase or Delay Distortion - Noise

### (23) Multistage Amplifiers

General - Amplifier Coupling - RC-Coupled Two stage Amplifier - Advantages of RC Coupling } Impedance-Coupled Two -stage Amplifier - Advantages of Impedance Coupling - Transformer - coupled Two Stage Amplifier - Advantages of Transformer Coupling - Frequency Response - Applications - Direct- coupled Two- stage Amplifier Using Similar Transistors - Direct-coupled Amplifier Using Complementary Symmetry of Two Transistors - Darlington Pair - Advantages of Darlington Pair - Comparison between Darlington Pair and Emitter Follower - Special Features of a Differential Amplifier - Common Model Input - Differential Amplifier - Conventional problems

### (24) Decibels and Frequency Response

The Decibel System - Other Expressions for Power Gain - Voltage and Current Levels - Characteristics of the Decibel System - Value of 1 dB Zero Decibel Reference Level - Variations In Amplifier Gain with Frequency - Changes in Voltage and Power Levels - Causes of Gain Variation.: Miller Effect - Cut-off Frequencies of Cascaded Amplifiers - Transistor Cut-off Frequencies - Alpha Cut-off Frequency - Beta Cut-off Frequency - The  $f_t$  of a Transistor - Relation Between  $f_a, f_b$  and  $f_t$  Gain-Bandwidth Product - Conventional Problems

### (25) Feedback Amplifier

Feedback Amplifiers - Principal of Feedback Amplifiers - Advantages of Negative Feedback - Gain Stability - Decreased Distortion - Increased Bandwidth - Forms of Negative Feedback - Shunt- derived Series-fed Voltage Feedback - Current -Series Feedback Amplifier - Voltage-shunt Negative Feedback Amplifier - Current -shunt Negative Feedback Amplifier - Conventional Problems.

## **(26) Field Effect Transistor**

What is a FET? Junction FET (JEFT) – Static Characteristics of a JFET – JFET Drain Characteristic with  $V_{GS} = 0$  – JFET Characteristic with External Bias – Transfer Characteristic – Small Signal JFET Parameters DC Biasing of a JFET – DC Load Line – Common Source JFET

Amplifier - JFET on an IC Chip - Advantages of FETs - MOSFET or IGFET DE MOSFET - Schematic Symbols for a DE MOSFET - Static Characteristics of a DE MOSFET - Enhancement only N-channel MOSFET Transfer Characteristic - FETs as Switches - FET Applications - MOS-FET Handling

## **(27) Breakdown Devices**

What are Breakdown Devices? Uni junction Transistor - UJT Relaxation Oscillator - Silicon Controlled Rectifier -  $C_{10}^\circ$  Phase Control - Theft Alarm - Triac - Diac - Silicon Controlled Switch (SCS)

## **(28) Sinusoidal Oscillators**

What is an Oscillator? - Comparison between an Amplifier and an Oscillator - Classification of Oscillators - Damped and Undamped Oscillations - The Oscillatory Circuit - Frequency of Oscillatory Current - Frequency Stability of an Oscillator - Essentials of a Feedback LC Oscillator - Tuned Base Oscillator - Tuned Collector Oscillator - Tuned Drain Oscillator (FET) - Hartley Oscillator - FET Hartley Oscillator - Colpitts Oscillator - Clapp Oscillator - FET Colpitts Oscillator - Crystals - Crystal Controlled Oscillator - Transistor Pierce Crystal Oscillator - FET Pierce Oscillator - Phase Shift Principle - Phase Shift Oscillator - Wien Bridge Oscillator

## **(29) Non-sinusoidal Oscillators**

Non-sinusoidal Waveforms - Classification of Non-sinusoidal Oscillators Pulse Definitions - Basic Requirements of a Sawtooth Generator - UJT Sawtooth Generator - Multi-vibrators (MV) - Uses of Multi-vibrators - Astable Multi-vibrator - Mono-stable Multi-vibrator (MMV) - Bi-stable Multi-vibrator (BMV) - Schmitt Trigger - Transistor Blocking Oscillator

## **(30) Modulation and DeModulation**

Introduction - What is a Carrier Wave? - Radio Frequency Spectrum Sound - Need for Modulation - Radio Broadcasting - Modulation Methods of Modulation - Amplitude Modulation - Per cent Modulation Upper and Lower Side Frequencies - Upper and Lower Sidebands - Mathematical Analysis of a Modulated Carrier Wave - Power Relations in an AM Wave - Forms of Amplitude Modulation - Generation of SSB - Methods of Amplitude Modulation - Block Diagram of an AM Transmitter - Modulating Amplifier Circuit - Frequency Modulation - Frequency Deviation and Carrier Swing - Modulation Index - Deviation Ratio - Per cent Modulation - FM Sidebands - Modulation index and Number of Sidebands - Mathematical Expression for FM Wave - Demodulation or Detection - Essentials of AM Detection - Diode Detector for AM Signals - Transistor Detectors for AM Signals - FM Detection - Quadrature Detector - Frequency Conversion - Super heterodyne AM Receiver - FM Receiver - Comparison between AM and FM - The Four Fields of FM - Conventional Problems

## **(31) Integrated Circuits**

Introduction - What is an Integrated Circuit? - Advantages of ICs - Drawbacks of ICs - Scale of Integration - Classification of ICs by Structure Comparison between Different ICs - Classification of ICs by Function Linear Integrated Circuits (LICs) - Digital Integrated Circuits - IC Terminology - How Monolithic ICs are Made? - IC Symbols - Fabrication of IC Components - Complete Monolithic Integrated Circuits - Popular Applications of ICs MOS Integrated Circuits - What is an OP-AMP? OP-AMP Symbol - Polarity Conventions - Ideal Operational Amplifier - Virtual Ground and Summing Point - Why  $V_i$  is Reduced to almost Zero? - OP-AMP Applications - Linear Amplifier - Unity Follower - Adder or Summer - Subtractor - Integrator - Differentiator - Comparator

## **(32) Number Systems**

Number of Systems - The Decimal Number System - Binary System Binary to Decimal Conversion - Binary Fractions - Double-D add Method - Decimal to Binary Conversion - Shifting the Place Point - Binary Operations - Binary Addition - Binary Subtraction - Complement of a Number - 1's Complement Subtraction - 2's Complement Subtraction - Binary Multiplication - Binary Division - Shifting a Number to Left or Right - Representation of Binary Numbers as Electrical Signals - Octal Number System - Octal to Decimal Conversion - Decimal to Octal Conversion - Binary to Octal Conversion - Octal to Binary Conversion - Advantages of Octal Number System, Hexadecimal Number System - How to Count beyond F in Hex Number System? - Binary to Hexadecimal conversion - Hexadecimal to Binary Conversion - Conventional Problems.

## **(33) Logic Gates**

Definition - Positive and Negative Logic - The OR Gate - Equivalent Relay Circuit of an OR Gate - Diode OR Gate - Transistor OR Gate OR Gate Symbolizes Logic Addition - Three Input OR Gate - Exclusive OR Gate - The AND Gate - Equivalent Relay Circuit of an AND Gate. Diode AND Gate - Transistor AND Circuit - AND Gate Symbolizes Logic Multiplication - The NOT Gate - Equivalent Circuits for a NOT Gate The NOT Operation - Buffered Gates The NOR Gate - NOR Gate is a Universal Gate - The NAND Gate - NAND gate is a Universal Gate The XNOR Gate - Logic Gates at a Glance - Adders and Subtractors Half Adder - Full Adder - Parallel Binary Adder - Half Subtractor - Full Subtractor - Conventional Problems

### **(34) Boolean Algebra**

Introduction - Unique Feature of Boolean Algebra - Lay of Boolean Algebra - Equivalent Switching Circuits - De Morgans Theorems - Duals - Conventional Problems

### **(35) Logic Families**

Main Logic Families Saturated and Non-saturated Logic Circuits - Characteristics of Logic Families - RTL Circuit - DTL Circuit - TTL Circuits - TTL Subfamilies - ECL Circuit - I<sup>2</sup>L Circuit - MOS Family - PMOS Circuit - NMOS Circuit - CMOS Circuit

### **(36) Transducer**

What is a Transducer? - Classification of Transducers • Classification based on Electrical Principle Involved - Resistive Position Transducer - Resistive Pressure Transducer - Inductive pressure Transducer - Capacitive Pressure Transducer - Self-generating Inductive Transducers - Linear Variable Differential Transformer (LVDT) - Piezoelectric Transducer - Strain Gauge Temperature Transducers - Resistance Temperature Detectors - Thermistor - Thermocouples - Ultrasonic Temperature Transducers - photoelectric Transducers - Various Types of Microphones - Carbon Microphone Ribbon Microphone - Moving-Coil (Me) Microphone - Crystal Microphone - Ceramic Microphone - Capacitor Microphone - The Electret Microphone The Loudspeaker

### **(37) Electronic Instruments**

Introduction - Analog and Digital Instruments - Function of Instruments - Electronic versus Electrical Instruments - Essentials of an Electronic Instrument - Measurement Standards - The Basic Meter Movement - Characteristics of Moving Coil Meter Movement - Variations of Basic Meter Movement - Converting Basic Meter to DC Ammeter - Multi range Meter - Measurement of Current - Converting Basic Meter to DC Voltmeter Multi range DC Voltmeter - Loading Effect of a Voltmeter - Ohmmeter The Multimeter - Rectifier Type AC Meter Electronic Voltmeters - The Direct Current VTVM - Comparison of VOM and VTVM - Direct Current PET VM - Electronic Voltmeter for Alternating Currents - The Digital Voltmeter (DVM) - Cathode Ray Oscilloscope (CRO) - Cathode Ray Tube (CRT) - Deflection Sensitivity of a CRT - Normal Operation of a CRO Triggered and Non-triggered Scopes - Dual Trace CRO - Dual Beam CRO - Storage Oscilloscope - Sampling CRO - Digital Readout CRO - Lissajous Figures - Frequency Determination with Lissajous Figures - Applications of a CRO

## **Syllabus for the post of - Librarian**

The questions will be testing the depth of understanding and application of the concepts at the level of Graduation.

### **I. Foundation of Library & Information Science.**

#### 1. Library as an Social Institution

- Social & Historical foundations of Library.
  - Different types of libraries- Academic, Public, Special –their distinguishing features and functions.
  - Role of U.G.C. for development of Academic libraries.
  - Role in Library of formal and informal education.
- Shivaji University, Kolhapur

#### 2. Normative Principles of Lib. & Inf. Science

- Five Laws of Library Science.
- Implications of five laws in Lib. & Inf. Science
- Development of Libraries with special reference to India, Baroda Public Library system
- Library Co-operation Resource Sharing and Library Networking.

#### 3. Laws relating to Libraries & Information.

- Library legislation need and essential features.
- Library legislation in India.
- Maharashtra Public Library Act.
- Press and registration act & Delivery of Books act (Public Library).
- Copyright act, Intellectual Property rights.

#### 4. Library and information Profession

- Attribution of profession.
- Librarianship as a profession.
- Professional ethics.
- Professional associations & their role.
- National & International Library Associations- FID, IFLA, LA, ILA, ALA, IASLIC etc.
- Professional education & research.

#### 5. Promoters of Library & Information services

- National level promoters- RRRLF.
- International level promoters- UNESCO

#### 6. Public relations & Extension activities

- Definition
- facets and programs.
- publicity & extension, Out reach activities.
- Library path finders (Guides)
- Factors affecting Library development, Literacy, publishing, Book Trade.

### **II. Knowledge Organization, Information Processing & Retrieval.**

#### 1. Universe of Knowledge

- Structure and attributes.
- Modes of formation of subjects.
- Different types of subjects.
- Universe of subjects as mapped in different schemes of classification.

#### 2. Bibliographic description

- Catalogue purpose, Structure and types physical forms including OPAC filling rules.
- Normative Principles of cataloguing.

- Overview of principles and practice in document description.
- Current trends in Standardization, description and exchange.
- Standard codes of cataloguing.

### 3. Methods of Knowledge Organization

- General theory of Library Classification.
- Normative principles of classification and their application.
- Species of Library Classification.
- Standard Schemes of Classifications and their features, CC, DDC, UDC.
- Notation: Need, Functions, Characteristics
- Design and development of schemes of Library Classification, Standard sub-division Index.
- Trends in Library Classification.

### 4. Subject Classification

- Principles of Subject Classification.
- Subject heading lists and their feature.

## III. **Information Technology: Basic**

### 1. Information Technology

- Definition, Need, Scope and Objectives.

### 2. Computer Basic (Hardware)

- Introduction to Computers
- Overview of Historical Development of Computers.
- Generations of Computers, Classification of Computers.
- Essential Components of Computer system.

### 3. Computer Architecture-Organization of Computer

- Input and Output devices- Keyboard, Scanner, OCR, Printers, Monitor

### 4. Software.

- Operating systems: Single & Multi User Systems, Basic features of MS-DOS, MS Windows, Linux, UNIX, Windows NT etc.
- Programming Languages: Concepts and Tools
- Algorithm & Flowcharting.

### 5. Word Processors, Spread Sheet etc.

### 6. DBMS Package

- Familiarity with DBASE, FOXPRO, CDS/ISIS, SOUL, MS Access (Basic features)

### 7. Computer application to library & Information work - House keeping operations

### 8. Communication Technology

- Communication Technology Basic Concepts
- Networking: Basic Concepts.
- Internet

## IV. **Management of Libraries & Information Centres/Institutions**

### 1. Management

- Concepts, definition and scope.



- Management styles and approaches.
- Management schools of thought.
- Functions and principles of Scientific Management.

## 2. Human Resource Management

- Organizational structure.
- Delegation, Communication and Participation.
- Job Description and Analysis, Job evaluation.
- Inter-personal relation.
- Recruitment procedures.
- Motivation, group Dynamics.
- Training and Development.
- Disciplines and Grievances.
- Performance Appraisal.

## 3. Financial Management

- Resources Mobilization
- Budgeting Techniques and Methods PPBS, Zero Based Budgeting etc.
- Budgetary Control.
- Cost effectiveness and Cost Benefit analysis.
- Outsourcing.

## 4. Reporting

- Types of reports, Annual report-compilation, Contents and style.
- Library Statistics etc.

## 5. System Analysis and Design

- Library as a system
- Project Management PERT/COM
- Decision Tables.
- Performance evaluation standards, MIS.
- Performance Measurement, reengineering, Time and Motion Study
- SWOT ( Strength Weakness Opportunities Threat)
- DFD (Data Flow Diagram)

## 6. Total Quality Management (TQM)

- Definition, Concept, Element
- Quality Audit, LIS related standards.
- Technology Management.

## 7. Library House Keeping Operations.

- Different sections of Library & Information Center and their functions.
- Collection Development and Management Policies Procedures.
- Book Ordering (Acquisition)
- Technical Processing.
- Serials Control, Circulation Control, Maintenance etc.
- Stock Verification- Policies and Procedures.
- Evaluation and Weeding.
- Archiving-conservation-Preservation.
- Restoration including Print, Non-Print and Electronic Materials.

## 8. Planning

- Concept, Definition, Need and Purpose, Types.
- Policies and Procedures, MBO
- Building and Space management in Libraries and Information Centers.
- Library Building, Interior & Exterior, Furniture, Equipment's, Standards & Types.
- Risk Management, Contingency Management.

- Planning of related Infrastructure, Library Standards.
- 9. Management of change.
  - concept of change.
  - changes in Procedures, Methods, Tools and Techniques.
  - Problems of Incorporating Change.
  - Techniques of Managing Change.

## **V. Information Sources & Services**

1. Reference and information sources.
  - Documentary Sources of Information, Print, Non-Print including Electronic: Special features, Scope, types
  - Nature, Characteristic, Utility and evaluation of different types of Information sources: Physical formats, Authority, Content, Utility.
  - Non-Documentary Information Sources.
  - Reference Sources Categories, Primary, Secondary & Tertiary Information Sources.(Encyclopedia, Dictionary, Periodical, Thesis, Books, Year book, Patents, Trade literature, standards, Monographs, Reference Books, Year Books, Almanac, Atlas, Abstracting & Indexing periodicals, Bibliographies, Handbooks etc.)
  - Internet as a Source of Information.
2. Reference Service.
  - Concept, Definition, Need, Scope and trends.
  - Reference Interview and Search Techniques.
3. Information Services and Products
  - Information services and Products.
  - Information services concepts, Definition, Need and trends.
  - Need, Techniques and Evaluation of Alerting services (CAS &SDI)
  - Bibliographic, Referral, Document Delivery and Translation Services.
4. Information System and their Services.
  - Study of National, International and Commercial Information Systems and Services- Background, their Services and Products.

## **VI. Library Users**

1. Techniques of Library and Information Centres Survey. - Proforma method.
  - Interview method.
  - Records analysis method.
2. Information users and their information Needs
  - Categories of Information users.
  - Information needs definition and models.
  - Information seeking behaviour.
3. User Education
  - Goals and Objectives level, Techniques and Methods, Evaluation of Users Education Programmes.
4. User Studies.
  - Methods and techniques of User studies.
  - Evaluation of User studies.
5. User Orientation Programmes:
  - Conventional and modern Techniques: Study tour, Newsletters, Handbooks, Leaflets, Powerpoint Presentation, Websites etc.

# **Subject specific syllabus for PRTs**

## **Direct Recruitment (2022)**

**Subject specific syllabus includes the concepts of NCERT/CBSE syllabus and Text Books (Classes I - V) as indicated under respective subject headings.**

**However, the questions will be testing the depth of understanding and application of these concepts at the level of Senior Secondary (upto class XII)**

### **English:**

Grammar: Nouns, pronouns, adjectives, adverbs, is, am, are, has, have, tense forms (Simple present and present continuous, simple past and past continuous), expressing future (will and be going to), articles, this, that, these, those (as determiners and empty subjects), question words, an, or, but, punctuation marks (full stop, comma, question mark and inverted commas), possessive adjectives, prepositions

### **हिन्दी**

व्याकरण: संज्ञा, विशेषण और वचन की पहचान और व्यावहारिक प्रयोग, गणित के पाठ्यक्रम पाठ्यक्रम के अनुरूप हिन्दी में संख्याएँ, सनयुक्ताक्षरों की पहचान, पर्याय और विलोम (स्तरानुकूल), सर्वनाम और लिंग की पहचान, विशेषण का संज्ञा के साथ सुसंगत प्रयोग, वचन वचन का प्रयोग, क्रिया, काल और कारक चिन्हों की पहचान, शब्दों के संदर्भ में लिंग का प्रयोग प्रयोग

### **Mathematics:**

Geometry: SHAPES & SPATIAL UNDERSTANDING, SOLIDS AROUND us,  
Numbers: DEVELOPING A SENSE OF NUMBERNESS, COUNTING AND OPERATIONS OF NUMBERS, ADDITION AND SUBTRACTION, MULTIPLICATION, DIVISION, MENTAL ARITHMETIC, FRACTIONAL NUMBERS, Money, Measurement, Length, weight, Capacity (Volume), Time, Data Handling, Patterns.

### **Environmental Science (EVS):**

FAMILY AND FRIENDS, FOOD, SHELTER, WATER, TRAVEL, THINGS WE MAKE AND DO

## **Syllabus for the post of PRT - Music**

### **Science of Music and Studies of Shruties**

Vibration and frequency; pitch and its relation and vibrator, Vocal and Instrumental ranges of sound; Amplitude, Timber, Qualities and musical and unmusical overtones (Swayambhu-Swar); consonance and Dissonance; Main types of chords; Absorption, Echo; Reverberation and Resonance of sound, concept of Shruti (different Opinions on it). Placement of suddha and Vikrit Swars on different shruties according to Lochan, Ahobal, Pundarik, Ramamatya, Somnath etc. Comparative study of Vyankat-Mukhi's 72 meals, Bhatkhade's Ten That's and Modern thirty-two That's.

#### **Study of Ragas and Tals**

Critical, detailed and comparative study of the following Ragas:- SUDHAKALYAN, DESHKAR, KAMOD, CHHAYANAT, GOUDSARANG, JAIJAIWANTI, RAMKALI, POORIYA, MARWA, SOHANI AND SHANKARA, Illustrations of Nyas, Alpatva, Bahutva, Avirbhava and Tirobhava in the above Ragas by means of notes.

Knowledge of the following Tals with different types of Layakaries and writing of the Tals in Dugun, Tigun, Chougun and Ada:- Trital, Ektal, Rupak, Teevra, Sooltal, Jhoomra, Dhamar and Jat tal.

Writing the songs in notation in the above ragas with Alaps. Tans, Boltans in Khayals and Dugun, Tigun etc., in dhruvapad and Dhamar. Identification of Ragas from given notes.

#### **Instrumental Music**

### **Science of Music and Studies of Shruties**

Vibration and frequency, pitch and its relation with vibrator Vocal and Instrumental ranges of sound. Amplitude, Timber, qualities of musical, unmusical overtones (Swaymbhu-Swar) consonance and Dissonance. Main types of chords, Absorption, Echo, Reverberation and resonance of sound, concept of shruti (different opinions on it) placement of sudh and vikrit swara according to lochan, Ahobal, Pundarik Rammamatya, somnath etc. Comparative study of Swaras of Northern saptak, critical study of Vyankatmukhu's 72 Melas. Bhatkhade's Ten That's and Modern thirty two that's.

#### **Study of Ragas and Tals**

Critical, detailed and comparative study of the following Ragas:- SUDHAKALYAN, DESHKAR, KAMOD, CHHAYANT, GOUDSARANG, JAIJAIWANTI, RAMKALI, POORIYA, MARWA, SOHANI AND SHANKARA.

Illustrations of Nyas, Aplatva, Bahutva, Tirobhav and Avirbhava in the above Ragas by means of notes. Knowledge of the following Tals with different types of Layakaries and writing of the Tals in Dugun, Tigun, Chougun and Ada:-

Trital Jhaptal, Choutal, Keharwa, Dadra, Tilwada, Rupak, Teevra, sool- Tal, Dhamar and jat-Tal.

Writing the Gats in notation in the above ragas with Alaps, Todas, Jhalas, Identification of Ragas from the given notes.

Candidates offering percussion Instruments must have critical details and comparative study of the following Tals:-

TEENTAL, JHAPTAL, RUPAK, CHOUTAL, SOOLTAL, TEEVRA, TILWADA, DADRA, KAHARWA, PANJABI, JATTAL.

Knowledge of different types of Laykaries, Tukaras, paranas, Peshkara, Quada, Avartan, Bant, Kisim, Paita, Rela, Laggi, Ladi, etc. where applicable in the abovementioned talas, writing in notation of all the matter in above talas and identified – for given Bols.

### **Vocal Music**

#### **Notation system, scales and study of Bio-graphics of Musicians**

Notation system of Bhatkhande and vishnudigambar and western Music, writing of simple songs in these notations. Western Note, various types of intervals of notes. Time signature, different Musical scales, Dia-tonic scale, comparative study of scales of Bhatkhande and western Music. Harmony and Melody, placement of notes on veena according to Pt. Srinivas, comparative study of Northern and Southern Tal paddhaties, contribution of various scholars and musicians to the Indian Music.

Biographies and Bhatkhande, Vishnudigamber, Tansen, Ameer Khusroo, Faiyyaz Khan, Pt. Ravi Shankar, Pt. Ram Sahay, Ahmadjan Thirakwa, Kudau Singh, Nana Sahib panse.

Study of Musical Styles and Ragas

Geet, Gandharva, Gan, Deshi Sangeet, Sthaya, Mukhachalan, akshiptika, Nibadha and Anibadh Gan, Raglakshan, Ragalap, Alapti swasthan Niyam, prachalit Alap, Tan; Meend, Gamar, Raku

Critical detail and comparative study of the following Ragas with illustration of Nyas, Alapatva, Bahutva, Tirobhav and Avirbhav in them.

Lalit, Darbari, Adana, Mia-Malhar, Goudmalhar, Bahar, Todi, Multani, Deshi, Jogiya and Vibhas, Bhairav, Yaman

Knowledge of the followings Tals with different types of Layakaries and writing of the Talas in DUGun, Tigun, Chougun and Ada:

Trital, Ektaal, Jhaptal, Choutal, Kaharwa, Dadra, Tilwada, Rupak, teevra, Sooltal, Jhoomra, Dhamar and Jattal and pancham Sawari, Bhajani

Comparative and details study with the descriptions of different styles of Indian Music viz. Dhrupad, Dhamar, Khayal, Thumri, Tappa, Chaturang, Taranas, Trivat, etc. and their evolution writing of notation of songs in the above Ragas with alaps, Tans Boltans etc. and with different Layakaries in Dhruvpad and Dhamar, Identification of ragas from given notes.

### Instrumental Music

Notation system of Bhatkhande, Vishnudigamber and western Music. Writing of simple gats in these notations. Western notes. Various types of intervals of notes. Time signature, different Musical scales Dia-tonic scale, pythagorain scale, Tempered scale, Major scale, Minor scale etc. Comparative study of scales of Bhatkhande and Western Music. Harmony and Melody, placement of notes on Veena according to Pt.Srinivas.

Comparative study of Northern and southern Tal paddhaties contribution of various scholars and Musicians to the Indian Music.

Biographies of Bhatkhande; Vishnudigamber, Tansen, Ameer Khusro Faiyaaz Khan, Onkarnath Thakur, Allauddin Khan, Pt. Ravishankar, Pt. Ram Sahai, Ahmad Jan Thirakwas, Kudau Singh, Nana Saheb Panse, Pt. Shiv Kumar Sharma, Pt. Debu Chaudhary

Study of Styles, Baj, Ragas and Tals

Geet, Gandharv, Gan, Deshi Sangeet, Sthaya Mukhchalan, Akshiptika Nibadha and Anibadha gan, Raglakshan, Raga-Alap, Rupakalap, Alpati Swasthan-Niyam, Prachalit Alap and Tan, Zamzama, Meend, Sootghaseet, Jor Alap, Toda, Jhala

Critical detailed comparative study of the following Ragas with illustrations of nyas, Alpatva, Bahutva, Tirobhava and Avirbhav in them.

Vibhas, Lalit, Darbari Kanhda, Adana, Miyan Malhar, Goud Malhar, Bahar, Todi, Multani, Deshi and Jogiya.

Identification of Raga from given notes. Knowledge of following tals;

Ada Chartal, Ektal, Deepchandi, Dhamar, Farodast, Pancha, Sawari, Kumbh, Sikhar.

Critical details and comparative study of the following tals:

Adachartal, Ektal, Pancham Sawari, Farodast, Dhamar, Kumbh, Shikhar, Matt Tal, Dhumali, Deepachandi, Addha tal.

Knowledge of - Tukras, paranas, Tihai, Kayadas, Pattas, Relas, Peshkaras, Mukharas, Tipallis, chaupalli, Chakkardar bols, Farmaishi, Paranas, Lom-Bilom, Charbagh, Stuti Ke Bol, Jhulna ke bol. Dhamar and Bedamdar tihais in the above mentioned tals.

Recognition of - Tals by given bols, writing of all the matters in notations.

Knowledge of Baithaks, styles of playing and Gharanas. Ability to write tals in different layakaries knowledge of different types of Musical Instruments and their system of classification.

### Vocal Music

#### **History of Music and classification of Rags and Tals**

Short History of Music of Ancient periods up to 13<sup>th</sup> century A.D. with classification of Rags and Tals. Evolution of jatis Ragas, short history of Music of Medieval and Modern periods, prabandh. Revival of Indian Classical Music, comparison of the Hindustani and Karnataka Music systems. Impact of Modern Science in the development and propagation of Music.

#### **Study of Musical Styles and Ragas**

Critical, detailed and comparative study of the following Ragas with illustrations of Nyas, Alpatva, Bahutva, Avirbhava and tirobhav.

Shree, Pooria-Dhanashree, Basant, Paraj, Hindol, Chandrakauns, Suddhasarang, Madhuwanti, Bageswari, Jaunpuri, Malgunji.

Critical study of different styles of Music of North and South, various Gharanas of Music, Gram, Moorchana, various kinds of Gamak, writing of notation of songs.

Knowledge of the following Tals with different types Layakaries: Ada- Choutal, Brahma, Lakshmi, Rudra, Shikhar, Pancham Sawari, sulfokta

### Instrumental Music

#### **History of Music and Classification of Ragas and Tals**

Short history of Music of ancient period up to 13<sup>th</sup> century A.D. with particular reference to Natyashastra, Brihaddesi, Sangeet Ratnakar. Classification of Ragas and Tals. Evolution of jatis, Ragas. Short History of Music in Medieval period. Revival of Indian classical Music. Comparison

of the Hindustani and Karnataka Music system. Impact of Modern science in the development and propagation of Music. Critical, comparative and detailed study of Musical styles and the following Ragas with illustration of Nyas, Apatva, Bahutva, Avirbhav and Tirobhav:

Shree, Pooria – Dhanashree, Basant, Paraj, Hindol, Chandrakauns, Suddh Sarang, Madhuwanti, Bageshree, Jaunpuri, Malgunji.

Critical study of the different styles of Music of North and South. Various Gharanas of Music, Gram, Moorchana, various kinds of Gamaks, Writing of Notation of gats.

Knowledge of the following Tals with different types of layakaries and writing of Tals in Dugun, Tigun, Chougun, Ada. And kuad, and Biyad.

Basant, Rudra, Laxmi, Gajjjhampa, Pashto, Brahma. Knowledge of baj and styles of Tabla and pakhawaj and should also know peskhkaras, Paran, Tihais, Tukaras, Kishime, Kyadas, Paltas, Relas, Mukhras, Tripalli, Choupallies, Chakkardar, Bols, Farmaishi paran, Kamali paran, Lom-Bilom, Charbagh, Stuti ke bole, Jhulan ke bole, Jababi Paran, Nayahakka, Damdar and Bedam ki tihal where applicable in the following Talas, along with their critical, detailed and comparative study:

Rudra, Badi swari, Jattal, Basant, Laxmi, Gaj Jhampa, Brahma Tal, Asth Mangal, Ganesh Tal, Mani Tal, Pashto.

Various kinds of chands in the Tals where applicable and writing of different layakaries, Dugun, Tigun, Chougun, Ada, Kaud and Biyad.