Navajyothi College of Teacher Education for Women

EDU.05.11. THEORETICAL BASES OF TEACHING NATURAL SCIENCE

First Unit

Session 1: Science – Meaning, Definition, and Nature

2 Mark Questions

1. From which Latin word is the term *Science* derived?
2. What does *Scientia* mean?
3. Define Science.
4. Mention three basic principles of the nature of science.
5. What does the product aspect of science indicate?
6. What does the process aspect of science indicate?
7. State any two products of science.
8. List two basic processes of science.
9. Mention two integrated process skills of science.
10. Quote Dr. D.S. Kothari's famous statement on learning science.

4 Mark Questions

1. Explain any four processes of science.
2. Write short notes on science as a body of knowledge.
3. Explain science as a process of investigation.
4. What are the differences between product and process aspects of science?
5. Describe the dynamic nature of science.
6. Explain the role of process skills in science learning.

10 Mark Questions

1. Discuss the meaning, definitions, and nature of science with examples.
2. Explain in detail how science is both a product and a process.
3. Critically examine the complementary relationship between product and process aspects of science.

Session 2: Science as an Ongoing Process of Enquiry

2 Mark Questions

1. What is meant by science as an ongoing process of enquiry?
2. How should teachers respond to student enquiries in enquiry-based learning?
3. State two benefits of enquiry-based learning.
4. Mention any two skills developed through scientific enquiry.
5. Write one method to encourage enquiry among students.

4 Mark Questions

1. Explain the role of the teacher in developing enquiry skills among students.
2. Write four points highlighting the importance of enquiry in science learning.
3. How does scientific enquiry help students become autonomous learners?
4. Describe the essential skills required in scientific enquiry.

10 Mark Questions

1. Explain science as an ongoing process of enquiry with suitable classroom examples.
2. Discuss how enquiry-based learning develops logical and critical thinking among students.

Session 3: Importance of Science as a School Subject & Values of Science Teaching

2 Mark Questions

1. When did educationalists begin to realize the importance of science education?
2. Which commission (1964–66) emphasized strengthening science education?
3. Mention two contributions of science to human life.
4. Name any two scientists whose discoveries are treasures of mankind.
5. State two intellectual values of science teaching.
6. Mention two utilitarian values of science teaching.
7. State two disciplinary values of science teaching.
8. Mention two vocational values of science teaching.
9. Write two aesthetic values of science teaching.
10. Mention two cultural values of science teaching.

11. State two social values of science teaching.
12. Mention two moral values of science teaching.
13. State two recreational values of science teaching.

4 Mark Questions

1. Write four arguments in favour of including science in school curriculum.
2. Explain the intellectual value of science teaching.
3. Describe the utilitarian values of science teaching with examples.
4. Explain the disciplinary and vocational values of science teaching.
5. Write short notes on the aesthetic and cultural values of science teaching.
6. Explain the moral and recreational values of science teaching.
7. How does science education contribute to national development?

10 Mark Questions

1. Discuss the importance of science as a school subject with reference to various values.
2. Explain in detail the intellectual, utilitarian, vocational, and social values of science teaching.
3. Critically examine the cultural, moral, and recreational values of science education.

Session 4: Scientific Method

2 Mark Questions

1. Define scientific method..
2. What is meant by “sensing the problem” in the scientific method?
3. Define “formulation of hypothesis.”
4. What is the last step of the scientific method?
5. State two techniques for collecting data in the scientific method.

4 Mark Questions

1. Explain the importance of “defining the problem” in scientific method.
2. Write short notes on collecting and interpreting data.
3. Explain how hypotheses are selected and tested in the scientific method.
4. How does the scientific method link classroom situations with real life?

10 Mark Questions

1. Explain the scientific method in detail with suitable examples.
2. Discuss the role of experimentation and hypothesis testing in the scientific method.
3. How can the steps of scientific method be applied in classroom science teaching?

Session 5: Scientific Attitude

2 Mark Questions

1. Define scientific attitude.
2. Mention any two characteristics of a person with scientific attitude.
3. Write two ways of developing scientific attitude among students.
4. Mention any two co-curricular activities that help develop scientific attitude.

4 Mark Questions

1. Write any four characteristics of scientific attitude.
2. How does classroom atmosphere contribute to scientific attitude?
3. Explain the role of co-curricular activities in developing scientific attitude.
4. What role does the teacher's personal influence play in shaping scientific attitude?

10 Mark Questions

1. Explain the meaning, characteristics, and importance of scientific attitude.
2. Discuss in detail how scientific attitude can be developed among students.

Session 6: Scientific Aptitude

2 Mark Questions

1. Define scientific aptitude.
2. State one importance of scientific aptitude.

4 Mark Questions

1. Differentiate between scientific aptitude and scientific attitude.
2. Explain how scientific aptitude contributes to proficiency in science learning.

10 Mark Questions

1. Define scientific aptitude and explain how it differs from scientific attitude with examples.
2. Discuss the role of scientific aptitude in the study and practice of science.

Second Unit

A. Micro Teaching

2 Mark Questions

1. Who introduced micro teaching and in which year?
2. Define micro teaching as given by D.W. Allen.
3. Mention any two objectives of micro teaching.
4. State any two characteristics of micro teaching.
5. What is the duration of a typical micro teaching session?
6. How many pupils are usually involved in micro teaching?
7. What is the main purpose of feedback in micro teaching?
8. Name the three phases of micro teaching.
9. What is link practice in micro teaching?

4 Mark Questions

1. Explain any four characteristics of micro teaching.
2. Write short notes on the objectives of micro teaching.
3. List and explain the steps of the micro teaching cycle.
4. Explain the phases of micro teaching.
5. What is link practice? Describe its importance.
6. Write any four merits of micro teaching.
7. Write any four limitations of micro teaching.

10 Mark Questions

1. Define micro teaching and explain its objectives, characteristics, and steps in detail.
2. Explain the micro teaching cycle with a neat diagram.
3. Discuss the phases of micro teaching and their relevance to teacher training.
4. Critically evaluate the merits and limitations of micro teaching.

B. Teaching Skills for Classroom Instruction

2 Mark Questions

1. **Who listed 13 teaching skills in the book *Becoming Better Teacher*?**
2. **What is Core teaching skill ?Mention any two core teaching skills.**
3. **Write two components of the skill of introducing a lesson.**
4. **List any two components of the skill of stimulus variation.**
5. **Name two components of the skill of explaining.**
6. **Mention any two components of the skill of using the blackboard.**
7. **What is probing questioning? Give one example.**
8. **Write any two aspects of reinforcement as a teaching skill.**

4 Mark Questions

1. **Explain the skill of introducing a lesson with components.**
2. **Describe the components of the skill of stimulus variation.**
3. **Explain the essential components of the skill of explaining.**
4. **Write short notes on the skill of illustrating with examples.**
5. **What are the essential aspects of blackboard use as a teaching skill?**
6. **Explain the skill of probing questions with examples.**
7. **Describe the skill of fluency in questioning.**
8. **Write short notes on reinforcement skill with examples.**

10 Mark Questions

1. **Discuss in detail the essential skills for science teaching.**
2. **Explain the eight core teaching skills with examples.**
3. **How does reinforcement improve classroom teaching? Discuss with examples.**

C. Models of Teaching

2 Mark Questions

1. **Define a model of teaching.**
2. **Name the four families of models of teaching.**
3. **Who developed the Concept Attainment Model?**
4. **Who developed the Inquiry Training Model?**
5. **Who developed the Advance Organizer Model?**

6. **List the six elements of a teaching model.**

4 Mark Questions

1. **Write short notes on the elements of a teaching model.**
2. **Explain the four families of models of teaching with examples.**
3. **Differentiate between expository and comparative organizers.**
4. **Explain progressive differentiation with an example.**
5. **Explain integrative reconciliation with an example.**

10 Mark Questions

1. **Explain the meaning, concept, and families of models of teaching.**
2. **Describe the Concept Attainment Model with phases, syntax, and examples.**
3. **Discuss the Inquiry Training Model with its syntax and phases.**
4. **Explain Ausubel's Advance Organizer Model with examples.**
5. **Compare and contrast Concept Attainment Model, Inquiry Training Model, and Advance Organizer Model.**

Unit III: Approaches, Methods, and Techniques of Teaching Science

Session 1: Maxims of Teaching

2 Mark Questions

1. **Define maxims of teaching.**
2. **Write two purposes of maxims of teaching.**
3. **What does the maxim "Proceed from known to unknown" mean?**
4. **Mention the importance of "Proceed from simple to complex."**
5. **State the meaning of "Proceed from concrete to abstract."**
6. **What is meant by "Proceed from empirical to rational"?**
7. **Write one difference between psychological and logical approach.**
8. **Give an example of "Proceed from whole to part."**

4 Mark Questions

1. **Explain the maxim "Proceed from easy to difficult."**

2. **Describe the importance of "Proceed from particular to general."**
3. **Explain the maxim "Proceed from actual to representative" with an example.**
4. **Write short notes on "Proceed from indefinite to definite."**
5. **Differentiate between "Proceed from psychological to logical" and "Proceed from logical to psychological."**

10 Mark Questions

1. **List and explain any five maxims of teaching with examples.**
2. **Explain in detail the different maxims of teaching and their importance in science teaching.**
3. **Critically evaluate the role of maxims of teaching in making learning child-centered.**

Session 2: Approaches of Teaching Science (Inductive, Deductive, Enquiry, Discovery, Guided Discovery)

2 Mark Questions

1. **Who developed the inductive method?**
2. **Mention two merits of the inductive approach.**
3. **Write two demerits of the inductive approach.**
4. **Define deductive approach.**
5. **State one merit and one demerit of deductive method.**
6. **Give one example of inductive reasoning.**
7. **Give one example of deductive reasoning.**
8. **Who is credited with developing the discovery approach?**
9. **Mention one feature of enquiry-based learning.**
10. **Write two steps of guided discovery approach.**

4 Mark Questions

1. **Differentiate between inductive and deductive approaches.**
2. **Explain the role of law of uniformity of nature in inductive reasoning.**
3. **Write short notes on the merits and demerits of the inductive method.**
4. **Explain the enquiry approach with its characteristics.**
5. **Describe the role of the teacher in the discovery approach.**
6. **Explain the steps of the guided discovery approach.**

10 Mark Questions

1. **Discuss inductive and deductive approaches in detail with merits, demerits, and examples.**
2. **Explain enquiry-based learning and its role in science classrooms.**
3. **Describe discovery approach with procedures, resources, and teacher's role.**
4. **Explain guided discovery approach with steps, merits, and demerits.**
5. **Compare inductive, deductive, discovery, and enquiry approaches of teaching science.**

Session 3: Methods of Instruction (Lecture, Lecture cum Demonstration, Heuristic, Project, Problem Solving, Dalton Plan, Individual Laboratory, Activity-Based Learning)

2 Mark Questions

1. **Define lecture method.**
2. **State one advantage of the lecture method.**
3. **Mention one limitation of lecture method.**
4. **Who developed the heuristic method?**
5. **Define project method as given by W.H. Kilpatrick.**
6. **Write two principles of project method.**
7. **State two types of projects.**
8. **Mention any two steps of the project method.**
9. **Define problem solving method.**
10. **Who introduced the Dalton Plan?**
11. **Mention any two principles of Dalton Plan.**
12. **Write one merit of an individual laboratory method.**
13. **State one demerit of laboratory method.**
14. **Define Activity-Based Learning (ABL).**
15. **Mention two features of ABL.**

4 Mark Questions

1. **Explain psychological principles for effective lecturing.**
2. **Describe the components of the lecture method.**
3. **Write short notes on the merits and demerits of the lecture method.**
4. **Explain the procedure of the heuristic method.**
5. **Write short notes on the merits and demerits of the heuristic method.**
6. **Explain the principles of the project method.**

7. **Write short notes on steps of the project method.**
8. **Explain criteria of a good project.**
9. **Explain the steps of the problem solving method.**
10. **Describe the merits and demerits of problem solving methods.**
11. **Write short notes on principles of Dalton Plan.**
12. **Explain the procedure of Dalton Plan.**
13. **Explain the merits and limitations of individual laboratory methods.**
14. **Write short notes on Activity-Based Learning with examples.**

10 Mark Questions

1. **Discuss the lecture method in detail with principles, components, merits, and limitations.**
2. **Explain the heuristic method with principles, procedures, merits, and demerits.**
3. **Write an essay on project method with definitions, steps, types, teacher's role, and merits.**
4. **Explain problem solving method with steps, merits, and demerits.**
5. **Describe Dalton Plan in detail with principles, procedure, merits, and limitations.**
6. **Explain individual laboratory method with preparation, role of teacher, merits, and demerits.**
7. **Discuss Activity-Based Learning in detail with history, philosophy, features, and teacher's role.**

Session 4: Teaching Techniques and Strategies (Questioning, Discussion, Brainstorming, Role Playing, Simulation, Seminar, Debate, Panel Discussion)

2 Mark Questions

1. **Who is known as the father of questioning technique?**
2. **Write two purposes of questioning technique.**
3. **Mention two types of questions.**
4. **What are recapitulatory questions?**
5. **Mention one characteristic of a good question.**
6. **Define group discussion.**
7. **Mention two purposes of group discussion.**
8. **Who introduced the panel discussion technique?**
9. **Mention one objective of panel discussion.**

10. **Define brainstorming.**
11. **Mention two principles of brainstorming.**
12. **Define simulation.**
13. **Mention two types of simulation.**
14. **Define role play.**
15. **Write two advantages of role play.**
16. **Define seminar.**
17. **Mention two advantages of seminar.**
18. **Define debate.**
19. **Mention two merits of debate.**

4 Mark Questions

1. **Explain the types of questions used in the questioning technique.**
2. **Write short notes on defective questions with examples.**
3. **Explain the characteristics of good questions.**
4. **Explain the elements of group discussion.**
5. **Write short notes on the merits and demerits of group discussion.**
6. **Explain the role of the teacher in panel discussion.**
7. **Write short notes on brainstorming procedures and stages.**
8. **Explain principles of brainstorming with examples.**
9. **Write short notes on types of simulation.**
10. **Explain the role of a teacher in role play.**
11. **Write short notes on advantages and disadvantages of role play.**
12. **Explain procedure of seminar in classroom teaching.**
13. **Write short notes on the merits and limitations of the seminar.**
14. **Write short notes on debate as a teaching strategy with merits and limitations.**

10 Mark Questions

1. **Discuss questioning technique in detail with types, characteristics, and rules.**
2. **Explain group discussion technique with procedure, purposes, merits, and limitations.**
3. **Write an essay on panel discussion with objectives, procedures, and advantages.**
4. **Explain brainstorming in detail with stages, principles, steps, and advantages.**
5. **Describe simulation technique with types, merits, and limitations.**
6. **Write an essay on role play with procedure, types, advantages, and disadvantages.**
7. **Explain seminar as a teaching technique with planning, procedure, advantages, and limitations.**
8. **Discuss debate as a teaching technique with procedure, merits, and limitations.**

Unit IV

Session 1: Constructivism – Conceptual Frame and Characteristics

2 Mark Questions

1. **Define constructivism.**
2. **Mention two key features of constructivist learning.**
3. **Who suggested the constructivist teaching sequence?**
4. **List any two characteristics of a constructivist classroom.**
5. **Write two differences between a traditional classroom and a constructivist classroom.**
6. **State any two phases in Driver's constructivist teaching sequence.**
7. **What is the role of enquiry in constructivism?**
8. **Mention two important ideas of constructivism.**

4 Mark Questions

1. **Explain any four characteristics of a constructivist classroom.**
2. **Describe the phases in the constructivist teaching sequence.**
3. **Write short notes on discovery learning in constructivism.**
4. **What is meant by learning through debate? Explain briefly.**
5. **Explain the role of problem-solving in constructivism.**

10 Mark Questions

1. **Discuss the conceptual framework of constructivism and its classroom characteristics.**
2. **Explain in detail the constructivist teaching sequence with examples.**
3. **Write an essay on important ideas of constructivism (discovery, debate, problem-solving, collaborative, cooperative learning).**

Session 2: Theoretical Underpinnings of Constructivism

2 Mark Questions

1. **Who developed the theory of genetic epistemology?**
2. **List Piaget's four stages of cognitive development.**
3. **Define assimilation in Piaget's theory.**
4. **Define accommodation in Piaget's theory.**
5. **Who introduced discovery learning?**
6. **Mention the three stages of representation according to Bruner.**
7. **Define scaffolding.**
8. **Who introduced the concept of Zone of Proximal Development?**
9. **What is meant by ZPD?**
10. **Who proposed the theory of multiple intelligences?**
11. **List any four intelligences from Gardner's theory.**

4 Mark Questions

1. **Explain assimilation and accommodation with examples.**
2. **Write short notes on Bruner's discovery learning.**
3. **Describe the stages of representation by Bruner.**
4. **Explain Vygotsky's concept of Zone of Proximal Development with example.**
5. **Write short notes on scaffolding.**
6. **Explain Howard Gardner's theory of multiple intelligences.**
7. **Distinguish between actual ability level and potential ability level in learning.**

10 Mark Questions

1. **Explain Piaget's theory of genetic epistemology and its implications for learning.**
2. **Write an essay on Bruner's discovery learning theory.**
3. **Discuss Vygotsky's social constructivism with special reference to ZPD and scaffolding.**
4. **Explain Howard Gardner's multiple intelligences and its educational implications.**
5. **Compare and contrast the theories of Piaget, Bruner, Vygotsky, and Gardner in relation to constructivism.**

Session 3: Behaviourist Approach Vs Constructivist Approach

2 Mark Questions

1. **Mention two differences between behaviourism and constructivism.**
2. **What is the role of motivation in behaviourism?**

3. **What is the role of motivation in constructivism?**
4. **Who is the centre of education in behaviourism?**
5. **Who is the centre of education in constructivism?**
6. **Write two classroom differences between behaviourist and constructivist approaches.**

4 Mark Questions

1. **Explain any four differences between behaviourist and constructivist approaches.**
2. **Compare traditional classrooms with constructivist classrooms.**
3. **Write short notes on assessment in behaviourist and constructivist approaches.**

10 Mark Questions

1. **Discuss the major differences between behaviourist and constructivist approaches with examples.**
2. **Explain how classroom practices differ under behaviourist and constructivist paradigms.**

Session 4: Collaborative Learning, Jigsaw Learning, and Managing Group Learning

2 Mark Questions

1. **Define collaborative learning.**
2. **Mention two assumptions of collaborative learning.**
3. **What is round robin activity?**
4. **Define jigsaw learning.**
5. **List any two components of the jigsaw method.**
6. **Mention two advantages of jigsaw learning.**
7. **State two disadvantages of the jigsaw method.**
8. **Write two tips for managing group learning.**

4 Mark Questions

1. **Explain any four advantages of jigsaw learning.**
2. **Write short notes on round robin and question group activities.**
3. **Explain the procedure of jigsaw learning.**
4. **Describe the disadvantages of the jigsaw method.**

5. **Explain any four tips for managing group learning.**

10 Mark Questions

1. **Discuss collaborative learning and its structures in classroom teaching.**
2. **Explain jigsaw learning in detail with procedure, merits, and limitations.**
3. **How can group learning be effectively managed in classrooms?**

Session 5: Learning as a Generative Process – Role of Teacher and Learner

2 Mark Questions

1. **What is meant by learning as a generative process?**
2. **Mention two key features of generative learning.**
3. **Give one example of generative learning from science.**
4. **State two roles of a teacher in a constructivist classroom.**
5. **Mention two roles of a learner in generative learning.**

4 Mark Questions

1. **Explain the key features of learning as a generative process.**
2. **Write short notes on strategies for developing children's concepts.**
3. **Explain the role of teachers in concept development.**
4. **Explain the role of learners in generative learning.**

10 Mark Questions

1. **Explain learning as a generative process with examples.**
2. **Discuss the role of teachers and learners in concept development.**

Session 6: Critical Pedagogy and Issue-Based Learning

2 Mark Questions

1. **Who popularized critical pedagogy through the book *Pedagogy of the Oppressed*?**
2. **Define conscientization.**
3. **What is meant by "culture of silence"?**

4. **What is the banking concept of education?**
5. **Define praxis according to Freire.**
6. **Mention any two attributes of critical pedagogy.**
7. **List two areas of issue-based learning identified in Kerala curriculum.**
8. **Mention two punch points of the new curriculum in Kerala.**

4 Mark Questions

1. **Explain any four attributes of critical pedagogy.**
2. **Write short notes on the dialogical method of learning.**
3. **Explain the role of praxis in critical pedagogy.**
4. **Discuss the eight areas of issue-based learning in Kerala curriculum.**
5. **Explain the vision of education in the new curriculum.**

10 Mark Questions

1. **Discuss Paulo Freire's contributions to critical pedagogy with examples.**
2. **Explain critical pedagogy and its classroom applications.**
3. **Write an essay on issue-based learning and its role in Kerala's curriculum reforms.**
4. **Compare constructivism, critical pedagogy, and issue-based learning as approaches to education.**

Unit V: Science Education

Session 1: Science as a Social Endeavour, Scientific Literacy, and Influence of Science on Society

2 Mark Questions

1. **Define science as a social endeavour.**
2. **Mention two ways society influences scientific research.**
3. **State two aims of science as a social endeavour.**
4. **Define scientific literacy.**
5. **List the three dimensions of scientific literacy.**
6. **Mention the three types of scientific literacy.**
7. **Write two examples of civic scientific literacy.**
8. **Give two examples of cultural scientific literacy.**
9. **Mention any two characteristics of a scientifically literate person.**

10. **State two roles of a scientifically literate student.**
11. **Mention two positive influences of science on society.**
12. **Mention two negative influences of science on society.**
13. **Write two differences between science and technology.**

4 Mark Questions

1. **Explain the concept of science as a social endeavour with examples.**
2. **Describe the three types of scientific literacy with examples.**
3. **Explain four characteristics of a scientifically literate person.**
4. **Explain the influence of science on agriculture and industry.**
5. **Describe the influence of science on medicine with examples.**
6. **Explain the role of science in education.**
7. **Write short notes on the negative effects of science and technology.**
8. **Differentiate between science and technology.**

10 Mark Questions

1. **Discuss science as a social endeavour, its aims, and importance.**
2. **Explain scientific literacy in detail—its dimensions, types, and characteristics.**
3. **Describe the positive and negative influences of science on society with examples.**
4. **Discuss the role of science and technology in agriculture, industry, government, medicine, and education.**

Session 2: Misconceptions in Science and Role of Teachers

2 Mark Questions

1. **Define pre-concept.**
2. **Define misconception.**
3. **Give one example of a misconception in science.**
4. **Mention two sources of misconceptions.**
5. **State two examples of misconceptions from biology.**
6. **Write two misconceptions related to physics.**
7. **Write two misconceptions related to chemistry.**
8. **State two steps in overcoming misconceptions.**
9. **Mention two roles of teachers in addressing misconceptions.**

4 Mark Questions

1. **Differentiate between pre-concept and misconception.**
2. **Explain how personal experience can lead to misconceptions.**
3. **Write short notes on misconceptions arising from language usage.**
4. **Explain misconceptions arising from informal learning.**
5. **Explain strategies teachers can use to overcome misconceptions.**
6. **Describe the role of inquiry-based learning in correcting misconceptions.**
7. **Write short notes on the role of metacognition in overcoming misconceptions.**

10 Mark Questions

1. **Explain in detail the sources of misconceptions in science with examples.**
2. **Discuss common misconceptions in physics, chemistry, and biology.**
3. **Describe the role of teachers in overcoming student misconceptions with strategies and models.**
4. **Explain how inquiry-based learning (5E model) can help in correcting misconceptions.**

Session 3: The Science Teacher and Society

2 Mark Questions

1. **Mention two roles of science teachers in society.**
2. **State two ways teachers help eradicate superstitions.**
3. **Write two roles of science teachers in spreading rational thinking.**
4. **Mention two contributions of science teachers to personal hygiene and health.**
5. **State two qualities of a modern science teacher.**

4 Mark Questions

1. **Explain any four roles of science teachers in society.**
2. **Write short notes on the role of science teachers in spreading scientific attitude.**
3. **Explain the role of science teachers in eradicating superstitions.**
4. **Describe the personal qualities of a modern science teacher.**
5. **Write short notes on the role of science teachers as counsellors and motivators.**

10 Mark Questions

1. **Discuss the role of science teachers in modern society.**
2. **Explain the contributions of science teachers in eradicating superstitions and developing scientific attitude.**

3. **Write an essay on the multiple roles of science teachers as educators, counsellors, motivators, and social workers.**
4. **Discuss how science teachers act as agents of social change and national development.**

Unit VI: Science Curriculum

Session 1: Conceptual Analysis of Curriculum, Syllabus, and Hidden Curriculum

2 Mark Questions

1. **From which Latin word is the term *curriculum* derived?**
2. **What does the word *currere* mean?**
3. **Define curriculum according to Cunningham.**
4. **Define curriculum according to Morroe.**
5. **Mention two differences between curriculum and syllabus.**
6. **Who first used the term hidden curriculum?**
7. **Define hidden curriculum.**
8. **Mention any two key aspects of the hidden curriculum.**
9. **Write two examples of hidden curriculum.**
10. **State two ways hidden curriculum influences social behaviour.**

4 Mark Questions

1. **Differentiate between curriculum and syllabus.**
2. **Explain the concept of hidden curriculum with examples.**
3. **Discuss the key aspects of the hidden curriculum.**
4. **Explain the influence of hidden curriculum on gender roles and identity.**
5. **Explain the importance of hidden curriculum in shaping social values.**

10 Mark Questions

1. **Discuss the conceptual analysis of curriculum with definitions.**
2. **Explain the differences between curriculum and syllabus with examples.**
3. **Write an essay on hidden curriculum with key aspects, examples, and educational implications.**

Session 2: Principles of Curriculum Construction

2 Mark Questions

1. **What is meant by child-centeredness in curriculum?**
2. **Define the principle of community-centeredness.**
3. **State the principle of activity-centeredness.**
4. **Mention the principle of flexibility in curriculum.**
5. **Write two aspects of the principle of conservation.**
6. **What is the renewal principle in the curriculum?**
7. **Define the principle of creativity.**
8. **Mention the principle of balance in curriculum.**
9. **What is the principle of utility?**
10. **State the principle of preparation for life.**
11. **What is the maturity principle?**
12. **Mention the principle of leisure.**

4 Mark Questions

1. **Explain the principle of child-centeredness in curriculum construction.**
2. **Explain the principle of activity-centeredness with examples.**
3. **Write short notes on flexibility and conservation principles.**
4. **Explain the renewal and creativity principles.**
5. **Write short notes on balance and utility principles.**
6. **Explain the principle of preparation for life.**
7. **Discuss the principle of maturity and leisure.**

10 Mark Questions

1. **Discuss in detail the principles of curriculum construction.**
2. **Explain how child-centeredness, activity-centeredness, and flexibility shape a good curriculum.**
3. **Write an essay on the importance of creativity, balance, and preparation for life in curriculum construction.**

Session 3: Stages of Curriculum Development

2 Mark Questions

1. **Mention the five stages of curriculum development.**
2. **What is the first step in curriculum development?**
3. **Define goal specification in curriculum development.**
4. **State the importance of planning in curriculum development.**
5. **What is validation in curriculum development?**
6. **What is field testing in curriculum development?**
7. **Mention the role of quality control in curriculum development.**

4 Mark Questions

1. **Explain goal specification and planning in curriculum development.**
2. **Write short notes on validation and field testing.**
3. **Explain the role of quality control in curriculum development.**
4. **Describe the five stages of curriculum development briefly.**

10 Mark Questions

1. **Discuss the stages of curriculum development in detail.**
2. **Explain the importance of validation, field testing, and quality control in curriculum design.**

Session 4: Approaches to Curriculum Organization

2 Mark Questions

1. **Define concentric approach.**
2. **Mention one merit of concentric approach.**
3. **State one demerit of concentric approach.**
4. **Define spiral approach.**
5. **Mention one advantage of spiral approach.**
6. **State one disadvantage of spiral approach.**
7. **What is topical approach?**
8. **Mention one merit and one demerit of topical approach.**
9. **Define unit approach.**
10. **State one merit of unit approach.**
11. **Define psychological approach.**
12. **Define logical approach.**
13. **Mention one merit of logical approach.**
14. **Define integrated approach.**
15. **Define disciplinary approach.**

16. **Define interdisciplinary approach.**

4 Mark Questions

1. **Differentiate between concentric and spiral approaches.**
2. **Explain the topical approach with merits and demerits.**
3. **Describe the unit approach with its characteristics.**
4. **Compare psychological and logical approaches.**
5. **Explain the integrated approach with examples.**
6. **Discuss the disciplinary approach with merits and demerits.**
7. **Explain the interdisciplinary approach with examples.**

10 Mark Questions

1. **Discuss the various approaches to curriculum organization in detail.**
2. **Explain concentric, spiral, and topical approaches with merits and demerits.**
3. **Compare and contrast psychological, logical, integrated, disciplinary, and interdisciplinary approaches.**

Session 5: Curriculum Reforms Abroad – BSCS and Nuffield Foundation

2 Mark Questions

1. **Who founded the BSCS project and when?**
2. **What was the main aim of the BSCS project?**
3. **Mention two objectives of BSCS.**
4. **List the three versions of BSCS textbooks.**
5. **State one feature of the Blue Version of BSCS.**
6. **State one feature of the Green Version of BSCS.**
7. **State one feature of the Yellow Version of BSCS.**
8. **Who initiated the Nuffield Science Teaching Project?**
9. **When did the Nuffield Science Teaching Project begin?**
10. **Mention two objectives of the Nuffield project.**
11. **State two features of the Nuffield study materials.**
12. **Mention one objective of the Nuffield Biology Project.**

4 Mark Questions

1. **Explain the objectives of BSCS.**
2. **Describe the themes of the BSCS curriculum.**
3. **Write short notes on Blue, Green, and Yellow versions of BSCS.**
4. **Explain the objectives of Nuffield Science Teaching Projects.**
5. **Discuss the teaching approach of Nuffield projects.**
6. **Explain the structure of Nuffield Biology curriculum.**

10 Mark Questions

1. **Discuss the BSCS project in detail with objectives, text materials, and versions.**
2. **Explain the Nuffield Science Teaching Project in detail with objectives, contents, and teaching approach.**
3. **Compare BSCS and Nuffield projects in terms of objectives, materials, and outcomes.**

Session 6: Correlation in Science Teaching

2 Mark Questions

1. **Define correlation in science teaching.**
2. **Mention two needs of correlation.**
3. **State two types of correlation.**
4. **Define incidental correlation.**
5. **Define systematic correlation.**
6. **Mention one merit of correlation.**
7. **Mention one limitation of correlation.**
8. **State two advantages of correlation.**

4 Mark Questions

1. **Explain the need and significance of correlation in science teaching.**
2. **Differentiate between incidental and systematic correlation.**
3. **Write short notes on merits and limitations of correlation.**
4. **Explain correlation of science subjects with one another with examples.**
5. **Explain correlation of science with mathematics.**
6. **Write short notes on correlation of science with social studies.**
7. **Explain correlation of science with the environment.**

10 Mark Questions

1. **Discuss correlation in science teaching with need, significance, and types.**
2. **Explain correlation of science with language, history, social studies, mathematics, and environment.**
3. **Critically examine the merits and limitations of correlation in science education.**

Session 7: Progressive Curriculum for Science Education

2 Mark Questions

1. **Mention two defects of traditional curriculum.**
2. **Mention two characteristics of a progressive science curriculum.**
3. **State one advantage of progressive curriculum.**

4 Mark Questions

1. **Explain the defects of traditional science curriculum.**
2. **Explain any four characteristics of a progressive science curriculum.**

10 Mark Questions

1. **Discuss in detail the characteristics of a progressive curriculum for science education.**
2. **Compare traditional and progressive curriculum in science education.**

PREVIOUS YEAR QUESTION PAPERS

2 Mark Questions

(2024)

1. Enlist any four objectives of teaching Natural Science with respect to NCF 2005.
2. What is a panel discussion?
3. Suggest four topics from high school Biology suitable for brainstorming technique.
4. Write any two advantages of an educational Seminar.

5. List two situations were Lecture Method preferred than other methods.
6. Write any two aims of Nuffield Science Project.
7. Describe Advance Organiser?
8. ‘Biology is useful for human welfare’. Justify with two examples.
9. Write any two common misconceptions in science.
10. What is Activity Based Learning?

(2023)

1. Write two activities helpful to develop a scientific attitude among your students?
2. What are the components of the skill ‘Stimulus Variation’?
3. Do you support link practice in pre service training? Justify.
4. Write any four major features of Dalton plan.
5. List any two types of project in Biology.
6. What is meant by the Role play method?
7. Briefly describe Cognitive constructivism.
8. Compare systematic correlation and incidental correlation.
9. Define scientific aptitude.
10. Write any four guiding principles of NCF.

(2022)

1. List out any four attributes of a person having a scientific attitude.
2. State the significance of link practice in pre service training of teachers.
3. What is an advanced organiser?
4. Define Concept. Give an example.
5. Write any four features of science debate.
6. What is collaborative learning?
7. Briefly describe the discovery approach.
8. What is meant by critical pedagogy ?
9. Enlist any four drawbacks of the present day High School curriculum.
10. What is a hidden curriculum ? Give one example.

(2021)

1. Distinguish between Instructional and Nurturant Effects of a Model.
2. What is the Heuristic Method? Who proposed it ?
3. List out the Phases of Advance Organizer Model.
4. What is the meaning of 'Critical Pedagogy' ? Who proposed it ?
5. List any four objectives of KCF (2007).
6. Distinguish between Spiral and Concentric Curriculum.
7. Mention any two path- breaking Discoveries in the field of Biology.
8. What is Hidden Curriculum ? Give one example.
9. What is Link Practice ? What is its Significance?
10. What is Simulation ? Give one example.

(2020)

1. Define ‘Scientific attitude’. Mention any one feature of it.
2. Mention role of a teacher in Project Method.
3. What are Core Teaching Skills? Give two examples.
4. Write any two applications of Science in our daily life.
5. What do you mean by Maxims of Teaching? Give one example.
6. Mention any four objectives of NCF (2005).
7. Write any four principles of Curriculum construction.
8. List out any two drawbacks of the Lecture Method.
9. Define Issue Based Learning. Suggest any two issues towards it.

(2018)

1. Define hypothesis.
2. List any four maxims of teaching?
3. Draw a flow chart depicting different families of models of teaching.
4. What is collaborative learning?
5. Write down any four objectives of teaching Natural Science with respect to NCF 2005.

6. Do you think that link practices are necessary? Justify.
7. Write a short note on objective based evaluation.
8. Write any four features of a person who possesses a scientific attitude.
9. Distinguish between incidental and systematic correlation.
10. Define critical pedagogy.

(2017)

1. What is a spiral curriculum?
2. Write any four merits of lecture-demonstration over lecture method.
3. Expand BSCS and mention its three versions.
4. Write any two features of the discovery approach.
5. What do you mean by activity based learning?
6. Mention any four periodicals, two in English and two in Malayalam, you would prescribe in your school library.
7. Briefly explain the social dimension of science.
8. Suggest two situations where the lecture method is preferred over other methods.
9. Differentiate between individual laboratory methods and supervised study.
10. Write Any two common misconceptions in science.

4 Mark Questions

(2024)

1. Explain the components of the skill 'Stimulus variation' with suitable examples.
2. Describe the phases of the Inquiry Training Model.
3. Write the syntax of Concept Attainment Model.
4. Explain the difference between micro teaching and link practice.
5. Differentiate between inductive and deductive approach in Science teaching.
6. What are the advantages and limitations of the Heuristic Method in teaching Biology ?
7. Suggest ways to modify the Lecture Method in order to involve the pupils in learning.

8. Define Project Method. What are the steps involved in this method ?
9. Write a note on critical pedagogy.
10. Give a brief account on the steps of collaborative learning.
11. What are the advantages of teaching Biology by correlating it with other subjects in the school ?How will you correlate your teaching with Chemistry ?
12. Write about the outstanding contribution of any one world Biologist.

(2023)

1. Define scientific method. Explain the steps of the scientific method.
2. Describe Heuristic Method of teaching.
3. Explain inductive and deductive approaches in science teaching with suitable examples.
4. Differentiate between behaviourism and constructivism.
5. Explain critical pedagogy.
6. Write a brief note on latest happenings in the state schooling procedures.
7. What are misconceptions in science ?What is the role of science teacher in overcoming students' misconceptions?
8. What is scientific literacy ? What are its dimensions ?
9. Describe the salient features of BSCS.
10. "Science is what scientists do". Elaborate the statement.
11. What are the phases of the Concept Attainment Model ?
12. Distinguish between expository and comparative organisers in Advance Organiser Model.

(2022)

1. Write a short note on science education envisaged in NCF 2005.
2. Science is both process and product. Explain.
3. Define models of teaching. Explain the families of Models of Teaching.
4. What is a micro-teaching cycle ?
5. Explain Brainstorming Technique ?
6. Compare Role play and Simulation.
7. Briefly describe the Problem Solving Method of teaching.

8. How can you correlate the teaching of Biology with Physics ?
9. What are the principles to be followed while framing curriculum for Biological Science at Secondary School level.
10. Compare and contrast the three versions of BSCS curriculum.
11. Knowledge about students' probable misconceptions and preconceptions is necessary for a science teacher. Substantiate.
12. Explain two discoveries in Biology that made remarkable social change.

(2021)

1. Briefly explain the various Families of Teaching Models.
2. What are Collaborative Learning Techniques ? How will you organize a Jig-Saw session in your classroom?
3. What is Issue Based Learning ? Explain the various Issues that can be discussed under Issue Based Pedagogy.
4. With a suitable example from your subject, differentiate between Inductive and Deductive approaches in learning.
5. "Science is both a Process and a Product-Substantiate the statement.
6. What are Science Process Skills ? Briefly explain the strategies to develop the process skills among the learners.
7. Critically evaluate the existing Biology Curriculum at Secondary level.
8. Briefly explain four Principles of Curriculum construction.
9. Briefly explain the major role of BSCS in the reformation of Science Curriculum.
10. Which are the major steps to conduct a Lecture Method ? Mention its Merits and Demerits.
11. What are Misconceptions in Science? What is the role of a Science teacher to remove these misconceptions?
12. Distinguish between Incidental and Systematic Correlation with suitable examples from Biology.

(2020)

1. Briefly explain the concept of Critical Pedagogy?
2. What is Social Constructivism? Briefly explains the theory of Lev Vygotsky.

3. Explain the following teaching techniques
   (a) Debate and (b) Seminar
4. What is Micro teaching? Explain the Micro-Cycle.
5. What is Scientific Literacy ? How will you promote scientific literacy in society ?
6. Briefly explain the Objective of Science teaching proposed by KCF (2007).
7. Briefly discuss the Role of a Science Teacher in the present era.
8. "Science is both a Proceed and a Product "-Comment on it.
9. Distinguish between lnductiue and Deductiue approaches in learning. Explain with suitable examples.
10. Briefly explain the various steps in problem solving methods.
11. Explain any four Landmarks in the field of Science.
12. What is BSCS? Explain the three versions of Text Books suggested by BSCS.

(2018)

1. Describe the method, which was used by scientists to explore new knowledge.
2. Explain about the different approaches of curriculum construction.
3. Explain about Lev Vygotsky's views on learning.
4. List out the process skills in Biology. Explain how you would develop their skills in your students?
5. Mention the relevance of micro-teaching as a teacher training programme.
6. Differentiate between inductive and deductive approaches.
7. Explain the steps in the Problem solving method.
8. Brainstorming is one of the effective techniques for developing concepts of social relevance. Explain.
9. What are the nine unifying themes of BSCS curriculum reforms?
10. Examine the relevance of Concept Attainment Model in learning Biological science.
11. Write about the path breaking history of any one world biologist.
12. Give a brief account about the elements of collaborative learning.

(2017)

1. State and explain problem solving methods with suitable examples.
2. Discuss the principles of curriculum construction. Arrange these principles in the order of their relevance.
3. Critically evaluate the merits and demerits of using computers in science education.
4. 'Discussion enables free expression of the child'. Explain.
5. Explain science as process and product.
6. How is teaching of Biology related to environmental education?
7. How do power points help in class room teaching? What are the points to be taken care of while preparing a power point presentation?
8. Discuss any four criteria on which method of teaching science should be based.
9. What is scientific literacy? What are its dimensions?
10. Summarise the significant remarks on science education as envisaged in the recommendations of different education commissions.
11. Write a note on critical pedagogy.
12. By citing examples, explain the concept of correlation in science.

10 Marks

(2024)

1. Define scientific method. What are the steps involved in scientific method? Briefly describe the technical aspects of scientific method.
2. Explain the theoretical bases of constructivism. Describe the characteristics of a constructivist classroom and the role of teacher and learner in this context.
3. What are the functions of the science curriculum ? Describe the principles of curriculum construction.

(2023)

1. Write an essay on the procedures of micro teaching technique. What are the advantages and limitations of microteaching ?
2. Explain about the Lecture cum demonstration method. What are the requisites of a good demonstration ?
3. What are the principles of curriculum construction ? Review the present IX standard Biology syllabus of Kerala state, in the light of these principles.

(2022)

1. Describe the basic elements of the Advance Organiser Model.
2. "A project is a whole-hearted purposeful activity proceeding in a social environment". In the light of this statement explains the various steps involved in the project method. What are the advantages and limitations of this method ?
3. Distinguish between Social Constructivism and Cognitive Constructivism. What are the underpinning theories of Constructivism ?

(2021)

1. What are Projects? Explain the various steps to carry out a Project in Biology. Mention the role of a Teacher in Project.
2. What is the Inquiry Training Model ? Briefly explain the various elements of this Model. Discuss the Merits and Demerits.
3. Briefly explain the Role of Nuffield Science Teaching projects in the progressive reformation of Science Education as well as teaching Biology.

(2020)

1. Define Curriculum. Explain the major Principles of constructing a suitable Science curriculum.Discuss the relevance also.
2. What are Teaching Models? Explain the components of Concept Attainment Model with a suitable example from your subject. Mention the relevance of this model in the present context.
3. Explain the concept of Correlation in teaching Biology With suitable examples. Discuss the merits of this approach.

(2018)

1. Explain the different steps involved in the scientific method. Also mention how this method helps in nurturing process skills?
2. Describe the National Goals of teaching Biology.
3. Critically evaluate any one high school Biology text book on thua-basis construction.

(2017)

1. Enumerate the values of teaching science with special reference to Biology.
2. Describe the theoretical bases of constructivism. Discuss the characteristics of a constructivist class room and the role of teacher and learner in these contexts.
3. Write an account on various print materials as learning resources. Describe the qualities of a good science text book.

Model Question Papers

- **Total: 80 Marks**
- **Section A: 10 questions × 2 marks = 20 marks (No choice)**

- **Section B: 12 questions × 4 marks = 48 marks (Attempt any 10, 2 choices)**
- **Section C: 3 questions × 10 marks = 30 marks (Attempt any 2, 1 choice)**

Total: 80 Marks

Model Question Paper 1

Total: 80 Marks

Section A — 2 marks each (Answer all 10)

1. **From which Latin word is the term Science derived?**
2. **What does *Scientia* mean?**
3. **Define Science.**
4. **What is meant by "sensing the problem" in the scientific method?**
5. **Define scientific attitude.**
6. **Define scientific aptitude.**
7. **Who introduced micro teaching and in which year?**
8. **Define lecture method.**
9. **Who is known as the father of questioning technique?**
10. **Define constructivism.**

Section B — 4 marks each (Answer any 10 out of 12)

11. Explain any four processes of science.

12. Write short notes on science as a body of knowledge.

13. Explain how hypotheses are selected and tested in the scientific method.

14. Write any four characteristics of scientific attitude.

15. Explain the phases of micro teaching.

16. Explain the procedure of the heuristic method.

17. Explain the steps of the problem solving method.

18. Explain the elements of group discussion.

19. Explain any four characteristics of a constructivist classroom.

20. Explain assimilation and accommodation with examples.

21. Explain any four differences between behaviourist and constructivist approaches.

22. Explain any four advantages of jigsaw learning.

Section C — 10 marks each (Answer any 2 out of 3)

23. Discuss the meaning, definitions, and nature of science with examples.

24. Describe the Concept Attainment Model with phases, syntax, and examples.

25. Discuss inductive and deductive approaches in detail with merits, demerits, and examples.

Model Question Paper 2

Total: 80 Marks

Section A — 2 marks each (Answer all 10)

1. **Mention three basic principles of the nature of science.**
2. **What does the product aspect of science indicate?**
3. **What does the process aspect of science indicate?**
4. **State two techniques for collecting data in the scientific method.**
5. **Mention any two co-curricular activities that help develop scientific attitude.**
6. **State one importance of scientific aptitude.**
7. **Define project method as given by W.H. Kilpatrick.**
8. **Define Activity-Based Learning (ABL).**
9. **Define brainstorming.**
10. **Who developed the theory of genetic epistemology?**

Section B — 4 marks each (Answer any 10 out of 12)

11. **What are the differences between product and process aspects of science?**
12. **Describe the dynamic nature of science.**
13. **Explain the importance of "defining the problem" in scientific method.**
14. **Explain the role of co-curricular activities in developing scientific attitude.**
15. **List and explain the steps of the micro teaching cycle.**
16. **Explain the principles of the project method.**

17. **Describe the merits and demerits of problem solving methods.**

18. **Write short notes on brainstorming procedures and stages.**

19. **Describe the stages of representation by Bruner.**

20. **Compare traditional classrooms with constructivist classrooms.**

21. **Explain the procedure of jigsaw learning.**

22. **Explain the key features of learning as a generative process.**

Section C — 10 marks each (Answer any 2 out of 3)

23. **Explain the scientific method in detail with suitable examples.**

24. **Write an essay on project method with definitions, steps, types, teacher's role, and merits.**

25. **Discuss the conceptual framework of constructivism and its classroom characteristics.**

Model Question Paper 3

Total: 80 Marks

Section A — 2 marks each (Answer all 10)

1. **State any two products of science.**

2. **List two basic processes of science.**

3. **Mention two integrated process skills of science.**

4. **What is meant by science as an ongoing process of enquiry?**
5. **Which commission (1964–66) emphasized strengthening science education?**
6. **Define "formulation of hypothesis."**
7. **What is link practice in micro teaching?**
8. **Who developed the heuristic method?**
9. **Define simulation.**
10. **Who introduced the concept of Zone of Proximal Development?**

Section B — 4 marks each (Answer any 10 out of 12)

11. **Write four points highlighting the importance of enquiry in science learning.**
12. **Describe the essential skills required in scientific enquiry.**
13. **Explain how the scientific method links classroom situations with real life.**
14. **Explain the skill of introducing a lesson with components.**
15. **Write short notes on reinforcement skill with examples.**
16. **Explain criteria of a good project.**
17. **Write short notes on principles of Dalton Plan.**
18. **Explain the role of a teacher in role play.**
19. **Explain Vygotsky's concept of Zone of Proximal Development with example.**
20. **Write short notes on strategies for developing children's concepts.**
21. **Explain the role of praxis in critical pedagogy.**

22. Explain the influence of science on agriculture and industry.

Section C — 10 marks each (Answer any 2 out of 3)

23. Explain in detail how science is both a product and a process.

24. Explain the heuristic method with principles, procedures, merits, and demerits.

25. Explain Piaget's theory of genetic epistemology and its implications for learning.

Model Question Paper 4

Total: 80 Marks

Section A — 2 marks each (Answer all 10)

1. **How should teachers respond to student enquiries in enquiry-based learning?**
2. **Mention any two skills developed through scientific enquiry.**
3. **When did educationalists begin to realize the importance of science education?**
4. **Name any two scientists whose discoveries are treasures of mankind.**
5. **What is the last step of the scientific method?**
6. **What is the main purpose of feedback in micro teaching?**
7. **State two types of projects.**
8. **Mention any two principles of Dalton Plan.**
9. **Mention two purposes of group discussion.**

10. Who proposed the theory of multiple intelligences?

Section B — 4 marks each (Answer any 10 out of 12)

11. Explain the role of the teacher in developing enquiry skills among students.

12. Describe the utilitarian values of science teaching with examples.

13. Write short notes on collecting and interpreting data.

14. Write any four merits of micro teaching.

15. Write any four limitations of micro teaching.

16. Explain the steps of the guided discovery approach.

17. Write short notes on the merits and limitations of the seminar.

18. Explain principles of brainstorming with examples.

19. Explain Howard Gardner's theory of multiple intelligences.

20. Explain any four tips for managing group learning.

21. Explain the role of teachers and learners in concept development.

22. Explain critical pedagogy and its classroom applications.

Section C — 10 marks each (Answer any 2 out of 3)

23. Discuss the importance of science as a school subject with reference to various values.

24. Explain problem solving method with steps, merits, and demerits.

25. Discuss Vygotsky's social constructivism with special reference to ZPD and scaffolding.

Model Question Paper 5

Total: 80 Marks

Section A — 2 marks each (Answer all 10)

1. **Write one method to encourage enquiry among students.**
2. **State two intellectual values of science teaching.**
3. **State two disciplinary values of science teaching.**
4. **Write two aesthetic values of science teaching.**
5. **Define group discussion.**
6. **Define debate.**
7. **Mention one feature of enquiry-based learning.**
8. **Give one example of inductive reasoning.**
9. **Give one example of deductive reasoning.**
10. **Define collaborative learning.**

Section B — 4 marks each (Answer any 10 out of 12)

11. **How does scientific enquiry help students become autonomous learners?**
12. **Explain the disciplinary and vocational values of science teaching.**
13. **How does classroom atmosphere contribute to scientific attitude?**
14. **Explain the skill of probing questions with examples.**

15. Write short notes on Activity-Based Learning with examples.

16. Explain the enquiry approach with its characteristics.

17. Write short notes on types of simulation.

18. Explain the procedure of seminar in classroom teaching.

19. Compare psychological and logical approaches.

20. Explain collaborative learning and its structures in classroom teaching.

21. Explain the vision of education in the new curriculum (issue-based learning in Kerala).

22. Explain correlation of science with mathematics.

Section C — 10 marks each (Answer any 2 out of 3)

23. Critically examine the complementary relationship between product and process aspects of science.

24. Compare inductive, deductive, discovery, and enquiry approaches of teaching science.

25. Discuss the role of science and technology in agriculture, industry, government, medicine, and education.