

General Instructions:

- (i) The question paper comprises two Sections, A and B. You are to attempt both the sections.
- (ii) All questions are compulsory.
- (iii) There is no choice in any of the questions.
- (iv) All questions of Section A and all questions of Section B are to be attempted separately.
- (v) Question numbers 1 to 3 in Section A are one-mark questions. These are to be answered in one word or in one sentence.
- (vi) Question numbers 4 to 6 in Section A are two-marks questions. These are to be answered in about 30 words each.
- (vii) Question numbers 7 to 18 in Section A are three-marks questions. These are to be answered in about 50 words each.
- (viii) Question numbers 19 to 24 in Section A are five-marks questions. These are to be answered in about 70 words each.
- (ix) Question numbers 25 to 33 in Section B are multiple choice questions based on practical skills. Each question is a one-mark question. You are to select one most appropriate response out of the four provided to you.
- (x) Question numbers 34 to 36 in Section B are two-marks questions based on practical skills. These are to be answered in brief.

SECTION-A

1. Write the molecular formula of the 2nd and the 3rd member of the homologous series whose first member is methane.
2. When a cell reproduces, what happens to its DNA?
3. In the following food chain, 100 J of energy is available to the lion. How much energy was available to the producer?
Plants → Deer → Lion
4. An object is placed at a distance of 30 cm from a concave lens of focal length 15 cm. List four characteristics (nature, position, etc.) of the image formed by the lens.
5. State two advantages of conserving
 - (i) forests, and (ii) wild-life.
6. Explain two main advantages associated with water harvesting at the community level.
7. Write the structural formula of ethanol. What happens when it is heated with excess of conc. H_2SO_4 at 443 K? Write the chemical equation for the reaction stating the role of conc. H_2SO_4 in this reaction.
8. Distinguish between esterification and saponification reactions with the help of the chemical equations for each. State one use of each
 - (i) esters, and (ii) saponification process.
9. Write the number of periods and groups in the Modern Periodic Table. How does the metallic character of elements vary on moving
 - (i) from left to right in a period, and
 - (ii) down a group?Give reason to justify your answer.
10. Na, Mg and Al are the elements of the 3rd period of the Modern Periodic Table having group number 1, 2 and 13 respectively. Which one of these elements has the
 - (a) highest valency,
 - (b) largest atomic radius, and
 - (c) maximum chemical reactivity?Justify your answer stating the reason for each.
11. Reproduction is one of the most important characteristics of living beings. Give three reasons in support of the statement.
12. What is vegetative propagation? State two advantages and two disadvantages of this method.
13. List three techniques that have been developed to prevent pregnancy. Which one of these techniques is not meant for males? How does the use of these techniques have a direct impact on the health and prosperity of a family?
14. How did Mendel explain that it is possible that a trait is inherited but not expressed in an organism?

15. "Evolution and classification of organisms are interlinked." Give reasons to justify this statement.
16. If the image formed by a lens for all positions of an object placed in front of it is always erect and diminished, what is the nature of this lens ? Draw a ray diagram to justify your answer. If the numerical value of the power of this lens is 10 D, what is its focal length in the Cartesian system?
17. State the cause of dispersion of white light by a glass prism. How did Newton, using two identical glass prisms, show that white light is made of seven colours? Draw a ray diagram to show the path of a narrow beam of white light, through a combination of two identical prisms arranged together in inverted position with respect to each other, when it is allowed to fall obliquely on one of the faces of the first prism of the combination.
18. (a) Water is an elixir of life, a very important natural resource. Your Science teacher wants you to prepare a plan for a formative assessment activity, "How to save water, the vital natural resource". Write any two ways that you will suggest to bring awareness in your neighbourhood, on 'how to save water'.
- (b) Name and explain any one way by which the underground water table does not go down further.
19. Why are certain compounds called hydrocarbons ? Write the general formula for homologous series of alkanes, alkenes and alkynes and also draw the structure of the first member of each series. Write the name of the reaction that converts alkenes into alkanes and also write a chemical equation to show the necessary conditions for the reaction to occur.
20. (a) Write the functions of each of the following parts in a human female reproductive system:
- Ovary
 - Uterus
 - Fallopian tube
- (b) Write the structure and functions of placenta in a human female.
21. With the help of one example for each, distinguish between the acquired traits and the inherited traits. Why are the traits/experiences acquired during the entire lifetime of an individual not inherited in the next generation? Explain the reason of this fact with an example.
22. Analyse the following observation table showing variation of image-distance (v) with object-distance (u) in case of a convex lens and answer the questions that follow without doing any calculations:

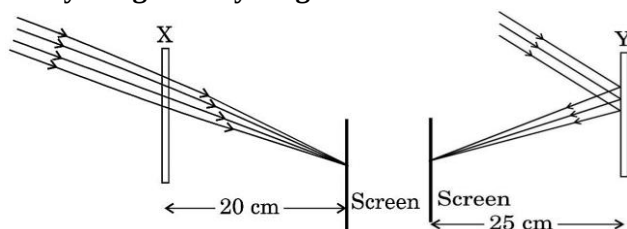
S.No.	Object-Distance u(cm)	Image-Distance v(cm)
1	-100	+25
2	-60	+30
3	-40	+40
4	-30	+60
5	-25	+100
6	-15	+120

- (a) What is the focal length of the convex lens ? Give reason to justify your answer.
- (b) Write the serial number of the observation which is not correct. On what basis have you arrived at this conclusion ?
- (c) Select an appropriate scale and draw a ray diagram for the observation at S.No.2. Also find the approximate value of magnification.
23. (a) If the image formed by a mirror for all positions of the object placed in front of it is always diminished, erect and virtual, state the type of the mirror and also draw a ray diagram to justify your answer. Write one use such mirrors are put to and why.
- (b) Define the radius of curvature of spherical mirrors. Find the nature and focal length of a spherical mirror whose radius of curvature is +24 cm .
24. (a) A student suffering from myopia is not able to see distinctly the objects placed beyond 5 m . List two possible reasons due to which this defect of vision may have arisen. With the help of ray diagrams, explain

- (i) why the student is unable to see distinctly the objects placed beyond 5 m from his eyes.
(ii) the type of the corrective lens used to restore proper vision and how this defect is corrected by the use of this lens.
(b) If, in this case, the numerical value of the focal length of the corrective lens is 5 m, find the power of the lens as per the new Cartesian sign convention.

SECTION-B

- 25. When you add a few drops of acetic acid to a test-tube containing sodium bicarbonate powder, which one of the following is your observation?**
(a) No reaction takes place
(b) A colourless gas with pungent smell is released with brisk effervescence
(c) A brown coloured gas is released with brisk effervescence
(d) Formation of bubbles of a colourless and odourless gas
- 26. While studying the saponification reaction, what do you observe when you mix an equal amount of colourless vegetable oil and 20% aqueous solution of NaOH in a beaker?**
(a) The colour of the mixture has become dark brown
(b) A brisk effervescence is taking place in the beaker
(c) The outer surface of the beaker has become hot
(d) The outer surface of the beaker has become cold
- 27. A student requires hard water for an experiment in his laboratory which is not available in the neighbouring area. In the laboratory there are some salts, which when dissolved in distilled water can convert it into hard water. Select from the following groups of salts, a group, each salt of which when dissolved in distilled water will make it hard.**
(a) Sodium chloride, Potassium chloride
(b) Sodium sulphate, Potassium sulphate
(c) Sodium sulphate, Calcium sulphate
(d) Calcium sulphate, Calcium chloride
- 28. To perform an experiment to identify the different parts of an embryo of a dicot seed, first of all you require a dicot seed. Select dicot seeds from the following group:**
Wheat, Gram, Maize, Pea, Barley, Ground-nut
(a) Wheat, Gram and Pea
(b) Gram, Pea and Ground-nut
(c) Maize, Pea and Barley
(d) Gram, Maize and Ground-nut
- 29. The following vegetables are kept in a basket :**
Potato, Tomato, Radish, Brinjal, Carrot, Bottle-gourd
Which two of these vegetables correctly represent the homologous structures?
(a) Carrot and Tomato (b) Potato and Brinjal
(c) Radish and Carrot (d) Radish and Bottle-gourd
- 30. Study the given ray diagrams and select the correct statement from the following :**



- (a) Device X is a concave mirror and device Y is a convex lens, whose focal lengths are 20 cm and 25 cm respectively.
(b) Device X is a convex lens and device Y is a concave mirror, whose focal lengths are 10 cm and 25 cm respectively.
(c) Device X is a concave lens and device Y is a convex mirror, whose focal lengths are 20 cm and 25 cm

respectively.

(d) Device X is a convex lens and device Y is a concave mirror, whose focal lengths are 20 cm and 25 cm respectively.

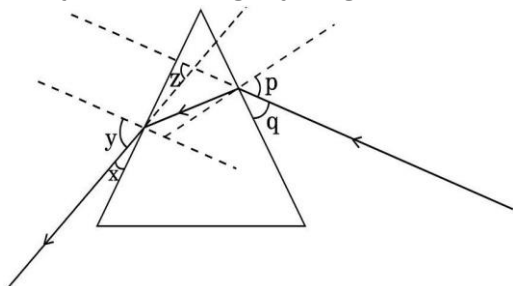
31. A student obtains a blurred image of a distant object on a screen using a convex lens. To obtain a distinct image on the screen he should move the lens

- (a) away from the screen
- (b) towards the screen
- (c) to a position very far away from the screen
- (d) either towards or away from the screen depending upon the position of the object

32. A student very cautiously traces the path of a ray through a glass slab for different values of the angle of incidence ($\angle i$). He then measures the corresponding values of the angle of refraction ($\angle r$) and the angle of emergence ($\angle e$) for every value of the angle of incidence. On analysing these measurements of angles, his conclusion would be

- (a) $\angle i > \angle r > \angle e$ (b) $\angle i = \angle e > \angle r$
- (c) $\angle i < \angle r < \angle e$ (d) $\angle i = \angle e < \angle r$

33. Study the following ray diagram:



In this diagram, the angle of incidence, the angle of emergence and the angle of deviation respectively have been represented by

- (a) y, p, z (b) x, q, z
- (c) p, y, z (d) p, z, y

34. Mention the essential material (chemicals) to prepare soap in the laboratory. Describe in brief the test of determining the nature (acidic/alkaline) of the reaction mixture of saponification reaction.

35. Draw in sequence (showing the four stages), the process of binary fission in Amoeba.

36. A student focuses the image of a candle flame, placed at about 2 m from a convex lens of focal length 10 cm, on a screen. After that he moves gradually the flame towards the lens and each time focuses its image on the screen.

- (a) In which direction does he move the lens to focus the flame on the screen?
- (b) What happens to the size of the image of the flame formed on the screen?
- (c) What difference is seen in the intensity (brightness) of the image of the flame on the screen?
- (d) What is seen on the screen when the flame is very close (at about 5 cm) to the lens?