

CBSE Board
Class X Summative Assessment – II
Science
Board Question Paper 2014 – Set 3

Time: 3 hrs

Max. Marks: 90

Note:

- Please check that this question paper contains 24 printed pages.
 - Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
 - Please check that this question paper contains 42 questions.
 - **Please write down the Serial Number of the question before attempting it.**
 - 15 minutes time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.
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General Instructions:

- (i) The question paper comprises of two Sections, A and B. You are to attempt both the sections.
- (ii) All questions are compulsory.
- (iii) All questions of Section A and all questions of Section B are to be attempted separately.
- (iv) Question numbers 1 to 8 in Section A are one-mark questions. These are to be answered in one word or in one sentence.
- (v) Question numbers 4 to 7 in Section A are two-marks questions. These are to be answered in about 30 words each.
- (vi) Question numbers 8 to 19 in Section A are three-marks questions. These are to be answered in about 50 words each.
- (vii) Question numbers 20 to 24 in Section A are five-marks questions. These are to be answered in about 70 words each.
- (viii) Question numbers 25 to 42 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.

SECTION A

- 1. The atomic numbers of three elements A, B and C are 12, 18 and 20 respectively. State, giving reason, which two elements will show similar properties. (1)
- 2. No two individuals are absolutely alike in a population. Why? (1)
- 3. Write one negative effect of affluent lifestyle of few persons on the environment. (1)

4. Draw labelled diagrams to illustrate budding in *Hydra*. (2)
5. "A concave mirror of focal length 15 cm can form a magnified, erect as well as inverted image of an object placed in front of it." Justify this statement stating the position of the object with respect to the pole of the mirror in both the cases for obtaining the images. (2)
6. State with reason any two possible consequences of elimination of decomposers from the Earth. (2)
7. What is water harvesting? How can this technique help in the conservation of water? (2)
8. Study the following table in which positions of six elements A, B, C, D, E and F are shown as they are in the modern periodic table: (3)

Group → Period ↓	1	2	3-12	13	14	15	16	17	18
2	A					B			C
3				D	E				F

On the basis of the above table, answer the following questions:

- (i) Name the element which forms only covalent compounds.
 - (ii) Name the element which is a metal with valency three.
 - (iii) Name the element which is a non-metal with valency three.
 - (iv) Out of D and E, which is bigger in size and why?
 - (v) Write the common name for the family to which the elements C and F belong.
9. The elements Be, Mg and Ca each having two electrons in their outermost shells are in periods 2, 3, and 4 respectively of the modern periodic table. Answer the following questions, giving justification in each case: (3)
 - (i) Write the group to which these elements belong.
 - (ii) Name the least reactive element.
 - (iii) Name the element having largest atomic radius.
 10. A carboxylic acid (molecular formula $C_2H_4O_2$) reacts with an alcohol in the presence of an acid catalyst to form a compound 'X'. The alcohol on oxidation with alkaline $KMnO_4$ followed by acidification gives the same carboxylic acid $C_2H_4O_2$. Write the name and structure of (i) carboxylic acid, (ii) alcohol and (iii) the compound 'X'. (3)
 11. Define the term 'structural' isomerism'. Explain why propane cannot exhibit this property. Draw the structures of possible isomers of butane, C_4H_{10} . (3)

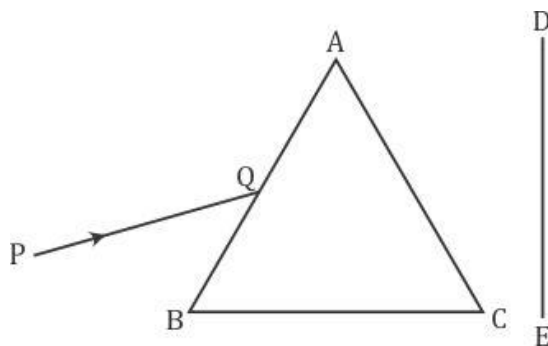
12. A student wants to project the image of a candle flame on a screen 90 cm in front of a mirror by keeping the flame at a distance of 15 cm from its pole. (3)
- (a) Suggest the type of mirror he should use.
 - (b) Determine the linear magnification in this case.
 - (c) Find the distance between the object and its image.
 - (d) Draw ray diagram to show the image formation in this case.

13. Draw a ray diagram to show the path of the refracted ray in each of the following cases: (3)

A ray of light incident on a concave lens is

- (i) passing through its optical centre.
- (ii) parallel to its principal axis.
- (iii) directed towards its principal focus.

14. A narrow beam PQ of white light is passing through a glass prism ABC as shown in the diagram. (3)

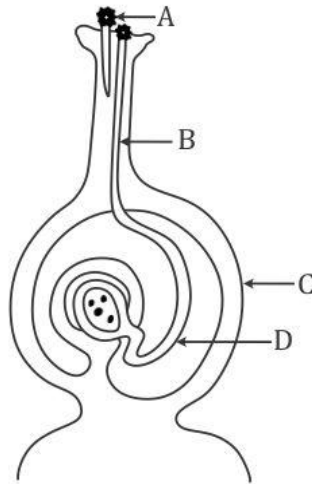


Trace it on your answer sheet and show the path of the emergent beam as observed on the screen DE.

- (i) Write the name and cause of the phenomenon observed.
 - (ii) Where else in nature is this phenomenon observed?
 - (iii) Based on this observation, state the conclusion which can be drawn about the constituents of white light.
15. "Energy flow in a food chain is unidirectional" Justify this statement. Explain how the pesticides enter a food chain and subsequently get into our body. (3)
16. Write one difference between asexual and sexual mode of reproduction. Which species is likely to have better chances of survival - the one reproducing asexually or the one reproducing sexually? Justify your answer. (3)
17. What is the effect of DNA copying, which is not perfectly accurate, on the reproduction process? How does the amount of DNA remain constant though each new generation is a combination of DNA copies of two individuals? (3)

18. List three main factors responsible for the speciation and briefly describe each one of them. (3)
19. "A trait may be inherited, but may not be expressed." Justify this statement with the help of a suitable example. (3)
20. List two reasons for carbon forming a large number of compounds. Name the type of bonding found in most of its compounds. Why does carbon form compounds mainly by this kind of bonding?
Give reason why the carbon compounds- (5)
- (i) generally have low melting and boiling points.
 - (ii) do not conduct electricity in molten state.
21. (a) List the parts of the human eye that control the amount of light entering into it. Explain how they perform this function. $\left(1\frac{1}{2}\right)$
- (b) Write the function of retina in human eye. $\left(\frac{1}{2}\right)$
- (c) Do you know that the corneal-impairment can be cured by replacing the defective cornea with the cornea of the donated eye? How and why should we organise groups to motivate the community members to donate their eyes after death? (3)
22. (a) Explain the following terms related to spherical lenses:
- (i) optical centre
 - (ii) centres of curvature
 - (iii) principal axis
 - (iv) aperture
 - (v) principal focus
 - (vi) focal length
- (b) A converging lens has focal length of 12 cm. Calculate at what distance the object should be placed from the lens so that it forms an image at 48 cm on the other side of the lens. (5)

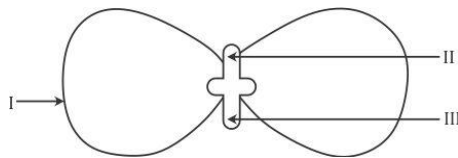
23. (a) Draw a sectional view of human female reproductive system and label the part where
- (i) eggs develop.
 - (ii) fertilisation takes place.
 - (iii) fertilised egg gets implanted.
- (b) Describe, in brief, the changes the uterus undergoes
- (i) to receive the zygote.
 - (ii) if zygote is not formed.
- (5)
24. (a) Name the parts labelled as A, B, C and D in the diagram given below:



- (b) What is pollination? State its significance.
- (c) How does fertilisation occur in flowers? Name the parts of the flower that develop into (i) seed, and (ii) fruit after fertilisation.
- (5)

SECTION B

25. In the following diagram showing the structure of embryo of a dicot seed, what are the parts marked I, II and III sequentially? (1)



- (A) Plumule, Cotyledon, Radicle
(B) Plumule, Radicle, Cotyledon
(C) Cotyledon, Plumule, Radicle
(D) Radicle, Plumule, Cotyledon
26. Study the following statements:
I. Wings of birds and wings of bats are homologous organs.
II. Wings of birds and wings of insects are modified forelimbs.
III. Wings of birds and wings of insects are analogous organs.
IV. Wings of birds and forelimbs of horse are homologous organs. (1)

The correct statements are

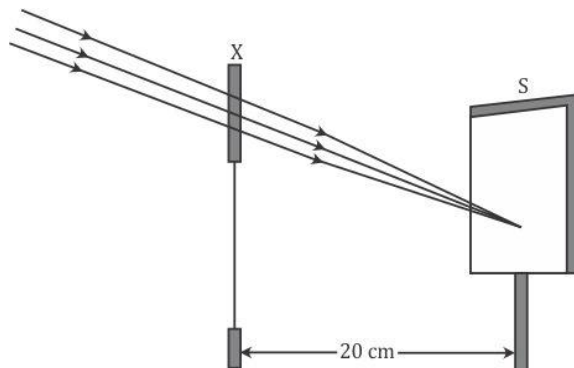
- (A) I and II
(B) II and III
(C) III and IV
(D) I and IV
27. Which of the following pairs of two vegetables represent the correct homologous structures? (1)
- (A) Sweet potato and potato
(B) Sweet potato and tomato
(C) Carrot and potato
(D) Radish and carrot

28. When you study a slide showing different stages of budding in yeast, you observe the following stages:
I. The bud may get separated from the parent body and develop into a new individual.
II. The body of the bud develops and gives rise to another baby bud.
III. A bud comes out in any direction from the body of the parent cell.
IV. Thus they may form a colony.
The proper sequence of the above stages is (1)
- (A) II, I, III, IV
(B) II, III, I, IV
(C) III, II, I, IV
(D) III, I, II, IV

29. A student has to focus his compound microscope to observe a prepared slide showing different stages of binary fission in *Amoeba*. The steps he is likely to follow are listed below in a haphazard manner:
- Adjust the diaphragm and the mirror of the microscope so that sufficient light may enter to illuminate the slide.
 - Fix the slide on the stage carefully.
 - Adjust the microscope to high power and focus.
 - Adjust the microscope to low power and focus.
- The correct sequence of the above steps to observe the slide under the microscope is (1)
- I, II, IV, III
 - II, I, IV, III
 - II, IV, I, III
 - I, IV, II, III
30. A student takes about 2 mL ethanoic acid in a dry test tube and adds a pinch of sodium hydrogen carbonate to it. He reports the following observations:
- Immediately a colourless and odourless gas evolves with a brisk effervescence.
 - The gas turns lime water milky when passed through it.
 - The gas burns with an explosion when a burning splinter is brought near it.
 - The gas extinguishes the burning splinter that is brought near it.
- The correct observations are (1)
- I, II and III
 - II, III and IV
 - III, IV and I
 - I, II and IV
31. In an experiment to study the properties of ethanoic acid, a student takes about 3 mL of ethanoic acid in a dry test tube. He adds an equal amount of distilled water to it and shakes the test tube well. After some time he is likely to observe that (1)
- a colloid is formed in the test tube.
 - the ethanoic acid dissolves readily in water.
 - the solution becomes light orange.
 - water floats over the surface of ethanoic acid.
32. We need 20% aqueous solution of sodium hydroxide for the study of saponification reaction. When we open the lid of the bottle containing solid sodium hydroxide we observe it in which form? (1)
- Colourless transparent beads
 - Small white beads
 - White pellets/flakes
 - Fine white powder

33. While studying saponification reaction, a student measures the temperature of the reaction mixture and also finds its nature using blue/red litmus paper. On the basis of his observations the correct conclusion would be (1)
- (A) the reaction is exothermic and the reaction mixture is acidic.
(B) the reaction is endothermic and the reaction mixture is acidic.
(C) the reaction is endothermic and the reaction mixture is basic.
(D) the reaction is exothermic and the reaction mixture is basic.
34. In a locality, hard water, required for an experiment, is not available. However, the following salts are available in the school laboratory:
1. Sodium sulphate
 2. Calcium sulphate
 3. Magnesium chloride
 4. Sodium chloride
 5. Calcium chloride
 6. Potassium sulphate
- Which of the above salts may be dissolved in water to obtain hard water for the experiment? (1)
- (A) 2, 3 and 5
(B) 1, 2 and 5
(C) 1, 2, 4 and 6
(D) 3 and 5 only

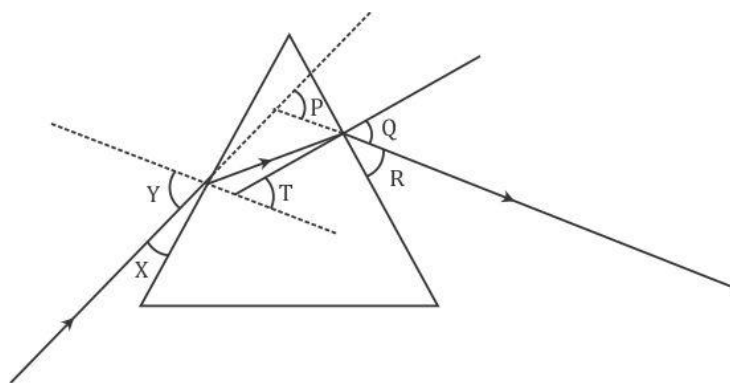
35. A student focused the Sun rays using an optical device 'X' on a screen S as shown.



- From this it may be concluded that the device 'X' is a (select the correct option) (1)
- (A) Convex lens of focal length 10 cm.
(B) Convex lens of radius of curvature 20 cm.
(C) Convex lens of focal length 20 cm.
(D) Concave mirror of focal length 20 cm.

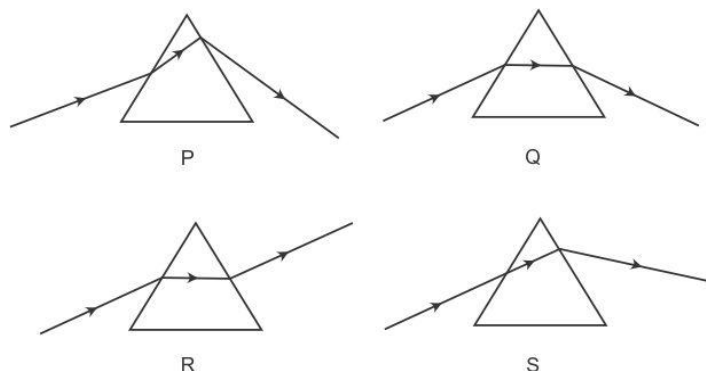
36. A student has obtained an image of a well-illuminated distant object on a screen to determine the focal length, F_1 of the given spherical mirror. The teacher then gave him another mirror of focal length, F_2 and asked him to obtain a focused image of the same object on the same screen. The student found that in order to focus the same object using the second mirror, he has to move the mirror away from the screen. From this observation, it may be concluded that both the spherical mirrors given to the student were (select the correct option) (1)
- (A) Concave and $F_1 < F_2$
(B) Concave and $F_1 > F_2$
(C) Convex and $F_1 < F_2$
(D) Convex and $F_1 > F_2$

37. In the following diagram, the path of a ray of light passing through a glass prism is shown:



- In this diagram the angle of incidence, the angle of emergence and the angle of deviation respectively are (select the correct option): (1)
- (A) X, R and T
(B) Y, Q and T
(C) X, Q and P
(D) Y, Q and P

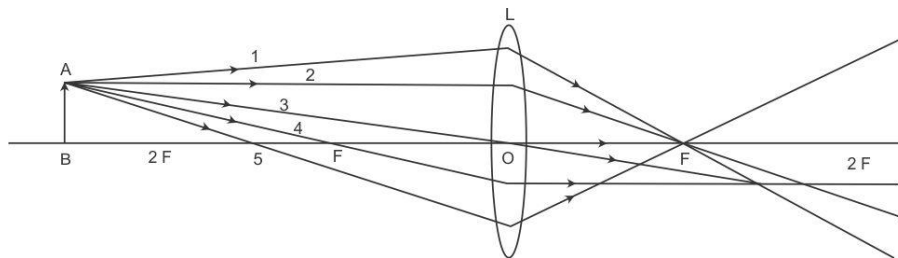
38. Study the following diagrams in which the path of a ray of light passing through a glass prism as traced by four students P, Q, R and S is shown:



The student who has traced the path correctly is (1)

- (A) P
- (B) Q
- (C) R
- (D) S

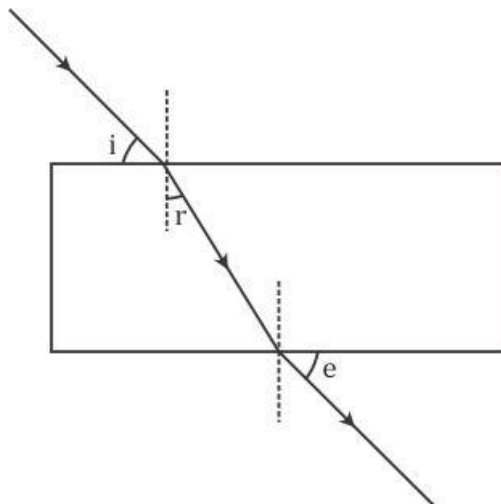
39. A student is using a convex lens of focal length 18 cm to study the image formation by it for the various positions of the object. He observes that when he places the object at 27 cm, the location of the image is at 54 cm on the other side of the lens. Identify from the following diagram the three rays that are obeying the laws of refraction and may be used to draw the corresponding ray diagram. (1)



- (A) 1, 2 and 4
- (B) 1, 3 and 5
- (C) 2, 4 and 5
- (D) 2, 3 and 4

40. A student is using a convex lens of focal length 10 cm to study the image formation by a convex lens for the various positions of the object. In one of his observations, he may observe that when the object is placed at a distance of 20 cm from the lens, its image is formed at (select the correct option) (1)
- (A) 20 cm on the other side of the lens and is of the same size, real and erect.
 - (B) 40 cm on the other side of the lens and is magnified, real and inverted.
 - (C) 20 cm on the other side of the lens and is of the same size, real and inverted.
 - (D) 20 cm on the other side of the lens and is of the same size, virtual and erect.

41. A student traces the path of a ray of light passing through a rectangular glass slab and marks the angle of incidence i , angle of refraction r and angle of emergence e , as shown.



The correctly marked angle(s) is/are

(1)

- (A) $\angle i$ only
- (B) $\angle e$ only
- (C) $\angle r$ only
- (D) $\angle i$ and $\angle e$

42. After tracing the path of a ray of light passing through a rectangular glass slab for four different values of the angle of incidence, a student reported his observations in tabular form as given below:

S. No	$\angle i$	$\angle r$	$\angle e$
I	30°	19°	29°
II	40°	28°	40°
III	50°	36°	50°
IV	60°	40°	59°

The best observation is

(1)

- (A) I
- (B) II
- (C) III
- (D) IV