CBSE
Class X Science
Board Paper – 2015 (Set 2)
Term II

Time allowed: 3 hours **Maximum Marks: 90**

General Instructions:

1. The question paper comprises of **two sections, A and B**. You are to attempt both the sections.
2. All questions are compulsory.
3. There is no choice in any of the questions.
4. All questions of **Section A** and all questions of **Section B** are to be attempted separately.
5. Question numbers **1** to **3** in **Section A** are **one-mark** questions. These are to be answered in one word or in one sentence.
6. Question numbers **4** to **6** in **Section A** are **two-marks** questions. These are to be answered in about 30 words each**.**
7. Question numbers **7** to **18** in **Section A** are **three-marks** questions. These are to be answered in about 50 words each**.**
8. Question numbers **19** to **24** in **Section A** are **five-marks** questions. These are to be answered in about 70 words each**.**
9. 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.
10. 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 number of covalent bonds in the molecule of propane, C_3H_8. [1]

2. Where is DNA found in a cell? [1]

3. The first trophic level in a food chain is always a green plant. Why? [1]

4. The absolute refractive indices of glass and water are 4/3 and 3/2, respectively. If the speed of light in glass is 2×10^8 m/s, calculate the speed of light in [2]
(a) vacuum
(b) water

5. We often observe domestic waste decomposing in the bylanes of our homes. List four ways to make the residents aware that improper disposal of wastes is harmful to the environment and also for their own health. [2]

6. List any two advantages associated with water stored in the ground. [2]

7. What is meant by homologous series of carbon compounds? Classify the following carbon compounds into two homologous series and name them. [3]
C_3H_4, C_3H_6, C_4H_6, C_4H_8, C_5H_8, C_5H_{10}

8. List two tests for experimentally distinguishing between an alcohol and a carboxylic acid and describe how these tests are performed. [3]

9. The elements $_4Be$, $_{12}Mg$ and $_{20}Ca$, each having two valence electrons in their valence shells, are in periods 2, 3 and 4, respectively, of the modern periodic table. Answer the following questions associated with these elements, giving reason in each case: [3]
(a) In which group should they be?
(b) Which one of them is least reactive?
(c) Which one of them has the largest atomic size?

10. Taking the example of an element of atomic number 16, explain how the electronic configuration of the atom of an element relates to its position in the modern periodic table and how valency of an element is calculated on the basis of its atomic number. [3]

11. List three distinguishing features between sexual and asexual reproduction in tabular form. [3]

12. List four points of significance of reproductive health in a society. Name any two areas related to the reproductive health which have improved over the past 50 years in our country. [3]

13. What are chromosomes? Explain how in sexually reproducing organisms the number of chromosomes in the progeny is maintained. [3]

14. A pea plant with blue colour flower denoted by BB is cross-bred with a pea plant with white flower denoted by ww. [3]
(a) What is the expected colour of the flowers in their F_1 progeny?
(b) What will be the percentage of plants bearing white flower in F_2 generation when the flowers of F_1 plants were selfed?
(c) State the expected ratio of the genotype BB and Bw in their F_2 progeny?

15. Explain the following: [3]
(a) Speciation
(b) Natural Selection

16. What is meant by scattering of light? Use this phenomenon to explain why the clear sky appears blue or the Sun appears reddish at sunrise. [3]

17. If the image formed by a mirror for all positions of the object placed in front of it is always erect and diminished, what type of mirror is it? Draw a ray diagram to justify your answer. Where and why do we generally use this type of mirror? [3]

18. What is an ecosystem? List its two main components. We do not clean natural ponds or lakes, but an aquarium needs to be cleaned regularly. Why is it so? Explain. [3]

19. What are fossils? How are they formed? Describe in brief two methods of determining the age of fossils. State any one role of fossils in the study of the process of evolution? [5]

20. [5]
(a) Name the human male reproductive organ that produces sperms and also secretes a hormone. Write the functions of the secreted hormone.
(b) Name the parts of the human female reproductive system where
i. fertilisation takes place
ii. implantation of the fertilised egg occurs
Explain how the embryo gets nourishment inside the mother's body.

21. What is meant by power of a lens? Define its SI unit. [5]
You have two lenses A and B of focal lengths +10 cm and –10 cm, respectively. State the nature and power of each lens. Which of the two lenses will form a virtual and magnified image of an object placed 8 cm from the lens? Draw a ray diagram to justify your answer.

22. Write the importance of ciliary muscles in the human eye. Name the defect of vision that arises due to gradual weakening of the ciliary muscles. What types of lenses are required by the person suffering from this defect to see the objects clearly? [5]

Akshay, sitting in the last row in his class, could not see clearly the words write on the blackboard. When the teacher noticed it, he announced if any student sitting in the front row could volunteer to exchange his seat with Akshay. Salman immediately agreed to exchange his seat with Akshay. He could now see the words written on the blackboard clearly. The teacher thought it fit to send the message to Akshay's parents advising them to get his eyesight checked.
In the context of the above event, answer the following questions:

(a) Which defect of vision is Akshay suffering from? Which type of lens is used to correct this defect?
(b) State the values displayed by the teacher and Salman.
(c) In your opinion, in what way can Akshay express his gratitude towards the teacher and Salman?

23. One half of a convex lens of focal length 10 cm is covered with a black paper. Can such a lens produce an image of a complete object placed at a distance of 30 cm from the lens? Draw a ray diagram to justify your answer.
A 4 cm tall object is placed perpendicular to its principal axis of a convex lens of focal length 20 cm. The distance of the object from the lens is 15 cm. Find the nature, position and the size of the image. [5]

24. Both soap and detergent are some type of salts. What is the difference between them? Describe in brief the cleansing action of soap. Why do soaps not form lather in hard water? List two problems that arise due to the use of detergents instead of soaps. [5]

SECTION B

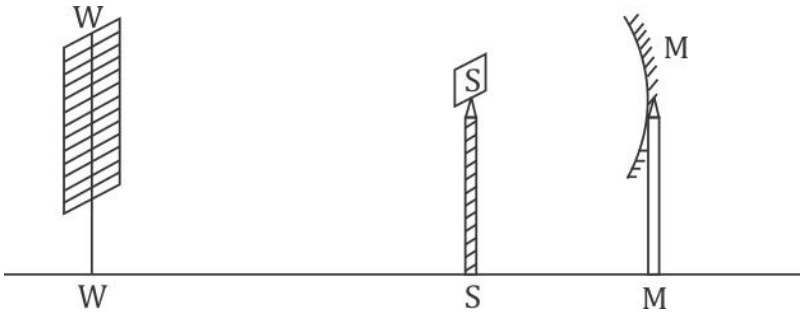
25. Given below is the list of vegetables available in the market. Select from these the two vegetables having homologous structures:
Potato, sweet potato, ginger, radish, tomato, carrot, okra (Lady's finger) [1]
(A) Potato and sweet potato
(B) Radish and carrot
(C) Okra and sweet potato
(D) Potato and tomato

26. A student was asked to observe and identify the various parts of an embryo of a red kidney bean seed. He identified the parts and listed them as under: [1]
I. Tegmen
II. Testa
III. Cotyledon
IV. Radicle
V. Plumule
The correctly identified parts among these are
(A) I, II and III
(B) II, III and IV
(C) III, IV and V
(D) I, III, IV and V

27. A student traces the path of a ray of light through a triangular glass prism for different values of angle of incidence. On analyzing the ray diagrams, which one of the following conclusions is he likely to draw? [1]
(A) The emergent ray is parallel to the incident ray.
(B) The emergent ray bends at an angle to the direction of the incident ray.
(C) The emergent ray and the refracted ray are at right angles to each other.
(D) The emergent ray is perpendicular to the incident ray.

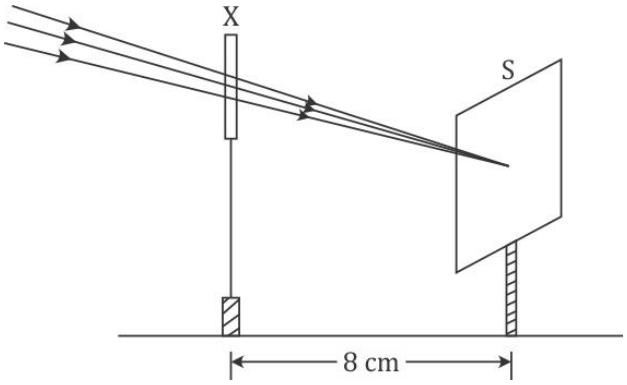
28. A student traces the path of a ray of light through a rectangular glass slab for the different values of angle of incidence. He observes all possible precautions at each step of the experiment. At the end of the experiment, on analyzing the measurements, which of the following conclusions is he likely to draw? [1]
(A) $\angle i = \angle e < \angle r$
(B) $\angle i < \angle e < \angle r$
(C) $\angle i > \angle e > \angle r$
(D) $\angle i = \angle e > \angle r$

29. A student obtains a sharp image of the distant window (W) of the school laboratory on the screen (S) using the given concave mirror (M) to determine its focal length. Which of the following distances should he measure to get the focal length of the mirror? [1]



(A) MW
(B) MS
(C) SW
(D) MW–MS

30. A student used a device (X) to obtain/focus the image of a well illuminated distant building on a screen (*S*) as shown below in the diagram. Select the correct statement about the device (X). [1]



(A) This device is a concave lens of focal length 8 cm.
(B) This device is a convex mirror of focal length 8 cm.
(C) This device is a convex lens of focal length 4 cm.
(D) This device is a convex lens of focal length 8 cm.

31. A student takes about 4 ml of distilled water in four test tubes marked P, Q, R and S. He then dissolves in each test tube an equal amount of one salt in one test tube, namely sodium sulphate in P, potassium sulphate in Q, calcium sulphate in R and magnesium sulphate in S. After that he adds an equal amount of soap solution in each test tube. On shaking each of these test tubes well, he observes a good amount of lather (foam) in the test tube marked [1]
(A) P and Q
(B) Q and R
(C) P, Q and S
(D) P, R and S

32. What do we observe on pouring acetic acid on red and blue litmus papers? [1]
(A) Red litmus remains red and blue litmus turns red.
(B) Red litmus turns blue and blue litmus remains blue.
(C) Red litmus turns blue and blue litmus turns red.
(D) Red litmus becomes colourless and blue litmus remains blue.

33. While preparing soap a small quantity of common salt is generally added to the reaction mixture of vegetable oil and sodium hydroxide. Which one of the following may be the purpose of adding common salt? [1]
(A) To reduce the basic nature of the soap
(B) To make the soap neutral
(C) To enhance the cleansing power of the soap
(D) To favour the precipitation of the soap

34. A 4 cm tall object is placed on the principal axis of a convex lens. The distance of the object from the optical centre of the lens is 12 cm and its sharp image is formed at a distance of 24 cm from it on a screen on the other side of the lens. If the object is now moved a little away from the lens, in which way (towards the lens or away from the lens) will he have to move the screen to get a sharp image of the object on it again? How will the magnification of the image be affected? [2]

35. When you add sodium hydrogen carbonate to acetic acid in a test tube, a gas liberates immediately with brisk effervescence. Name this gas. Describe the method of testing this gas. [2]

36. Students were asked to observe the permanent slides showing different stages of budding in yeast under high power of a microscope. [2]
(A) Which adjustment screw (coarse/fine) were you asked to move to focus the slides?
(B) Draw three diagrams in correct sequence showing budding in yeast.