

CLASS X (2020-21)
SCIENCE (CODE 086)
SAMPLE PAPER-10

Time : 3 Hours

Maximum Marks : 80

General Instructions :

- (i) The question paper comprises four sections A, B, C and D. There are 36 questions in the question paper. All questions are compulsory.
 - (ii) Section–A – question no. 1 to 20 - all questions and parts thereof are of one mark each. These questions contain multiple choice questions (MCQs), very short answer questions and assertion - reason type questions. Answers to these should be given in one word or one sentence.
 - (iii) Section–B – question no. 21 to 26 are short answer type questions, carrying 2 marks each. Answers to these questions should in the range of 30 to 50 words.
 - (iv) Section–C – question no. 27 to 33 are short answer type questions, carrying 3 marks each. Answers to these questions should in the range of 50 to 80 words.
 - (v) Section–D – question no. 34 to 36 are long answer type questions carrying 5 marks each. Answer to these questions should be in the range of 80 to 120 words.
 - (vi) There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
 - (vii) Wherever necessary, neat and properly labeled diagrams should be drawn.
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SECTION-A

Q1. What is a chemical equation? [1]

OR

Balance the following chemical equation:

Q2. What is a neutralisation reaction? [1]

Q3. Define allotropy. [1]

Q4. In which forms do most plants absorb nitrogen? [1]

Q5. What is ascent of sap? [1]

OR

Which is the major nitrogenous waste product in human beings? How is it removed from the body?

Q6. Why does lack of oxygen in muscles often lead to cramps among cricketers? [1]

Q7. Write two different uses of concave mirrors. [1]

OR

Define the term magnification.

Q8. Draw a labelled ray diagram to show the path of the reflected ray corresponding to an incident ray of light parallel to the principal axis of a convex mirror. Mark the angle of incidence and angle of reflection on it. [1]

Q9. Why do we see a rainbow in the sky only after rainfall? [1]

Q10. Mention the condition under which a current can flow in a conductor. [1]

OR

What are the special features of a heating wire?

Q11. On what effect of an electric current does an electromagnet work? [1]

Q12. State Faraday's law of electromagnetic induction. [1]

Q13. Which of the following are always at the second trophic level of food chains?
Carnivores, Autotrophs, Herbivores [1]

OR

What will be the amount of energy available to the organisms of the 2nd trophic level of a food chain, if the energy available at the first trophic level is 10,000 joules?

For question numbers 14, 15 and 16, two statements are given-one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below :

(a) Both A and R are true and R is correct explanation of the assertion.

(b) Both A and R are true but R is not the correct explanation of the assertion.

(c) A is true but R is false.

(d) A is false but R is true.

Q14. **Assertion :** Calcium carbonate when heated gives calcium oxide and water.
Reason : On heating calcium carbonate, decomposition reaction takes place. [1]

Q15. **Assertion :** Mutation is sudden change in the genetic material.
Reason : Variation is useful for the survival of species over time. [1]

Q16. **Assertion :** Man is a herbivore.
Reason : Omnivores eat both plant parts and meat of animals. [1]

OR

Assertion : The food in the ecosystem is preserved in a linear fashion.

Reason : Plants use the solar energy in reducing carbon dioxide to carbon.

Q17. **Read the following and answer any four questions from 17.1 to 17.5.** 1 × 4

In Modern Periodic Table, metals are towards the left hand side, non-metals are towards the right hand side and there is a zig-zag line between them which contains metalloids.

Metals are electropositive, i.e., they have a tendency to lose electrons. As the effective nuclear charge acting on the valence shell electrons increases across a period, the tendency to lose electron will decrease so metallic character decreases. Down the group, the effective nuclear charge experienced by valence electrons is decreasing because the outermost electrons are farther away from the nucleus. Therefore, they can be lost easily and thus metallic character increases down the group.

Non-metals on the other hand, are electronegative. They tend to form bonds by gaining electrons. Non-metallic character increases along the period and decreases down the group.

17.1 Which of the following element is not a metalloid?

(a) Ge

(b) As

(c) Ar

(d) Te

- 17.2** The order of metallic character of some elements is $N < P < As < Sb < Bi$. The most electronegative among these elements is
- (a) N (b) P
(c) Sb (d) Bi
- 17.3** Which of the following statements is correct?
- (a) Electronegativity increases down the group.
(b) Metallic character decreases down the group.
(c) Effective nuclear charge decreases down the group.
(d) The force of attraction between the nucleus and the outermost electrons increases down the group.
- 17.4** Which of the following property increases along the period?
- (a) Atomic size
(b) Metallic character
(c) Electropositivity
(d) Non-metallic character
- 17.5** Which of the following is the most non-metallic element?
- (a) P (b) Cl
(c) Se (d) Br

Q18. Read the following and answer any four questions from 18.1 to 18.5. 1 × 4

Energy is needed to maintain a state of order in our body. The source of energy and materials is the food we eat. Some organisms use simple food material obtained from inorganic sources and other organisms utilise complex substances. These complex substances have to be broken down into simpler ones before they can be used for the upkeep and growth of the body.

18.1 All non-green organisms fall under the category of

- (a) autotrophs
(b) heterotrophs
(c) saprobes
(d) chemotrophs

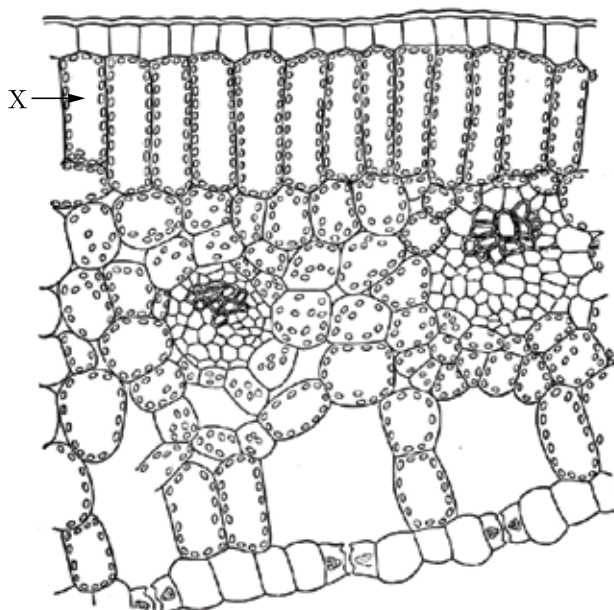
18.2 The diagram below is an experiment conducted to study a factor necessary for photosynthesis.



The test performed on the leaf and the solution used for the test are respectively

- (a) starch test and potassium iodide
(b) chlorophyll test and ethyl alcohol
(c) photosynthesis test and potassium iodide
(d) starch test and ethyl alcohol

18.3 Below given diagram represents the cross section of a leaf.



Identify “X” and choose the correct combination of plots provided in the following table.

	X	Description	Function
(a)	Chlorophyll	A green coloured pigment	Essential for photosynthesis
(b)	Chloroplast	A cell organelle	Conducts photosynthesis
(c)	Vascular bundle	Vascular tissue	Transportation in plants
(d)	Chloroplast	A green coloured pigment	Essential for photosynthesis

18.4 Which of the following statement(s) is (are) true about stomata?

- I. These are the tiny pores present on the surface of the leaves.
 II. Through these, massive amounts of gaseous exchange take place.
 III. Plants open these pores when carbon dioxide is not required for photosynthesis.
 IV. Guard cells operate the opening and closing of these pores.
- (a) I and II only (b) I and III only
 (c) I, II and III only (d) I, II and IV only

18.5 Study the table below and select the row that has the incorrect information.

	Organism	Type of heterotrophic nutrition
(a)	Amoeba	Holozoic
(b)	Mushroom	Saprophytic
(c)	Lice	Parasitic
(d)	Lion	Parasitic

Q19. Read the following and answer any four questions from 19.1 to 19.5.

1 × 4

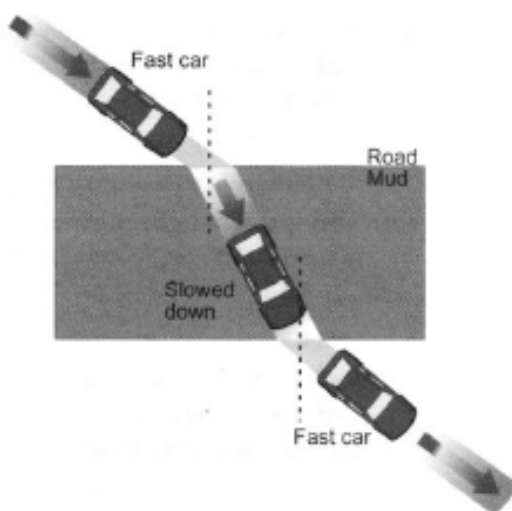
A ray of light travelling from a rarer medium to a denser medium slows down and bends towards the normal. When it travels from denser medium to a rarer medium, it speeds up and bends away from the normal.

Consider an analogy to assist in our understanding of these two important principles. Suppose that a fast car is travelling across the road towards a thick mud at an angle, the mud slows down one side of the car, and the path of the car bends.

The more it is slowed, the more it bends. Upon exiting the thick mud on the opposite side, the car speeds up and achieves its original speed. In effect, this analogy would be representative of light wave crossing two boundaries.

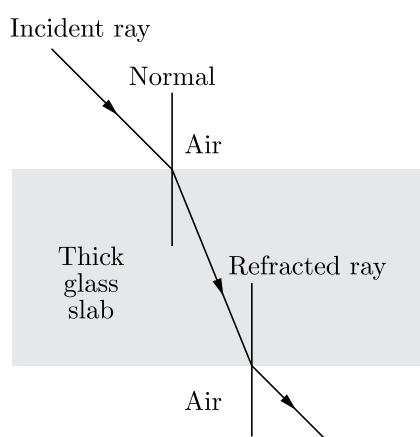
At the first boundary (the road to thick mud boundary), the light ray (or the car) would be slowing down; and at the second boundary (the mud to road boundary), the light ray (or the car) would be speeding up. We can apply our two important principles listed above and predict the direction of bending and the path of the car as it travels through the thick mud. As indicated in the diagram, upon entering the mud, the car slows down and the path of the car bends towards the normal (perpendicular line drawn to the surface). Upon exiting the mud, the car speeds up and the path of the car bends away from the normal. The path of the car is closer to the normal in the slower medium and farther from the normal in the faster medium.

This analogy can be extended to the path of a light ray as it passes from air into and out of a rectangular block of glass.



19.1 A student studies that when a ray of light travels from air into the glass slab, it bends towards the normal. But as refracted ray emerges out of the glass slab to the vacuum, it bends away from the normal, as shown.

Which option explains the law of refraction of light through the glass slab?



- Light always bends towards the normal slab in a glass slab.
- Ray of light travelling in the air is always considered as the incident ray, and the one in the glass is the refracted ray.
- The incident ray, the refracted ray and the normal to the interface always lie on the same plane.
- Ray of light always travels in a straight path irrespective of change in medium.

- 19.2** A student studies that speed of light in air is 300000 km/s whereas that of speed in a glass slab is about 197000 km/s. What causes the difference in speed of light in these two media?
- (a) Difference in density
 - (b) Difference in amount of light
 - (c) Difference in direction of wind flow
 - (d) Difference in temperature
- 19.3** The speed of light in air is 3×10^8 m/s, whereas that of the speed of light in water is 2.26×10^8 m/s. What is the refractive index of water with respect to air?
- (a) 2.64
 - (b) 1
 - (c) 1.32
 - (d) 0.75
- 19.4** Rahul conducts an experiment using an object of height 10 cm and a concave lens with focal length 20 cm. The object is placed at a distance of 25 cm from the lens. Can the image be formed on a screen?
- (a) Yes, as the image formed will be real.
 - (b) No, as the image formed will be inverted.
 - (c) No, as the image formed will be virtual.
 - (d) Yes, as the image formed will be erect.
- 19.5** A ray of light continues moving along the same path while passing through air-glass interface. The angle of incidence for the ray is
- (a) zero
 - (b) 90°
 - (c) less than 90°
 - (d) greater than 90°

Q20. Read the following and answer any four questions from 20.1 to 20.5.

1 × 4

It is now well known that “magnetic field is caused by electric current.”

Whenever there is a change in magnetic flux linked with a coil (or circuit) an emf is induced in the coil. This phenomenon is called electromagnetic induction.

The emf produced in the coil is called the induced emf. If the coil is closed, the current thus produced is called as induced current.

The direction of induced current is determining by Fleming’s right hand rule.

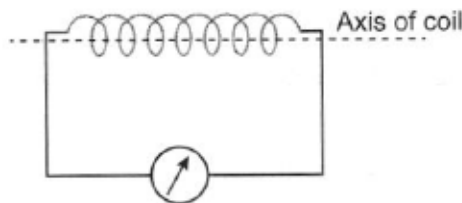
These induced current are used in a moving coil microphone, tape-recorders, video-recorders, hard-discs in computers, etc.

- 20.1** The direction of magnetic field around straight conductor carrying current can be determined by
- (a) Fleming’s right hand rule
 - (b) Fleming’s left hand rule
 - (c) Right hand thumb rule
 - (d) Lenz’s law
- 20.2** Induced current flows through coil
- (a) only for the period during which magnetic field changes through it.
 - (b) less than the period during which magnetic field changes through it
 - (c) more than the period during which magnetic field changes through it
 - (d) none of these
- 20.3** The direction of induced current is determined by
- (a) Fleming’s right hand rule
 - (b) Fleming’s left hand rule
 - (c) Right hand thumb rule
 - (d) Lenz’s law

20.4 A technique of taking image of different body organs which is based on magnetic effect of current is

- (a) MRI (b) X-ray
(c) sonography (d) none of these

20.5 A student connects a coil of wire with a sensitive galvanometer as shown in figure. He will observe the deflection in the galvanometer if bar magnet is



- (a) placed near one of the faces of the coil and parallel to the axis of the coil
(b) placed near one of the faces of the coil and perpendicular to the axis of the coil
(c) moved towards or away from the coil and parallel to the axis of the coil
(d) placed inside the coil

SECTION-B

Q21. Name two physical properties each of sodium and carbon in which their behaviour is not as expected from their classification as metal and non-metal respectively. [2]

Q22. Draw the electron dot structure of the gas molecule which is liberated when zinc metal is treated with aqueous NaOH solution. [2]

OR

What is heteroatom? Give an example.

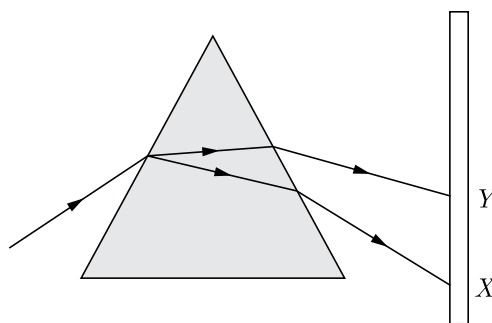
Q23. How does water affect the rate of photosynthesis in plants? [2]

Q24. List two different functions performed by pancreas in our body. [2]

OR

What is peptic ulcer? How is peptic ulcer caused?

Q25. In the figure given below, a narrow beam of white light is shown to pass through a triangular glass prism. After passing through the prism, it produces a spectrum XY on the screen. [2]



- (i) Name the phenomenon.
(ii) State the colours seen at X and Y .

[2]

- Q26. Two wires made of copper and nichrome have equal lengths and equal resistance. Which is thicker? (The resistivity of nichrome is greater than resistivity of copper.) [2]

SECTION-C

- Q27. 2 g of silver chloride is taken in a china dish and the china dish is placed in sunlight for sometime. What will be your observation in this case? Write the chemical reaction involved in the form of a balanced chemical equation. Identify the type of chemical reaction. [3]
- Q28. Distinguish between ionic and covalent compounds under the following properties:
(i) Strength of forces between constituent elements
(ii) Solubility of compounds in water
(iii) Electrical conduction in substances [3]
- Q29. An element 'X' has mass number 35 and number of neutrons 18. Write atomic number and electronic configuration of 'X'. Also write group number, period number and valency of 'X'. [3]
- Q30. Explain the processes of aerobic respiration in mitochondria of a cell and anaerobic respiration in yeast and muscle with the help of word equations. [3]
- Q31. Name the plant Mendel used for his experiment. What type of progeny was obtained by Mendel in F_1 and F_2 generations when he crossed the tall and short plants? Write the ratio he obtained in F_2 generation plants. [3]

OR

List two differences in tabular form between dominant trait and recessive trait. What percentage/proportion of the plants in the F_2 generation/progeny were round, in Mendel's cross between round and wrinkled pea plants?

- Q32. (i) List four characteristics of the images formed by plane mirrors.
(ii) How can you distinguish between a plane mirror, a concave mirror and a convex mirror without touching them? [3]
- Q33. Why are forests considered "biodiversity hot spots"? Suggest four approaches towards the conservation of forests. [3]

SECTION-D

- Q34. For making cake, baking powder is taken. If at home your mother uses baking soda instead of baking powder in cake.
(i) How will it affect the taste of the cake and why?
(ii) How can baking soda be converted into baking powder?
(iii) What is the role of tartaric acid added to baking soda? [5]

OR

Compounds such as alcohols and glucose also contain hydrogen but are not categorised as acids. Describe an activity to prove it.

- Q35. Define pollination. Explain the different types of pollination. List two agents of pollination. How does suitable pollination lead to fertilization? [5]
- Q36. A current of 1 ampere flows in a series circuit having an electric lamp and a conductor of $5\ \Omega$ when connected to a 10 V battery. Calculate the resistance of the electric lamp.

Now if a resistance of $10\ \Omega$ is connected in parallel with this series combination, what change (if any) in current flowing through $5\ \Omega$ conductor and potential difference across the lamp will take place? Give reason. [5]

OR

- (i) With the help of a labelled diagram, explain the distribution of magnetic field due to a current through a circular loop. Why is it that if a current carrying coil has n turns, the field produced at any point is n times as large as that produced by a single turn?
- (ii) Draw a pattern of magnetic field formed around a current carrying solenoid. What happens to the magnetic field when the current through the solenoid is reversed?

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