

## CBSE Class 10 Science Sample Paper 2021- Set 1

(Based on New Question Paper Pattern)

**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 be 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 be 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 labelled diagrams should be drawn.

### SECTION- A

#### I) 1 to 20 Questions (1 Mark)

1. What is the observation on burning of a magnesium ribbon in air?

Or

Identify the product formed when Calcium oxide reacts vigorously with water?

2. What is an exothermic chemical reaction? Give an example.

3. Take a small amount of copper oxide in a beaker and add dilute hydrochloric acid slowly while stirring. What will be the colour of the solution? Give reason.

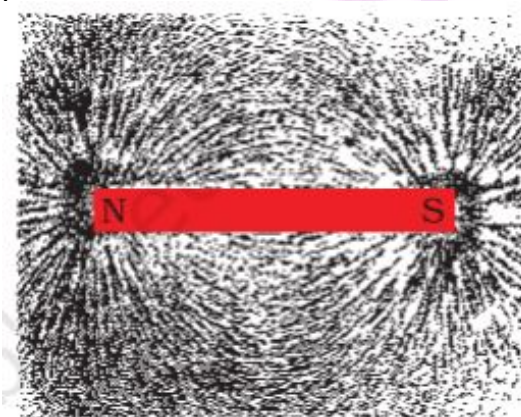
- (a) Greyish pink
- (b) Yellowish red
- (c) Dark blue
- (d) Blue-green

4. You have seen that white light is dispersed into its seven-colour components by a prism. Why do we get these colours?
5. Is there a relationship between the radius of curvature  $R$ , and focal length  $f$ , of a spherical mirror?
6. The image formed by a concave mirror is observed to be virtual, erect and in enlarged size. Determine the position of the image and the object.

Or

What is the other name for diverging lens? Give a reason.

- (a) Concave lens
  - (b) Converging lens
  - (c) Convex lens
  - (d) Plain lens
7. Fix a sheet of white paper on a drawing board using some adhesive material. Place a bar magnet in the center of it. Sprinkle some iron filings uniformly around the bar magnet (as depicted in the image below). Now tap the board gently. What do you observe? Why do the iron filings arrange in such a pattern?



8. Draw the Magnetic field lines of the field produced by a current-carrying circular loop.
9. How much current will an electric bulb draw from a 220 V source, if the resistance of the bulb filament is  $1200\ \Omega$ ? How much current will an electric heater coil draw from a 220 V source, if the resistance of the heater coil is  $100\ \Omega$ ?

Or

A piece of wire of resistance  $R$  is cut into five equal parts. These parts are then connected in parallel. If the equivalent resistance of this combination is  $R'$ , then the ratio  $R/R'$  is –

- (a)  $1/25$
- (b)  $1/5$
- (c) 5
- (d) 25

10. Why do the arteries have thick elastic walls? Give a reason for this.

11. What is the function of Digestive enzymes?

Or

How do a wide variety of organisms like cuscuta (amar-bel), ticks, lice, leeches and tape-worms derive nutrition?

12. Give any two examples of how biodegradable substance would affect the environment.

Or

What are the various steps of food chains through which the transfer of food energy takes place?

13. What is the function of digestive enzymes?

For question numbers 14, 15 and 16, two statements are given- one labeled Assertion (A) and the other labeled 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.

14. **Assertion:** Reaction Between silver nitrate ( $\text{AgNO}_3$ ) and Sodium chloride ( $\text{NaCl}$ ) result in the formation of white silver chloride precipitate.

**Reason:** During this double displacement reaction negative and positive ion trade positions.

15. **Assertion:** Diffusion is sufficient to meet the oxygen requirements of multicellular organisms like humans.

**Reason:** Multi-cellular organisms like humans require very less oxygen to diffuse into body slowly in order to meet the oxygen requirement.

Or

**Assertion:** Man is an Omnivore.

**Reason:** Man, only eats food obtained from plants.

**16.Assertion:** Variations are seen in offspring produced by asexual reproduction.

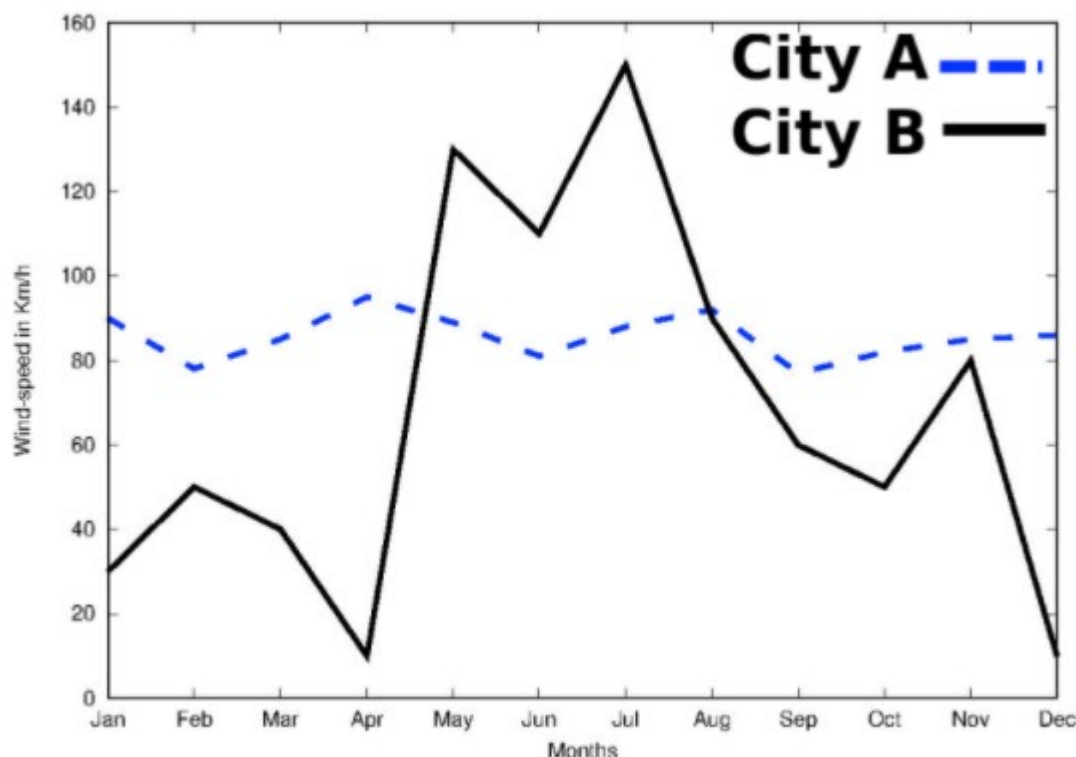
**Reason:** DNA molecules generated by replication is not exactly identical to original DNA.

**Answer Q. No 17 - 20 contain five sub-parts each. You are expected to answer any four subparts in these questions.**

**17. Read the following and answer any four questions from 17 (i) to 17 (v)**

Renewable energy sources such as wind energy are vital for the Indian economy, not only from the point of view of supply, but also from the perspective of environmental and social benefits. India is the world's fifth largest wind-power producer and the largest windmill facilities in India are installed in Tamil Nadu. Muppandal is a small village of Tamil Nadu and one of the most important sites of wind-farm in the state. It uses wind from the Arabian Sea to produce renewable energy. The suitability of Muppandal as a site for wind farms stems from its geographical location as it has access to the seasonal monsoon winds. The electrical generators used on wind turbines in sites like Muppandal, produce an output AC of 240 V and a frequency of 50 Hz even when the wind speed is fluctuating. A transformer may be required to increase or decrease the voltage so it is compatible with the end usage, distribution or transmission voltage, depending on the type of interconnection.

- (i) What is the principle behind the electric generator?
- (ii) The output frequency of wind turbine is 50 Hz. What is meant by this statement?
- (iii) Muppandal is at an advantageous position for this project. Justify with reason.
- (iv) Based on the data represented below in the graph, which of the two cities A or B would be an ideal location for establishing a wind-farm. State reason.



(v) What is the use of a transformer?

**18. From the following and answer any four questions from 18 (i) to 18 (v).**

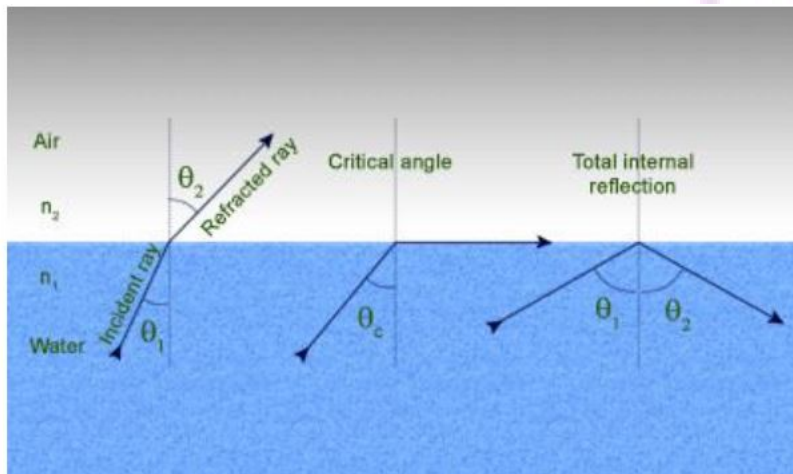
1	2																	18
A																		C
	D	3	4	5	6	7	8	9	10	11	12		13	14	15	16	17	F

- Which element from the table is a metal with valency 2?
- What is the common name for the Group of Element C and F?
- Atomic numbers of few elements are given as 10,20,7 and 14. Identify these elements.
- Determine the valency of elements depicted as 13 and 16.
- Identify the element that will form only a covalent bond.

**19. Read the following and answer any four questions from 19 (i) to 19 (v)**

The phenomenon which occurs when the light rays travel from a more optically denser medium to a less optically denser medium is defined as the total internal reflection. Consider the following situation. A ray of light passes from a medium of water to that of air. Light ray will be refracted at the junction separating the two media. Since it passes from a medium of a higher refractive index to that having a lower refractive index, the refracted light ray bends away from the normal. At a specific angle of incidence, the incident ray of light is refracted in such a way that it passes along the surface of the water. This particular angle of incidence is called the critical angle. Here the angle of refraction is 90 degrees. When the angle of incidence is greater than the critical angle, the incident ray is reflected back to the medium. We call this phenomenon total internal reflection. Following are the two conditions of total internal reflection:

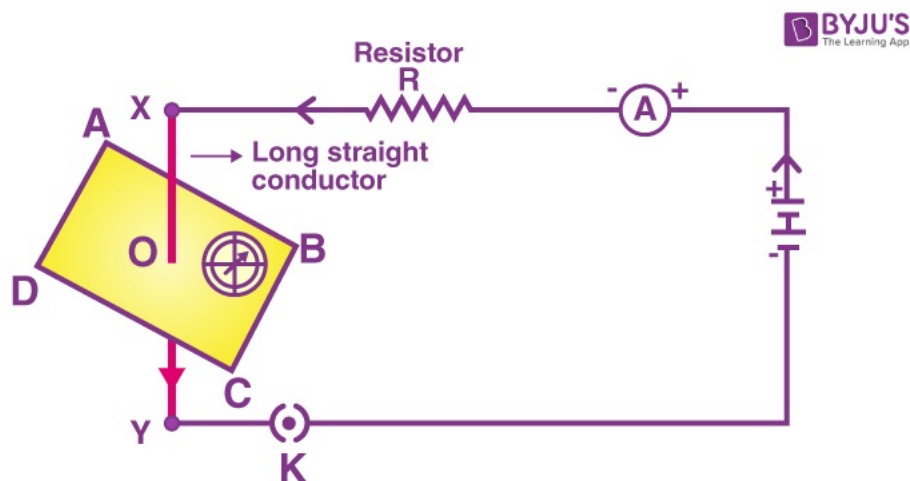
- The light ray moves from a denser medium to a less dense medium.
- The angle of incidence must be greater than the critical angle.



- What is total internal reflection?
- Name the two conditions for total internal reflection.
- What happens to a ray of light at the junction when it passes from a medium of water to air?
- In which condition is the incident ray reflected back to the medium?
- What happens to the refracted light ray at a specific angle of incidence? What is this particular angle known as?

**20. Read the following and answer any 4 questions from 20 (i) to 20 (v)**

Take a straight thick copper wire and place it between the points X and Y in an electric circuit, as shown in Fig. The wire XY is kept perpendicular to the plane of paper. Horizontally place a small compass near to this copper wire. See the position of its needle. Pass the current through the circuit by inserting the key into the plug. Observe the change in the position of the compass needle. The deflection in the needle becomes opposite when the direction of the current is reversed.



- (ii) What has to be passed through the metallic conductor for the compass needle to deflect?
- (iii) Magnetism and electricity are not linked to each other. Mark this as true or false.
- (iv) When does the deflection of the needle become opposite? What happens to the deflection of the compass needle placed at a given point if the current in the copper wire is changed?
- (v) What happens to the deflection of the needle if the compass is moved away from the copper wire but the current through the wire remains the same? Why?

## SECTION-B

21. How do living things get their food?

Or

Describe the structure and functioning of nephrons.

22. What is autotrophic nutrition?



**23.** Which gas is usually liberated when an acid reacts with a metal? Illustrate with an example. How will you test for the presence of this gas?

Or

What is the electron dot structure of a molecule of sulphur made up of eight atoms of sulphur?

**24.** Mix solutions of lead (II) nitrate and potassium iodide.

- (i) What was the color of the precipitate formed? Can you name the compound precipitated?
- (ii) Write the balanced chemical equation for this reaction.
- (iii) Is this also a double displacement reaction?

**25.** What is the reason for the reddish appearance of the sun? Demonstrate an activity that explains this phenomenon.

**26.** An electric iron consumes energy at a rate of 840 W when heating is at the maximum rate and 360 W when the heating is at the minimum. The voltage is 220 V. What are the current and the resistance in each case?

### SECTION-C

**27.** Plastic cups were used to serve tea in trains in early days- these could be returned to the vendors, cleaned and reused. Later, Kulhads were used instead of plastic cups. Now, paper cups are used for serving tea. What are the reasons for the shift from Plastic to Kulhads and then finally to paper cups?

**28.** What experiment would we do to confirm that the F<sub>2</sub> generation did in fact have a 1:2:1 ratio of TT, Tt and tt trait combinations?

Or

If a trait A exists in 10% of a population of an asexually reproducing species and a trait B exists in 60% of the same population, which trait is likely to have arisen earlier?

**29.** What are the methods used by plants to get rid of excretory products?

**30. a)**  $\text{Fe}_2\text{O}_3 + 2\text{Al} \rightarrow \text{Al}_2\text{O}_3 + 2\text{Fe}$

The above reaction is an example of a

1. Combination reaction.
2. Double displacement reaction.



3. Decomposition reaction.
4. Displacement reaction.

**b)** Why do we apply paint on iron articles?

**31.** Which of the following statements is not a correct statement about the trends when going from left to right across the periods of Periodic Table.

- (a) The elements become less metallic in nature.
- (b) The number of valence electrons increases.
- (c) The atoms lose their electrons more easily.
- (d) The oxides become more acidic

**32. a)** Draw the electron dot structures for

- (a) ethanoic acid
- (b)  $\text{H}_2\text{S}$

**33.** Why are alloys commonly used in electrical heating devices, like electric iron, toasters etc.?

**33. (a)** Light enters from air to glass having refractive index 1.50. What is the speed of light in the glass? The speed of light in vacuum is  $3 \times 10^8 \text{ m s}^{-1}$ ?

**(b)** Where is the speed of light relatively lesser? Why?

- (i) vacuum
- (ii) air
- (iii) water
- (iv) Diamond

#### SECTION-D

**34.** Five solutions A, B, C, D and E when tested with universal indicator showed pH as 4, 1, 11, 7 and 9, respectively. Which solution is

- (a) neutral?
- (b) Strongly alkaline?
- (c) Strongly acidic?
- (d) Weakly acidic?

(e) Weakly alkaline?

A milkman adds a very small amount of baking soda to fresh milk.

(a) Why does he shift the pH of the fresh milk from 6 to slightly alkaline?

(b) Why does this milk take a long time to set as curd?

**Or**

- (i) Equal lengths of magnesium ribbons are taken in test tubes A and B. Hydrochloric acid (HCl) is added to test tube A, while acetic acid ( $\text{CH}_3\text{COOH}$ ) is added to test tube B. Amount and concentration taken for both the acids are same. In which test tube will the fizzing occur more vigorously and why?
- (ii) Plaster of Paris should be stored in a moisture-proof container. Explain why?
- (iii) What are the two important uses of washing soda and baking soda?

**35.** What possible functions could the petals and sepals serve? How is the process of pollination different from fertilisation?

**36.** An electric lamp of  $100\ \Omega$ , a toaster of resistance  $50\ \Omega$ , and a water filter of resistance  $500\ \Omega$  are connected in parallel to a  $220\ \text{V}$  source. What is the resistance of an electric iron connected to the same source that takes as much current as all three appliances, and what is the current through it? Draw a diagram explaining the answer as well.

**Or**

State whether the following statements are true or false. Justify

1. An electric motor converts mechanical energy into electrical energy.
2. An electric generator works on the principle of electromagnetic induction.
3. The field at the centre of a long circular coil carrying current will be parallel straight lines.
4. A wire with a green insulation is usually the live wire of an electric supply.
5. At the time of short circuit, the current in the circuit reduces substantially

