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Your JEE Guide

# MP Board Class X · Science

Sample Question Paper 2 · Session 2026-27

**Time allowed: 3 hours** **Maximum marks: 75**

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This is an original practice paper written to the MPBSE 2027 sample question paper pattern; it is not issued by MPBSE.

**General instructions:**

1. All questions are compulsory.
2. Questions 1 to 5 are 30 objective type questions. Each carries 1 mark.
3. Internal options are given in questions 18 to 23.
4. Marks of each question are indicated against it.
5. Answer questions 6 to 17 in about 30 words each.
6. Answer questions 18 to 20 in about 75 words each.
7. Answer questions 21 to 23 in about 120 words each.
8. Draw neat and clean labelled diagrams wherever required.

| | | |
|---|---|---|
| **1.** | **(i)** *Choose the correct option and write it:*<br>Which of the following is a decomposition reaction?<br>(a) $2AgCl \rightarrow 2Ag + Cl_2$ (in sunlight) (b) $C + O_2 \rightarrow CO_2$<br>(c) $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$ (d) $NaOH + HCl \rightarrow NaCl + H_2O$ | 1 |
| | **(ii)** Toothpaste is generally:<br>(a) acidic (b) basic<br>(c) neutral (d) strongly acidic | 1 |
| | **(iii)** Which of these metals is the best conductor of electricity?<br>(a) mercury (b) lead<br>(c) iron (d) silver | 1 |
| | **(iv)** Soaps form scum with:<br>(a) rain water (b) distilled water<br>(c) hard water (d) soft water | 1 |
| | **(v)** The part of the brain that maintains posture and balance is the:<br>(a) cerebellum (b) medulla<br>(c) hypothalamus (d) cerebrum | 1 |
| | **(vi)** The far point of a normal human eye is at:<br>(a) 25 cm (b) 1 m<br>(c) 10 cm (d) infinity | 1 |

| | | |
|---|---|---|
| **2.** | **(i)** *Fill in the blanks:*<br>A reaction in which heat is given out is called an _____ reaction. | 1 |
| | **(ii)** Brass is an alloy of copper and _____. | 1 |
| | **(iii)** The tiny pores on leaves through which gases are exchanged are called _____. | 1 |
| | **(iv)** The _____ gland is called the master gland. | 1 |
| | **(v)** The SI unit of the power of a lens is the _____. | 1 |
| | **(vi)** The ozone layer protects us from _____ radiation of the sun. | 1 |
| **3.** | **(i)** *Write True or False:*<br>Respiration is an endothermic process. | 1 |
| | **(ii)** Ionic compounds have high melting points. | 1 |
| | **(iii)** Ethanol is soluble in water. | 1 |
| | **(iv)** Amoeba reproduces by budding. | 1 |
| | **(v)** A concave mirror always forms a virtual image. | 1 |
| | **(vi)** The resistance of a wire increases with its length. | 1 |
| **4.** | **(i)** *Answer in one word or one sentence:*<br>Name the natural indicator that is purple in a neutral solution. | 1 |
| | **(ii)** Name the non-metal that is a liquid at room temperature. | 1 |
| | **(iii)** Name the largest gland in the human body. | 1 |
| | **(iv)** Which hormone prepares the body for an emergency ("fight or flight")? | 1 |
| | **(v)** Which colour of white light is deviated the most by a glass prism? | 1 |
| | **(vi)** Name the chemicals mainly responsible for the depletion of the ozone layer. | 1 |
| **5.** | Match each item in column A with its role in digestion in column B: | 6 |

| Column A | Column B |
|---|---|
| (i) Pepsin | (a) emulsifies fats |
| (ii) Lipase | (b) digests proteins in the stomach |
| (iii) Bile | (c) makes the medium in the stomach acidic |
| (iv) Villi | (d) digests fats |
| (v) Trypsin | (e) digests proteins in the small intestine |
| (vi) Hydrochloric acid | (f) absorb digested food |

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| | | |
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| **6.** | In the reaction $CuO + H_2 \rightarrow Cu + H_2O$, identify the substance oxidised and the substance reduced. | 2 |
| **7.** | Why do silver articles turn black after some time? Name this process. | 2 |
| **8.** | Why do people with acidity take antacids? Name one antacid. | 2 |
| **9.** | Why does copper not react with dilute hydrochloric acid? | 2 |
| **10.** | What is a homologous series? Write two of its characteristics. | 2 |
| **11.** | Why do aquatic animals breathe much faster than land animals? | 2 |
| **12.** | What is the function of thyroxine? Which mineral is needed to make it? | 2 |
| **13.** | Distinguish between binary fission and multiple fission, with one example of each. | 2 |
| **14.** | Why are variations important for a species? | 2 |
| **15.** | What is the power of accommodation of the eye? | 2 |
| **16.** | Why does the clear sky appear blue? | 2 |
| **17.** | Resistors of 4 Ω and 6 Ω are connected in series to a 10 V battery. Find the current and the potential difference across each resistor. | 2 |
| **18.** | Write balanced equations for what happens when: (a) quicklime is added to water; (b) silver chloride is kept in sunlight; (c) lead nitrate is heated.<br>**OR**<br>How are detergents better than soaps for hard water? Explain the cleansing action of soap. | 3 |
| **19.** | What are the methods of contraception? Give one example of each.<br>**OR**<br>What is a gene? Explain, with an example, how genes control the characteristics of an organism. | 3 |
| **20.** | An object is placed 30 cm in front of a concave mirror of focal length 10 cm. Find the position and nature of the image and the magnification.<br>**OR**<br>State Snell's law of refraction. The refractive index of glass is 1.5. Find the speed of light in glass. | 3 |
| **21.** | What is the reactivity series of metals? Explain how the method of extracting a metal depends on its reactivity.<br>**OR**<br>Show the formation of NaCl and $MgCl_2$ by the transfer of electrons. Write two properties of ionic compounds. | 4 |

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| | | |
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| **22.** | Draw a labelled diagram of a neuron and explain how a nerve impulse travels.<br>**OR**<br>What are tropic movements? Explain phototropism and geotropism, and the role of auxin. | 4 |
| **23.** | State Joule's law of heating. An electric iron of 1000 W is used for 2 hours every day. Find the energy used in 30 days and its cost at ₹5 per unit.<br>**OR**<br>Draw the magnetic field lines around a straight current-carrying conductor. State the right-hand thumb rule. What happens to the field if the current is reversed? | 4 |

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# Answers and Marking Scheme

Marks for each step are shown in brackets. Any correct alternative method gets full credit.

**Question 1**

**(i)** **(a)** $2AgCl \rightarrow 2Ag + Cl_2$ (in sunlight). *Working:* One substance breaks into two simpler ones.

**(ii)** **(b)** basic. *Working:* It neutralises the acid formed in the mouth.

**(iii)** **(d)** silver. *Working:* Silver, then copper, are the best conductors.

**(iv)** **(c)** hard water. *Working:* Calcium and magnesium salts in hard water form insoluble scum.

**(v)** **(a)** cerebellum. *Working:* The cerebellum is part of the hindbrain.

**(vi)** **(d)** infinity. *Working:* The near point is about 25 cm.

**Question 2**

**(i)** exothermic.

**(ii)** zinc.

**(iii)** stomata.

**(iv)** pituitary.

**(v)** dioptre.

**(vi)** ultraviolet.

**Question 3**

**(i)** False: it releases energy, so it is exothermic.

**(ii)** True: strong electrostatic forces hold the ions together.

**(iii)** True.

**(iv)** False: it reproduces by binary fission.

**(v)** False: it forms real images when the object is beyond its focus.

**(vi)** True: R is proportional to length.

**Question 4**

**(i)** Litmus.

**(ii)** Bromine.

**(iii)** The liver.

**(iv)** Adrenaline.

**(v)** Violet.

**(vi)** Chlorofluorocarbons (CFCs).

**5.** (i) – (b) digests proteins in the stomach; (ii) – (d) digests fats; (iii) – (a) emulsifies fats; (iv) – (f) absorb digested food; (v) – (e) digests proteins in the small intestine; (vi) – (c) makes the medium in the stomach acidic

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**6.** $H_2$ gains oxygen, so it is oxidised to $H_2O$ (1). CuO loses oxygen, so it is reduced to Cu (1).

**7.** Silver reacts with sulphur compounds in the air to form a black coating of silver sulphide (1). This is corrosion, also called tarnishing of silver (1).

**8.** Too much hydrochloric acid in the stomach causes pain and irritation; an antacid, a mild base, neutralises the excess acid (1). Example: milk of magnesia, $Mg(OH)_2$ (1).

**9.** Copper is below hydrogen in the reactivity series (1), so it cannot displace hydrogen from the acid (1).

**10.** A series of carbon compounds with the same functional group, in which successive members differ by a $–CH_2–$ unit (1). Members have similar chemical properties, and their physical properties change gradually with molecular mass (1).

**11.** The amount of oxygen dissolved in water is much lower than in air (1). So aquatic animals must pass water over their gills rapidly to get enough oxygen (1).

**12.** Thyroxine regulates the metabolism of carbohydrates, proteins and fats for growth (1). Iodine is needed to make it (1).

**13.** In binary fission the parent cell divides into two daughter cells, e.g. Amoeba (1). In multiple fission it divides into many daughter cells at once, e.g. Plasmodium (1).

**14.** Variations help some individuals survive changes in the environment, such as heat or disease (1). Over time this lets the species survive and evolve (1).

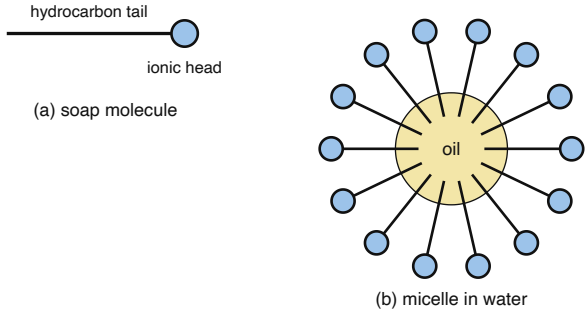
**15.** The ability of the eye lens to change its focal length (1), so that both near and distant objects are seen clearly (1).

**16.** Air molecules and fine particles scatter light of shorter wavelengths much more than longer wavelengths (1). Blue light is scattered most strongly and reaches our eyes from all directions (1).

**17.** Total resistance 10 Ω, so I = 10/10 = 1 A (1). V across 4 Ω = 4 V and across 6 Ω = 6 V (1).

**18.** (a) $CaO + H_2O \rightarrow Ca(OH)_2$, with much heat (1). (b) $2AgCl \rightarrow 2Ag + Cl_2$; the white solid turns grey (1). (c) $2Pb(NO_3)_2 \rightarrow 2PbO + 4NO_2 + O_2$; brown fumes of $NO_2$ are seen (1).

**OR** Detergents do not form insoluble scum with calcium and magnesium ions, so they work even in hard water (1). A soap molecule has an ionic end that dissolves in water and a long hydrocarbon tail that dissolves in oil (1). The tails stick into the oily dirt and the soap forms micelles that hold the dirt in the centre, so it is washed away with water (1).




**19.** Barrier methods prevent sperm from reaching the egg, e.g. condoms (1). Hormonal methods change the hormonal balance so that eggs are not released, e.g. oral pills; copper-T placed in the

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uterus also prevents pregnancy (1). Surgical methods, e.g. vasectomy in males and tubectomy in females, block the passage of sperm or eggs (1).

**OR** A gene is a section of DNA that carries the information for making a particular protein (1). Proteins such as enzymes and hormones control characteristics (1). E.g. a gene for an enzyme that makes a plant growth hormone: if the enzyme works efficiently, much hormone is made and the plant is tall; if it is less efficient, the plant is dwarf (1).

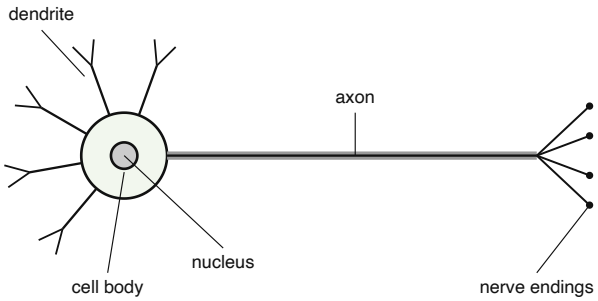
**20.** $\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$: $\frac{1}{v} = -\frac{1}{10} + \frac{1}{30} = -\frac{1}{15}$, so v = –15 cm (1). m = –v/u = –(–15)/(–30) = –0.5 (1). The image is real, inverted and half the size of the object, 15 cm in front of the mirror (1).

**OR** The ratio of the sine of the angle of incidence to the sine of the angle of refraction is constant for a given pair of media: sin i / sin r = constant (1½). v = c/n = $(3 \times 10^8)/1.5 = 2 \times 10^8$ m/s (1½).

**21.** The arrangement of metals in decreasing order of reactivity, e.g. K, Na, Ca, Mg, Al, Zn, Fe, Pb, (H), Cu, Hg, Ag, Au (1). Metals low in the series (e.g. mercury) are obtained by heating their ores alone (1). Metals in the middle (e.g. zinc, iron) are obtained by reducing their oxides with carbon (1). Highly reactive metals (e.g. sodium, aluminium) are obtained by electrolysis of their molten compounds (1).

**OR** Na (2, 8, 1) loses one electron to Cl (2, 8, 7), giving $Na^+$ and $Cl^-$ (1). Mg (2, 8, 2) loses two electrons, one to each of two Cl atoms, giving $Mg^{2+}$ and two $Cl^-$ (1). Ionic compounds have high melting and boiling points (1), and they conduct electricity when molten or dissolved in water (1).

**22.** Labelled diagram (2):




Information is picked up at the dendrite tips, setting off a chemical reaction that creates an electrical impulse (1). The impulse travels from the dendrite to the cell body and along the axon to its end, where chemicals are released across the synapse to start an impulse in the next neuron (1).

**OR** Tropic movements are directional growth movements of plant parts in response to a stimulus (1). Phototropism: shoots bend towards light (1). Geotropism: roots grow downwards towards gravity, shoots upwards (1). Auxin collects on the shaded side of a shoot and makes its cells grow longer, so the shoot bends towards light (1).

**23.** The heat produced in a resistor is $H = I^2Rt$: proportional to the square of the current, the resistance and the time (1½). Energy = 1 kW × 2 h × 30 = 60 kWh = 60 units (1½). Cost = 60 × ₹5 = ₹300 (1).

**OR** Field pattern: concentric circles around the wire (1½):

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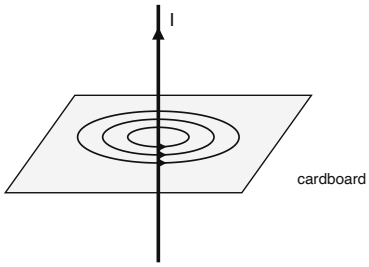


Right-hand thumb rule: hold the wire in the right hand with the thumb along the current; the curled fingers give the direction of the field lines (1½). If the current is reversed, the direction of the field lines is reversed (1).

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