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Your JEE Guide

MP Board Class X · Science

Sample Question Paper 3 · 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:* In the reaction $Fe_2O_3 + 2Al \rightarrow Al_2O_3 + 2Fe$, the substance reduced is: (a) Fe_2O_3 (b) Al (c) Fe (d) Al_2O_3	1
	(ii) The pH of a neutral solution at 25 °C is: (a) 0 (b) 1 (c) 14 (d) 7	1
	(iii) Which of the following metals does NOT react with oxygen even at high temperature? (a) magnesium (b) iron (c) gold (d) zinc	1
	(iv) The molecular formula of the fourth member of the alkane series is: (a) C_4H_8 (b) C_4H_{10} (c) C_4H_6 (d) C_3H_8	1
	(v) In human beings, fertilisation normally takes place in the: (a) vagina (b) uterus (c) ovary (d) oviduct (fallopian tube)	1
	(vi) 1 kWh is equal to: (a) 3600 J (b) 3.6×10^6 J (c) 1000 J (d) 3.6×10^3 J	1

2.	**(i)** *Fill in the blanks:* The chemical formula of slaked lime is _____.	1
	(ii) Metals that can be cut with a knife include sodium and _____.	1
	(iii) The pigment that absorbs light energy in photosynthesis is _____.	1
	(iv) The growth of a plant's roots towards water is called _____.	1
	(v) The bending of light as it passes from one medium to another is called _____.	1
	(vi) Energy flow in an ecosystem is always _____.	1
3.	**(i)** *Write True or False:* A displacement reaction can occur only between a metal and a salt.	1
	(ii) Diamond is a good conductor of electricity.	1
	(iii) Haemoglobin carries oxygen in the blood.	1
	(iv) Spirogyra reproduces by fragmentation.	1
	(v) A convex mirror always forms a virtual, erect and diminished image.	1
	(vi) In a series circuit, the same current flows through every resistor.	1
4.	**(i)** *Answer in one word or one sentence:* Name the salt formed when hydrochloric acid reacts with sodium hydroxide.	1
	(ii) Name the most malleable metal.	1
	(iii) Name the tube that carries urine from the kidney to the urinary bladder.	1
	(iv) What is the name of the reproductive method in which new plants grow from the leaves of Bryophyllum?	1
	(v) What is the value of the near point of a normal eye?	1
	(vi) Name one biodegradable waste.	1
5.	Match each part in column A with its function in column B:	6

Column A	Column B
(i) Guard cells	(a) help the blood to clot
(ii) Xylem	(b) open and close the stomata
(iii) Phloem	(c) filters blood in the kidney
(iv) Platelets	(d) carries water and minerals
(v) Nephron	(e) carries food
(vi) Alveoli	(f) exchange of gases in the lungs

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6.	What is observed when a solution of potassium iodide is added to a solution of lead nitrate? Write the equation.	2
7.	Why does a solution of an acid conduct electricity, while alcohol and glucose solutions do not?	2
8.	What is an alloy? Why is solder used for welding electrical wires?	2
9.	What is the difference between a saturated and an unsaturated hydrocarbon? Give one example of each.	2
10.	Why do the walls of the heart's ventricles have thicker muscles than those of the atria?	2
11.	What are the raw materials needed for photosynthesis? Write the overall equation.	2
12.	How does the brain control voluntary actions such as picking up a pen?	2
13.	What is regeneration? Name one organism that shows it.	2
14.	Why does the Sun appear reddish at sunrise and sunset?	2
15.	A ray of light enters glass from air. Does it bend towards or away from the normal? Why?	2
16.	Why are the coils of electric toasters and electric irons made of an alloy rather than a pure metal?	2
17.	What is a food web? Why is it better for an ecosystem than a single food chain?	2
18.	Explain, with one equation each, (a) a combination reaction; (b) a double displacement reaction; (c) an endothermic decomposition reaction. **OR** How is bleaching powder prepared? Write the equation and two uses.	3
19.	Describe the role of the following in human digestion: (a) the mouth; (b) the stomach; (c) the small intestine. **OR** What is the importance of DNA copying in reproduction? Why does it produce variation?	3
20.	A concave lens has a focal length of 20 cm. At what distance should an object be placed so that it forms an image 10 cm from the lens? Find the magnification. **OR** Describe how a glass prism disperses white light. Why do different colours bend through different angles?	3

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21.	Describe the properties of ethanol, with equations for its reaction with (a) sodium; (b) concentrated sulphuric acid; (c) acidified potassium dichromate. **OR** What is corrosion? Describe an experiment to show that both air and water are needed for iron to rust. State two ways to prevent rusting.	4
22.	Describe the male reproductive system in human beings and the function of each part. **OR** Write the differences between asexual and sexual reproduction. Why is sexual reproduction important for evolution?	4
23.	What is the heating effect of electric current? Write two of its applications. A heater draws 4 A at 220 V. Find its power and the heat produced in 10 minutes. **OR** What is the resistivity of a material? On what factors does the resistance of a wire depend? A wire 2 m long with cross-section 1×10^{-6} m² has resistance 34 Ω. Find its resistivity.	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)** Fe_2O_3. *Working:* Fe_2O_3 loses oxygen.

(ii) **(d)** 7. *Working:* $[H^+] = 10^{-7}$ mol/L.

(iii) **(c)** gold. *Working:* Gold is at the bottom of the reactivity series.

(iv) **(b)** C_4H_{10}. *Working:* Alkanes are C_nH_{2n+2}: CH_4, C_2H_6, C_3H_8, C_4H_{10}.

(v) **(d)** oviduct (fallopian tube). *Working:* The zygote then moves to the uterus.

(vi) **(b)** 3.6×10^6 J. *Working:* 1000 W × 3600 s.

Question 2

(i) $Ca(OH)_2$.

(ii) potassium (or lithium).

(iii) chlorophyll.

(iv) hydrotropism.

(v) refraction.

(vi) unidirectional.

Question 3

(i) False: e.g. zinc displaces hydrogen from dilute acids too.

(ii) False: graphite conducts, diamond does not.

(iii) True.

(iv) True.

(v) True.

(vi) True.

Question 4

(i) Sodium chloride.

(ii) Gold.

(iii) The ureter.

(iv) Vegetative propagation.

(v) About 25 cm.

(vi) Vegetable peels (or paper, cotton cloth).

5. (i) – (b) open and close the stomata; (ii) – (d) carries water and minerals; (iii) – (e) carries food; (iv) – (a) help the blood to clot; (v) – (c) filters blood in the kidney; (vi) – (f) exchange of gases in the lungs

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6. A yellow precipitate of lead iodide forms (1). $Pb(NO_3)_2 + 2KI \rightarrow PbI_2 + 2KNO_3$ (1).

7. Acids produce H^+ ions in water, and ions carry the current (1). Alcohol and glucose do not form ions in water (1).

8. A homogeneous mixture of a metal with other metals or a non-metal (1). Solder, an alloy of lead and tin, has a low melting point (1).

9. Saturated: only single bonds between carbon atoms, e.g. ethane (1). Unsaturated: at least one double or triple bond, e.g. ethene (1).

10. Ventricles pump blood out to the lungs and the whole body (1), so they need more force than the atria, which only push blood into the ventricles (1).

11. Carbon dioxide and water, with sunlight and chlorophyll (1). $6CO_2 + 12H_2O \rightarrow C_6H_{12}O_6 + 6O_2 + 6H_2O$ (1).

12. The forebrain (cerebrum) receives information from the senses and decides what to do (1). It sends messages through the motor nerves to the muscles, which carry out the action (1).

13. The ability of a fully differentiated organism to grow a whole new individual from its body parts (1). Example: Planaria (or Hydra) (1).

14. At these times light from the Sun travels through a thicker layer of air (1). Most blue light is scattered away, and mainly red light reaches our eyes (1).

15. Towards the normal (1), because light slows down in the optically denser glass (1).

16. An alloy has a higher resistivity than a pure metal (1), and it does not oxidise (burn) readily at high temperatures (1).

17. A network of interconnected food chains (1). If one food source disappears, organisms can switch to another, so the ecosystem is more stable (1).

18. (a) Two or more substances combine to form one product: $CaO + H_2O \rightarrow Ca(OH)_2$ (1). (b) Two compounds exchange ions: $Na_2SO_4 + BaCl_2 \rightarrow BaSO_4 + 2NaCl$ (1). (c) A substance breaks down by absorbing heat: $CaCO_3 \rightarrow CaO + CO_2$ (1).

OR By the action of chlorine on dry slaked lime: $Ca(OH)_2 + Cl_2 \rightarrow CaOCl_2 + H_2O$ (1½). Uses (any two): bleaching cotton and linen, disinfecting drinking water, as an oxidising agent in industry (1½).

19. (a) Teeth break food into small pieces; salivary amylase begins to break starch into sugar (1). (b) Gastric glands release hydrochloric acid, pepsin and mucus; pepsin begins protein digestion (1). (c) Bile and pancreatic and intestinal juices complete the digestion of carbohydrates, proteins and fats, and the villi absorb the digested food (1).

OR DNA copying passes the body design information to the next generation, so offspring resemble their parents (1½). Copying is not perfectly accurate; small errors produce slight variations in the copies, which can help the species survive changes in the environment (1½).

20. v = –10 cm, f = –20 cm. $\frac{1}{u} = \frac{1}{v} - \frac{1}{f} = -\frac{1}{10} + \frac{1}{20} = -\frac{1}{20}$, so u = –20 cm (1½). m = v/u = (–10)/(–20) = 0.5 (1½).

OR When white light passes through a prism it splits into a band of seven colours, violet to red, called the spectrum (1½):

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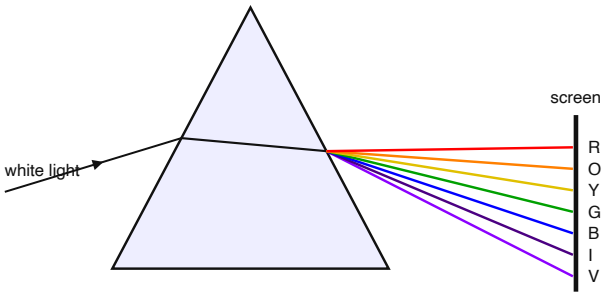
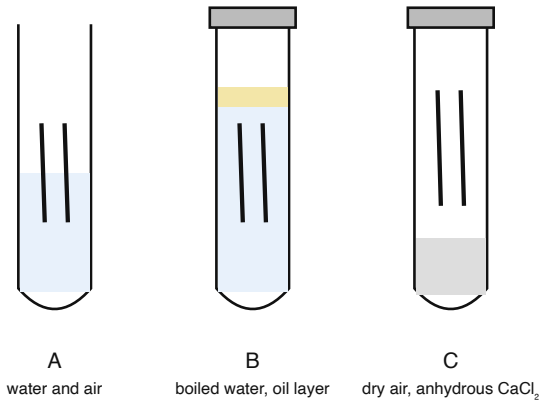


Each colour travels at a different speed in glass, so each is refracted through a different angle; red bends the least and violet the most (1½).

21. Ethanol is a colourless liquid, soluble in water, used as a solvent and in medicines (1). (a) $2CH_3CH_2OH + 2Na \rightarrow 2CH_3CH_2ONa + H_2$ (1). (b) Heated with excess concentrated H_2SO_4 at 443 K, it is dehydrated: $CH_3CH_2OH \rightarrow CH_2{=}CH_2 + H_2O$ (1). (c) Oxidising agents convert it to ethanoic acid: $CH_3CH_2OH \rightarrow CH_3COOH$ (1).

OR Corrosion is the slow eating away of a metal by air, moisture or chemicals (1). Three test tubes with iron nails: one in tap water open to air, one in boiled water sealed with oil, one with anhydrous calcium chloride to dry the air; only the first rusts (2):



Prevention: painting, oiling, galvanising (any two) (1).

22. The testes produce sperms and the hormone testosterone; they lie in the scrotum, at a slightly lower temperature (1). The vas deferens carries sperms to the urethra (1). The seminal vesicles and the prostate gland add fluid that nourishes the sperms and makes their movement easier (1). The urethra is a common passage for urine and sperms (1).

OR Asexual: one parent, no gametes, offspring nearly identical (1). Sexual: two parents, gametes fuse, offspring vary (1). Sexual reproduction combines DNA from two individuals, creating new combinations of variations (1). This variation increases the chance that some individuals survive environmental changes, driving evolution (1).

23. When current flows through a resistor, part of the electrical energy changes into heat (1). Applications: electric iron, heater, fuse, filament bulb (any two) (1). $P = VI = 220 \times 4 = 880$ W (1). $H = Pt = 880 \times 600 = 528000$ J (1).

OR Resistivity is the resistance of a conductor of unit length and unit cross-sectional area (1). R depends on length (directly), area of cross-section (inversely) and the material and temperature (1). $\rho = RA/l = 34 \times 10^{-6}/2$ (1) $= 1.7 \times 10^{-5}\ \Omega$ m (1).

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