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Your JEE Guide

MP Board Class X · Science

Sample Question Paper 7 · 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:* When an iron nail is placed in copper sulphate solution, the solution changes from: (a) blue to colourless (b) green to blue (c) colourless to blue (d) blue to light green	1
	(ii) Which of the following solutions has the highest concentration of H^+ ions? (a) pH 7 (b) pH 1 (c) pH 13 (d) pH 4	1
	(iii) Aqua regia is a mixture of concentrated hydrochloric acid and concentrated nitric acid in the ratio: (a) 3 : 1 (b) 2 : 1 (c) 1 : 1 (d) 1 : 3	1
	(iv) Vinegar is a dilute solution of ethanoic acid in water of about: (a) 20–25% (b) 50% (c) 5–8% (d) 90%	1
	(v) In which organism does fertilisation take place outside the body? (a) cow (b) frog (c) human (d) hen	1
	(vi) The angle of incidence for a ray that falls along the normal to a mirror is: (a) 0° (b) 180° (c) 90° (d) 45°	1

2.	**(i)** *Fill in the blanks:* The reaction of an oil or fat with oxygen that spoils its taste and smell is called _____.	1
	(ii) A metal oxide that reacts with water to form an alkali is called a _____ oxide.	1
	(iii) Oxygenated blood is carried from the heart to the body by the _____.	1
	(iv) The part of the pistil that receives pollen grains is the _____.	1
	(v) The middle point of a spherical mirror's reflecting surface is called its _____.	1
	(vi) The SI unit of electric energy is the _____.	1
3.	**(i)** *Write True or False:* A balanced chemical equation has the same number of atoms of each element on both sides.	1
	(ii) Zinc oxide is an amphoteric oxide.	1
	(iii) Ethanol reacts with sodium to give hydrogen gas.	1
	(iv) Plants absorb carbon dioxide only at night.	1
	(v) White light is a mixture of seven colours.	1
	(vi) The resistance of a conductor depends on the potential difference across it.	1
4.	**(i)** *Answer in one word or one sentence:* Write the chemical formula of quicklime.	1
	(ii) Name the most reactive metal among sodium, iron, copper and zinc.	1
	(iii) Which organ in the human body produces urea?	1
	(iv) What is the name of the cell formed after fertilisation?	1
	(v) Name the type of lens used in a simple microscope.	1
	(vi) What is the potential difference across a 5 Ω resistor carrying 2 A?	1

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5. Match each disease or condition in column A with its cause in column B: — 6

Column A	Column B
(i) Goitre	(a) lack of iodine
(ii) Diabetes	(b) lack of growth hormone in childhood
(iii) Dwarfism	(c) lack of insulin
(iv) Myopia	(d) weakening of the ciliary muscles with age
(v) Hypermetropia	(e) eyeball too short
(vi) Presbyopia	(f) elongated eyeball

6. What is the difference between a displacement and a double displacement reaction? Give one example of each. — 2

7. Why is it said that "an acid with a base gives salt and water"? Write the equation for HCl and NaOH. — 2

8. Why do noble gases hardly form any compounds? — 2

9. Why does carbon form covalent bonds and not ionic bonds? — 2

10. Why is the small intestine of human beings very long and folded? — 2

11. What is the role of the diaphragm and the rib muscles in breathing? — 2

12. Why is the nervous system alone not enough to control and coordinate the body? What else helps? — 2

13. What are the advantages of sexual reproduction over asexual reproduction? — 2

14. In a cross between a pea plant with round seeds (RR) and one with wrinkled seeds (rr), what will the F_1 generation be? Why? — 2

15. What is meant by the "optical centre" of a lens? — 2

16. Why do we see a rainbow only when the Sun is behind us? — 2

17. Why is tungsten used for the filaments of electric bulbs? — 2

18. Identify the oxidising agent and the reducing agent in each of: (a) $ZnO + C \rightarrow Zn + CO$; (b) $MnO_2 + 4HCl \rightarrow MnCl_2 + 2H_2O + Cl_2$; (c) $CuO + H_2 \rightarrow Cu + H_2O$. — 3

OR

Why are some metals found in the free state in nature while others are found as compounds? Give two examples of each.

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19.	What are the main components of blood? Write the function of each. **OR** What is the role of the following in the human reproductive system: (a) seminal vesicle; (b) uterus; (c) placenta?	3
20.	An object is placed 20 cm in front of a convex lens of focal length 20 cm. Where is the image formed? Draw the ray diagram and describe the image. **OR** What is the refractive index of a medium? If the refractive index of water is 1.33 and of glass is 1.5, in which medium does light travel faster, and why?	3
21.	Describe the steps involved in obtaining a metal of medium reactivity, such as iron or zinc, from its ore. **OR** How are ethanol and ethanoic acid distinguished by a chemical test? Write the uses of each.	4
22.	Explain the process of photosynthesis. Write its three main steps and the balanced equation. **OR** What is ozone? How is it formed in the upper atmosphere, and why is its depletion a concern?	4
23.	What is electric power? Derive $P = I^2R$. An electric motor takes 5 A from a 220 V line. Find its power and the energy used in 2 hours. **OR** Describe the pattern of magnetic field lines of a bar magnet and state three properties of field lines.	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) **(d)** blue to light green. *Working:* Iron sulphate solution is light green.

(ii) **(b)** pH 1. *Working:* Lower pH means more H^+ ions.

(iii) **(a)** 3 : 1. *Working:* It can dissolve gold and platinum.

(iv) **(c)** 5–8%. *Working:* Vinegar is used as a preservative in pickles.

(v) **(b)** frog. *Working:* Frogs show external fertilisation in water.

(vi) **(a)** 0°. *Working:* It is measured from the normal.

Question 2

(i) rancidity.

(ii) basic.

(iii) aorta.

(iv) stigma.

(v) pole.

(vi) joule.

Question 3

(i) True: it obeys the law of conservation of mass.

(ii) True.

(iii) True.

(iv) False: they take in carbon dioxide for photosynthesis during the day.

(v) True.

(vi) False: at constant temperature it depends on the material, length and area.

Question 4

(i) CaO.

(ii) Sodium.

(iii) The liver.

(iv) Zygote.

(v) Convex lens.

(vi) 10 V.

5. (i) – (a) lack of iodine; (ii) – (c) lack of insulin; (iii) – (b) lack of growth hormone in childhood; (iv) – (f) elongated eyeball; (v) – (e) eyeball too short; (vi) – (d) weakening of the ciliary muscles with age

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6. In displacement, a more reactive element replaces a less reactive one from its compound: $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$ (1). In double displacement, two compounds exchange ions: $AgNO_3 + NaCl \rightarrow AgCl + NaNO_3$ (1).

7. The H^+ ions of the acid combine with the OH^- ions of the base to form water, and the remaining ions form a salt (1). $HCl + NaOH \rightarrow NaCl + H_2O$ (1).

8. Their outermost shells are completely filled: an octet, or a duplet in helium (1). They have no tendency to lose, gain or share electrons (1).

9. Carbon has 4 valence electrons (1). It cannot lose or gain 4 electrons easily, as this needs too much energy, so it shares electrons (1).

10. It gives a large surface area and enough time for the complete digestion of food (1) and for the absorption of digested food (1).

11. When we breathe in, the diaphragm flattens and the ribs move up and out, enlarging the chest cavity, so air enters the lungs (1). When we breathe out, they return, the cavity becomes smaller and air is pushed out (1).

12. Nerve impulses reach only cells connected to nerves and cannot keep up a continuous response (1). Hormones from endocrine glands reach all cells through the blood and give long-lasting control (1).

13. It produces variation, as DNA from two parents combines (1). Variation helps the species to survive changing conditions and to evolve (1).

14. All F_1 plants have round seeds (Rr) (1), because round is dominant over wrinkled (1).

15. The central point of a lens (1). A ray of light passing through it goes straight without bending (1).

16. A rainbow forms when sunlight is refracted, dispersed and internally reflected by raindrops in front of the observer (1). The dispersed light comes back towards the Sun's side, so the Sun must be behind us (1).

17. It has a very high melting point (about 3380 °C) (1), so it can glow at a high temperature without melting (1).

18. (a) ZnO is the oxidising agent; C is the reducing agent (1). (b) MnO_2 is the oxidising agent; HCl is the reducing agent (1). (c) CuO is the oxidising agent; H_2 is the reducing agent (1).

OR Metals with low reactivity, such as gold and platinum, do not react easily with air or water, so they are found free (1½). Reactive metals, such as sodium and calcium, combine readily with other elements, so they are found as oxides, sulphides and carbonates (1½).

19. Plasma: the fluid that carries food, carbon dioxide and nitrogenous wastes in dissolved form (1). Red blood cells: carry oxygen with haemoglobin (1). White blood cells fight infection; platelets help the blood to clot at a wound (1).

OR (a) Its secretion provides nutrition to the sperms and helps them move (1). (b) It holds and nourishes the developing embryo (1). (c) It provides food and oxygen to the embryo and removes its wastes (1).

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20. The object is at the focus, so the refracted rays are parallel (1½). The image is formed at infinity; it is real, inverted and highly enlarged (1½).

OR The ratio of the speed of light in vacuum (or air) to the speed of light in the medium, n = c/v (1). Light travels faster in water (1), because a lower refractive index means a higher speed of light (1).

21. Concentration: unwanted rock and earth (gangue) are removed from the ore (1). Sulphide ores are roasted (heated strongly in air) and carbonate ores are calcined (heated in limited air) to form the metal oxide (1). The oxide is reduced with carbon to the metal, e.g. ZnO + C → Zn + CO (1). The impure metal is refined, often by electrolysis (1).

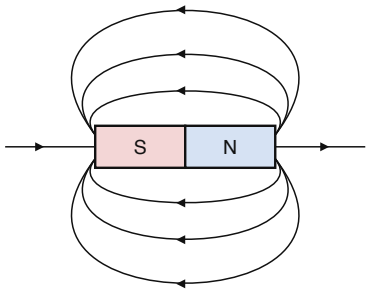
OR Ethanoic acid gives brisk effervescence of carbon dioxide with sodium hydrogencarbonate; ethanol does not (2). Ethanol: solvent, fuel, in medicines (1). Ethanoic acid: vinegar for preserving food, making esters (1).

22. Green plants make glucose from carbon dioxide and water using sunlight and chlorophyll (1). Steps: (i) chlorophyll absorbs light energy; (ii) light energy is converted to chemical energy and water is split into hydrogen and oxygen; (iii) carbon dioxide is reduced to carbohydrates (2). Equation: $6CO_2 + 12H_2O \rightarrow C_6H_{12}O_6 + 6O_2 + 6H_2O$, in the presence of sunlight and chlorophyll (1).

OR Ozone (O_3) is a molecule of three oxygen atoms (1). High-energy ultraviolet radiation splits O_2 into free oxygen atoms, which combine with O_2 to form O_3 (1). The ozone layer shields the Earth from harmful ultraviolet radiation that causes skin cancer (1). Its depletion, mainly by CFCs, lets more UV radiation reach the Earth (1).

23. Electric power is the rate at which electric energy is used, P = VI (1). Since V = IR, P = I × IR = I^2R (1). P = 220 × 5 = 1100 W (1). Energy = 1.1 kW × 2 h = 2.2 kWh (1).

OR Field pattern (1):



Field lines emerge from the north pole and enter the south pole (1). They never intersect each other (1). They are closer together where the field is stronger (1).

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