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Your JEE Guide

MP Board Class X · Science

Sample Question Paper 5 · 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 copper powder is heated in air, its colour changes to black because of the formation of: (a) copper(II) oxide (b) copper carbonate (c) copper nitrate (d) copper sulphate	1
	(ii) Which of the following is a weak base? (a) calcium hydroxide (b) sodium hydroxide (c) potassium hydroxide (d) ammonium hydroxide	1
	(iii) Which metal melts if you hold it in your palm? (a) silver (b) gallium (c) iron (d) copper	1
	(iv) Pentane (C_5H_{12}) has how many structural isomers? (a) 2 (b) 5 (c) 3 (d) 4	1
	(v) In which part of a flower does the pollen tube carry the male gamete to the female gamete? (a) anther (b) ovule (c) sepal (d) petal	1
	(vi) The resistance of a wire of resistivity ρ, length l and area A is: (a) lA/ρ (b) ρlA (c) ρA/l (d) ρl/A	1

2.	**(i)** *Fill in the blanks:* The substance that gets oxidised in a reaction is called the _____ agent.	1
	(ii) The chemical name of common salt is sodium _____.	1
	(iii) In human beings, the exchange of gases takes place in the _____ of the lungs.	1
	(iv) The unit of heredity is the _____.	1
	(v) The point where all rays parallel to the principal axis meet after reflection from a concave mirror is its _____.	1
	(vi) 1 ampere = 1 coulomb per _____.	1
3.	**(i)** *Write True or False:* Oxidation is the gain of oxygen or the loss of hydrogen.	1
	(ii) Copper displaces zinc from zinc sulphate solution.	1
	(iii) Ethanoic acid turns blue litmus red.	1
	(iv) Plants do not need oxygen for respiration.	1
	(v) In the human eye, the lens forms a real and inverted image on the retina.	1
	(vi) Two resistors in parallel have a combined resistance greater than either of them.	1
4.	**(i)** *Answer in one word or one sentence:* What is the colour of copper sulphate crystals?	1
	(ii) Name a metal that is found in the free state in nature.	1
	(iii) Which blood vessel carries oxygenated blood from the lungs to the heart?	1
	(iv) Name the part of the plant cell where photosynthesis takes place.	1
	(v) What is the focal length of a lens of power +4 D?	1
	(vi) Name the effect of current used in an electric bulb.	1

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5. Match each organism or structure in column A with its method of reproduction in column B: — 6

Column A	Column B
(i) Amoeba	(a) spore formation
(ii) Plasmodium	(b) multiple fission
(iii) Hydra	(c) cutting (vegetative propagation)
(iv) Rhizopus	(d) budding
(v) Planaria	(e) binary fission
(vi) Rose	(f) regeneration

6.	Why do we store silver chloride in dark-coloured bottles?	2
7.	What is the effect of dilution on the pH of an acid? Why is water never added to concentrated acid?	2
8.	Give two uses of plaster of Paris.	2
9.	Why does the flame of a gas stove turn yellow when the vessel bottom becomes black?	2
10.	How are the lungs designed to maximise the area for the exchange of gases?	2
11.	What is the role of the stomata in plants? How are they opened and closed?	2
12.	What is a reflex action? Give one example.	2
13.	Why is vegetative propagation useful? Give two advantages.	2
14.	Why is the F_1 generation of a cross between pure tall and pure dwarf pea plants all tall?	2
15.	A lens has a power of −2.5 D. What is its focal length, and what kind of lens is it?	2
16.	What is Tyndall effect? Give one example from daily life.	2
17.	Why is a series arrangement not used for domestic circuits?	2
18.	Write the chemical equations for: (a) the reaction of calcium with water; (b) the reaction of aluminium oxide with sodium hydroxide; (c) burning of sulphur in air. **OR** How is washing soda prepared from baking soda? Write the equation and two uses of washing soda.	3
19.	How is the food we eat absorbed and used by the body? Describe the role of villi. **OR** Describe the life process of transportation of food in plants.	3

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20.	An object 2 cm tall is placed 15 cm from a convex mirror of focal length 15 cm. Find the position, size and nature of the image. **OR** Why does the human eye need a lens of variable focal length? Name the part that changes it, and state how.	3
21.	What are the types of chemical reactions shown below? Explain each. (a) $2KClO_3 \rightarrow 2KCl + 3O_2$ (on heating); (b) $Fe + CuSO_4 \rightarrow FeSO_4 + Cu$; (c) $AgNO_3 + NaCl \rightarrow AgCl + NaNO_3$; (d) $2H_2 + O_2 \rightarrow 2H_2O$. **OR** What is the pH scale? How is pH important in (a) digestion; (b) tooth decay; (c) soil for plants?	4
22.	What is heredity? Explain Mendel's experiment with two traits (seed shape and seed colour) to show that traits are inherited independently. **OR** What is an ecosystem? Explain its biotic and abiotic components and why decomposers are important.	4
23.	A wire of resistance 10 Ω is stretched to twice its length. What is its new resistance? Explain. Also state Ohm's law. **OR** Describe the magnetic field produced by a current in a circular loop. On what factors does its strength depend?	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)** copper(II) oxide. *Working:* $2Cu + O_2 \rightarrow 2CuO$.

(ii) **(d)** ammonium hydroxide. *Working:* NH_4OH ionises only partly.

(iii) **(b)** gallium. *Working:* Gallium melts at about 30 °C.

(iv) **(c)** 3. *Working:* n-pentane, isopentane and neopentane.

(v) **(b)** ovule. *Working:* The pollen tube grows through the style to the ovule in the ovary.

(vi) **(d)** ρl/A. *Working:* R = ρl/A.

Question 2

(i) reducing.

(ii) chloride.

(iii) alveoli.

(iv) gene.

(v) principal focus.

(vi) second.

Question 3

(i) True.

(ii) False: copper is less reactive than zinc.

(iii) True: it is an acid.

(iv) False: plant cells respire aerobically and need oxygen.

(v) True.

(vi) False: it is less than the smallest one.

Question 4

(i) Blue.

(ii) Gold (or platinum, silver).

(iii) The pulmonary vein.

(iv) The chloroplast.

(v) +25 cm (0.25 m).

(vi) The heating effect.

5. (i) – (e) binary fission; (ii) – (b) multiple fission; (iii) – (d) budding; (iv) – (a) spore formation; (v) – (f) regeneration; (vi) – (c) cutting (vegetative propagation)

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6. Silver chloride decomposes in sunlight into silver and chlorine (1): $2AgCl \rightarrow 2Ag + Cl_2$. Dark bottles keep out light (1).

7. Dilution lowers the H^+ ion concentration, so the pH rises towards 7 (1). Mixing is highly exothermic; adding water to the acid can make it splash and break the glass, so acid is added slowly to water (1).

8. Making casts to support fractured bones (1). Making toys, decorative items and smooth surfaces (1).

9. Incomplete combustion produces unburnt carbon particles that glow yellow (1). The air holes of the burner are blocked, so the fuel does not get enough oxygen (1).

10. The bronchioles end in millions of tiny balloon-like alveoli (1). Their walls are thin and covered with a dense network of blood capillaries, giving a very large surface (1).

11. Stomata allow exchange of gases and loss of water vapour (1). Guard cells swell with water to open the pore and shrink to close it (1).

12. A sudden, automatic response to a stimulus, without conscious thought (1). Example: pulling the hand back from a hot object (1).

13. Plants that cannot produce viable seeds, such as banana, can be grown (1). The new plants are genetically like the parent and bear flowers and fruit sooner (1).

14. Each F_1 plant gets one T gene from the tall parent and one t gene from the dwarf parent, so it is Tt (1). Tall is dominant, so only the tall trait is expressed (1).

15. $f = 1/P = 1/(-2.5) = -0.4$ m $= -40$ cm (1). The negative sign shows it is a concave (diverging) lens (1).

16. The scattering of light by tiny particles in a colloid, which makes the path of a beam visible (1). Example: sunlight entering a smoke-filled room or a dense forest (1).

17. If one appliance fails, the circuit breaks and all appliances stop (1). Each appliance cannot get the full supply voltage or its own current (1).

18. (a) $Ca + 2H_2O \rightarrow Ca(OH)_2 + H_2$; calcium floats because bubbles of hydrogen stick to it (1). (b) $Al_2O_3 + 2NaOH \rightarrow 2NaAlO_2 + H_2O$ (1). (c) $S + O_2 \rightarrow SO_2$, an acidic oxide (1).

OR Baking soda is heated to give sodium carbonate, which is recrystallised to give washing soda: $2NaHCO_3 \rightarrow Na_2CO_3 + H_2O + CO_2$; $Na_2CO_3 + 10H_2O \rightarrow Na_2CO_3{\cdot}10H_2O$ (1½). Uses (any two): in the glass, soap and paper industries; for removing the permanent hardness of water; as a cleaning agent (1½).

19. Digested food (glucose, amino acids, fatty acids and glycerol) is absorbed by the walls of the small intestine (1). The inner lining has thousands of finger-like villi, which greatly increase the surface area for absorption (1). The villi are richly supplied with blood vessels, which carry the absorbed food to every cell of the body (1).

OR Food made in the leaves is carried by the phloem; this is called translocation (1). It moves upwards and downwards to every part, including roots, fruits and seeds (1). Translocation uses energy from ATP: sugar is loaded into the phloem, water enters by osmosis, and the pressure moves the food to areas of need (1).

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20. $\frac{1}{v} = \frac{1}{f} - \frac{1}{u} = \frac{1}{15} + \frac{1}{15} = \frac{2}{15}$, so v = +7.5 cm (1). m = –v/u = –7.5/(–15) = 0.5, so the image is 1 cm tall (1). It is virtual, erect and diminished, 7.5 cm behind the mirror (1).

OR Objects at different distances must all form sharp images on the retina, which is at a fixed distance (1). The ciliary muscles change the focal length (1). They relax to make the lens thin for distant objects and contract to make it thick for near objects (1).

21. (a) Thermal decomposition: one compound breaks into simpler substances on heating (1). (b) Displacement: the more reactive iron displaces copper from its salt (1). (c) Double displacement and precipitation: ions are exchanged and insoluble AgCl forms (1). (d) Combination: two substances combine to form a single product (1).

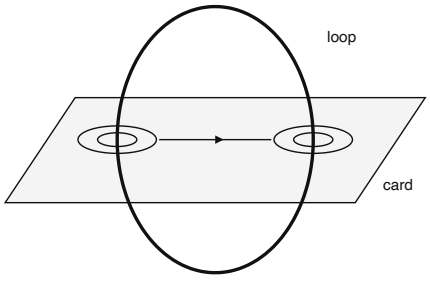
OR A scale from 0 to 14 that measures the H^+ ion concentration: below 7 acidic, 7 neutral, above 7 basic (1). (a) The stomach makes hydrochloric acid for digestion; antacids neutralise excess acid (1). (b) Tooth enamel corrodes when the pH in the mouth falls below 5.5; basic toothpaste neutralises the acid (1). (c) Plants grow well in a narrow pH range; soil that is too acidic is treated with lime (1).

22. Heredity is the passing of traits from parents to offspring (1). Mendel crossed plants with round yellow seeds (RRYY) and wrinkled green seeds (rryy); all F_1 were round yellow (1). On self-pollination, F_2 had round yellow, round green, wrinkled yellow and wrinkled green seeds in the ratio 9 : 3 : 3 : 1 (1). New combinations appeared, showing that the two traits are inherited independently (1).

OR All the living organisms in an area together with the non-living environment (1). Biotic components: producers, consumers and decomposers (1). Abiotic components: temperature, rainfall, wind, soil and minerals (1). Decomposers break down dead plants and animals into simple substances, returning nutrients to the soil (1).

23. Ohm’s law: at constant temperature, the current through a conductor is proportional to the potential difference across it, V = IR (1). On stretching, the volume stays the same: length doubles and area halves (1). R = ρl/A becomes ρ(2l)/(A/2) = 4ρl/A (1). New resistance = 40 Ω (1).

OR Field lines are concentric circles near the wire; at the centre of the loop they are nearly straight and perpendicular to its plane (1½):



The strength increases with the current (1) and with the number of turns, and decreases with the radius of the loop (1½).

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