

Sample Paper

1

ANSWER KEYS

1	(b)	7	(a)	13	(c)	19	(b)	25	(c)	31	(a)	37	(c)	43	(c)	49	(c)	55	(d)
2	(b)	8	(d)	14	(c)	20	(b)	26	(d)	32	(a)	38	(d)	44	(c)	50	(a)	56	(a)
3	(a)	9	(a)	15	(b)	21	(b)	27	(c)	33	(b)	39	(c)	45	(a)	51	(b)	57	(a)
4	(b)	10	(a)	16	(b)	22	(d)	28	(c)	34	(c)	40	(c)	46	(c)	52	(c)	58	(a)
5	(a)	11	(b)	17	(c)	23	(c)	29	(b)	35	(a)	41	(a)	47	(a)	53	(b)	59	(c)
6	(d)	12	(c)	18	(c)	24	(d)	30	(b)	36	(b)	42	(b)	48	(c)	54	(c)	60	(d)



- (b)
- (b)
- (a) $\text{Ca(OH)}_2 + \text{CO}_2 \rightarrow \text{CaCO}_3 + \text{H}_2\text{O}$
- (b) Gastric glands are located in stomach (labeled B in the diagram). The gastric glands secrete digestive juice rich in protein splitting enzyme pepsin. The pepsin is secreted in an active form called pepsinogen.
- (a) The sino-atrial node (SAN) is a mass of nodal tissue found in the upper part of right auricle. It generates the nerve impulse which is responsible for starting the contraction of the heart. It controls the rhythm of the heart contraction.
- (d) The organ labelled A is the kidney. From the kidney, the urine moves into the ureter, labelled B in the figure. Through the ureters, the urine is collected in the urinary bladder, labelled C is the organ for the temporary stage of urine. The urethra labelled D is the duct, that carries urine from the urinary bladder to the outside.
- (a) Cu does not produce hydrogen gas on reaction with hydrochloric acid. Cu is present below hydrogen in reactivity series, i.e. it is less reactive than hydrogen.
- (d) The given reaction is an example of displacement reaction as in this reaction Al displaces Fe from Fe_2O_3 .
- (a) In the test tube A at day 1, the plant is in the inverted position. In the figure at day 5, the shoot is moving towards sun-light as the shoot shows positive phototropism because they require sunlight for photosynthesis the root is moving towards gravity as the root shows positive geotropism because they require soil for the growth and anchoring of plant.
- (a) Amoeba has holozoic mode of nutrition. Amoeba is a unicellular organism and thus has no specialised organs or structures for the process of nutrition. It takes place through the general body surface through pseudopodia. Amoeba intakes the food by the invagination.
- (b) Chemical 'A' is calcium hydroxide (slaked lime).
 $\text{Ca(OH)}_2 + \text{Na}_2\text{CO}_3 \rightarrow 2\text{NaOH} + \text{CaCO}_3 \downarrow$
- (c) When magnesium is exposed to air, a layer of oxide is formed on its surface and it gets corroded. So, as to remove the layer, magnesium ribbon is rubbed.
- (c) Conversion of liquid to gas is an endothermic process.
- (c) H_3PO_3 is a dibasic acid.
$$\text{H}_3\text{PO}_3 \rightleftharpoons \text{H}^+ + \text{H}_2\text{PO}_3^-$$

$$\text{H}_2\text{PO}_3^- \rightleftharpoons \text{H}^+ + \text{HPO}_3^{2-}$$

$$\text{H}_3\text{PO}_3 + 2\text{NaOH} \longrightarrow \text{Na}_2\text{HPO}_3 + 2\text{H}_2\text{O}$$
- (b)
- (b) $\text{Zn} + 2\text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2$
Hydrogen gas burns with a pop sound. Zinc surface becomes dull and black.
- (c) For all spherical mirrors $f = R/2$
- (c) given, $m = \frac{\text{Image height}}{\text{object height}} > 1$
 $\Rightarrow \text{Image height} > \text{Object height}$
- (b)
- (b)

21. (b) Refractive index of diamond relative to water

$$= \frac{\mu_{\text{diamond}}}{\mu_{\text{water}}} = \frac{2.4}{1.33} = 1.80$$

22. (d)

23. (c) Focal length of a lens, $F = 25 \text{ cm}$

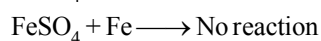
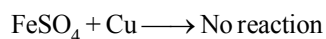
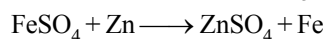
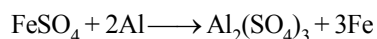
$$f = 0.25 \text{ m}$$

$$P = \frac{1}{f} = \frac{1}{0.25} = 4D$$

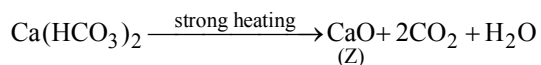
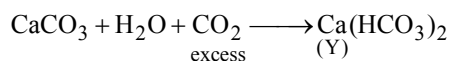
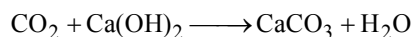
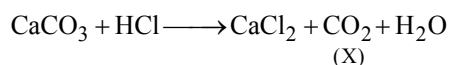
24. (d) Near the horizon at sunrise and sunset, most of the blue light and shorter wavelengths are scattered away and hence sun appears red.

25. (c)

26. (d) Zn and Al are more reactive than iron, therefore they will displace iron from its salt solution giving black residue, while Cu being less reactive than iron will not be able to displace iron from its salt solution.

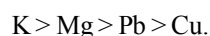


27. (e) The egg shells are made up of calcium carbonate (CaCO_3)



28. (c) Metals below hydrogen in a reactivity series do not react with dilute HCl. Medium reactive metals react with warm water and highly reactive metals react with cold water.

As per the given information H, K, L and M can be identified as Cu, Mg, Pb and K/Na respectively. So their reactivity order will be $M > K > L > H$ i.e.



29. (b) $2\text{C}_2\text{H}_6(\text{g}) + 7\text{O}_2(\text{g}) \longrightarrow 4\text{CO}_2(\text{g}) + 6\text{H}_2\text{O}(\text{l})$

30. (b) CuO is basic in nature. Thus, this reaction is an acid-base reaction or neutralization reaction and double displacement reaction because both the cations and anions are exchanged.

31. (a) Because H_2SO_4 is a strong acid, it readily forms hydronium ions when dissolved in water which are responsible for its corrosive action.

32. (a) The metals placed at the top of the series are most reactive.

33. (b) A pacemaker is a small mass specialised cell that is located in the right atrium of the heart. It generates an electrical impulse that causes the heart muscles to move and generate a heart beat. A pacemaker regulates the number of heart beats per minute. For example, during the state of rest, the heart beats 72 times a minute, but during the state of anxiety running exhaustion, the heart rate is increased. This is controlled by both medulla oblongata in the brain and pacemaker.

34. (c)

35. (a) 36. (b)

37. (c) Transpiration is an essential phenomenon. Its pulling action helps in absorption and transportation of water in the plant. It also supplies water for photosynthesis.

38. (d) All the green plants are called autotrophs. This is due to the fact that the green plants make their own food from very simple substances like carbon dioxide and water that is present in the surroundings. They do this by the process of photosynthesis. These green plants contain a green pigment called chlorophyll which further helps in making food by absorbing energy received from the sunlight. Thus, the autotrophic mode of nutrition requires CO_2 , H_2O , chlorophyll and sunlight.

39. (c) In case of minimum deviation, the light ray inside the prism becomes parallel to the base of the prism.

40. (c)

41. (a) The rate at which oxygen moves from the alveoli of our lungs into our blood depends on the difference in oxygen concentration between the alveoli and the blood. More oxygen absorbed by our body using more it is absorbed into the blood and utilized by body muscles.

42. (b) Whale is a mammal and in mammals, two separate circulatory pathways are found - systemic circulation and pulmonary circulation. Oxygenated and deoxygenated bloods received by the left and right atria respectively pass on to the left and right ventricles. Thus, oxygenated and deoxygenated bloods are not mixed. This is referred to as double circulation.

43. (c)

44. (c) For the end B, image distance of end B will be,

$$f = 10 \text{ cm}$$

$$u_B = -18 \text{ cm}$$

$$v_B = \text{image distance of end B}$$

As we know,

$$\frac{1}{f} = \frac{1}{v_B} - \frac{1}{u_B}$$

$$\frac{1}{v_B} = \frac{1}{f} + \frac{1}{u_B}$$

$$\frac{1}{v_B} = \frac{1}{10} - \frac{1}{18} = \frac{8}{180}$$

$$v_B = \frac{180}{8} \Rightarrow 22.5 \text{ cm}$$

Similarly, for the end A , image distance of end A will be,

$$f = 10 \text{ cm}$$

$$u_A = -20 \text{ cm}$$

$$v_A = \text{image distance of end } A$$

$$\frac{1}{f} = \frac{1}{v_A} - \frac{1}{u_A}$$

$$\frac{1}{v_A} = \frac{1}{f} + \frac{1}{u_A}$$

$$\frac{1}{v_A} = \frac{1}{10} - \frac{1}{20} = \frac{1}{20}$$

$$v_A = 20 \text{ cm}$$

$$\begin{aligned} \text{So, length of image } A'B' &= (v_B - v_A) \\ &= 22.5 - 20 = 2.5 \text{ cm} \end{aligned}$$

$$\text{So magnification, } m = \frac{A'B'}{AB} \Rightarrow \frac{2.5}{2} = 1.25$$

48. (c) A neutral salt brings no change with blue litmus solution, red litmus solution and with phenolphthalein solution. An acidic salt turns blue litmus to red and brings no change in red litmus solution as well as in phenolphthalein solution. Basic salt turns red litmus to blue and also turns phenolphthalein solution pink.

Sample	Solution	With blue litmus solution	With red litmus solution	With phenolphthalein solution
A	Neutral salt (NaCl)	No change	No change	No change
B	Acidic salt (NH ₄ Cl)	Turns red	No change	No change
C	Basic salt (CH ₃ COONa)	No change	Turns blue	Turns pink

49. (c) 50. (a)

51. (b) Mg²⁺ and O²⁻ ions are divalent due to which they have very strong electrostatic force of attraction. Hence MgO has very high melting point and also very low thermal conductivity.

52. (a) HCl is a covalent compound. Sugar crystals does not contain positive ions or negative ions. Hence, it is not an ionic compounds.

53. (b) 54. (c) 55. (d) 56. (a)

57. (a) From figure, angle of incidence, $i = 60^\circ$ and angle of refraction, $r = 45^\circ$

Refractive index of the medium B relative to medium A , (from Snell's law)

$$\mu_{BA} = \frac{\sin i}{\sin r} = \frac{\sin 60^\circ}{\sin 45^\circ} = \frac{\left(\frac{\sqrt{3}}{2}\right)}{\left(\frac{1}{\sqrt{2}}\right)} = \frac{\sqrt{3}}{2}$$

45. (a)

46. (c) Light waves are refracted by some material.

47. (a)

58. (a) Since light rays in the medium B goes towards normal (figure), so it has greater refractive index i.e., denser w.r.t. medium A . Hence, refractive index of medium B relative to medium A is greater than unity.

59. (c)

60. (d) Among the given material kerosene refractive index, $\mu = 1.44$, water $\mu = 1.33$, mustard oil $\mu = 1.46$ and glycerine $\mu = 1.74$. Glycerine is most optically denser. Therefore, ray of light bend most in glycerine.