Sample Paper

ANSWER KEYS

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

SOLUTIONS

1. **(c)** The gas evolved at anode during electrolysis of brine is chlorine (G). When chlorine gas is passed through dry $Ca(OH)_2$ (Y) produces bleaching powder (Z), used for disinfecting drinking water.

$$\underset{\text{Slaked lime (Y)}}{Ca(OH)_2} + Cl_2 \longrightarrow \underset{\text{Bleaching powder (Z)}}{CaOCl_2} + H_2O$$

Since Y and Z are calcium salts, therefore X is also a calcium salt and it is calcium carbonate.

$$\underset{X}{CaCO_3} + 2HCl \longrightarrow CaCl_2 + CO_2 + H_2O$$

$$\underset{Y}{Ca(OH)_2} + CO_2 \longrightarrow \underset{X}{CaCO_3} + H_2O$$

2. **(a)** Cu reacts with conc. H_2SO_4 on heating but does not react with $FeSO_4$ as it is less reactive than Fe.

3. **(c)**   4. **(c)**

5. **(c)** Silver and platinum are less reactive than copper hence does not displace copper from copper sulphate solution.

6. **(c)**   7. **(b)**

8. **(c)** $\underset{X}{Mg} + \underset{Y}{Cl_2} \rightarrow MgCl_2$

9. **(c)** $2NaHCO_3 \longrightarrow Na_2CO_3 + CO_2$

10. **(d)** Distilled water and glucose water do not contain ions. Hence, they can not conduct electricity.

Rain water, while falling to the earth through the atmosphere, dissolves acidic gases like CO_2, SO_2 etc. from the air thus forms acids like carbonic acid (H_2CO_3), sulphurous acid (H_2SO_3) etc. These acids provides ions to rain water. So, due to presence of these acids, the rain water conducts electricity.

11. **(b)**   12. **(b)**   13. **(d)**   14. **(b)**   15. **(d)**   16. **(b)**

17. **(c)** $\dfrac{1}{v} - \dfrac{1}{u} = \dfrac{1}{f}$

v = image distance

u = object distance and
f = focal length of lens

18. **(b)** Power of lens, $P = \dfrac{1}{f \text{ (in metre)}} = \dfrac{1}{\dfrac{50}{100}} = 2$ D

19. **(c)** $F = \dfrac{R}{2} \Rightarrow R = 2F$

20. **(c)** The minimum distance between a real object and its real image formed by convex lens is 4f i.e. four times of focal length.

21. **(b)** Given $n_{12} = \dfrac{n_1}{n_2} = \dfrac{\sqrt{2}}{\sqrt{3}}$

Applying Snell's law

$n_1 \sin i = n_2 \sin r$

$\dfrac{n_1}{n_2} \sin x = \sin 45°$

$\dfrac{\sqrt{2}}{\sqrt{3}} \sin x = \dfrac{1}{\sqrt{2}}$

$\sin x = \dfrac{\sqrt{3}}{2}$

$x = 60°$

22. **(b)** Refraction of light through prism causes refraction at two refracting surfaces.

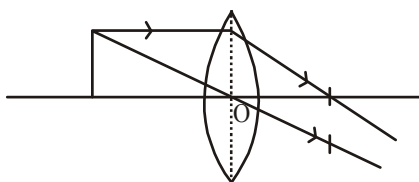where $\angle A$ = angle of prism

23. **(c)**

Ray which passes through optical centre remains undeviated.

24. **(d)** $f = +30$ cm, $u = -15$ cm

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u} \Rightarrow \frac{1}{v} = \frac{1}{30} - \frac{1}{15}$$

$V = -30$ cm

$$m = \frac{v}{u} = \frac{-30}{-15} = 2$$

$m = 2$

25. **(d)**
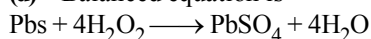
26. **(d)** $4FeSO_4 \longrightarrow 2Fe_2O_3 + 4SO_2 + O_2$

27. **(b)** In acid, blue litmus changes to red and in basic solution red litmus changes to blue. Hence blue litmus first changes its color to red and then to blue.

28. **(c)** A metal which is soft-sodium a nonmetal which is hardest-diamond Iodine is not hardest nonmetal.

29. **(d)** Balanced equation is
Pbs $+ 4H_2O_2 \longrightarrow PbSO_4 + 4H_2O$

30. **(d)**

31. **(a)** Magnesium ion and oxide ions are divalent thus form stong electrostatic bond or ionic bond.

32. **(a)** Both assertion and reason are true and reason is the correct explanation of assertion.

33. **(c)** Rupiration in catabolic while Photosynthesis an anabolic process. In rupiration, glucoic in broken down into water and carbondioxide and energy During Photosynthesis, CO_2 and H_2O combine in the presence of sunlight to produce glucoic and oxygen. Procus in exactly opposite of Rupiration.

34. **(a)**

35. **(d)** H_2CO_3 (carbonic acid) is a weak acid.

36. **(d)**   **37.** **(c)**   **38.** **(c)**

39. **(b)** Time taken $= \dfrac{\dfrac{\text{distance}}{\text{thickness}}}{V_{\text{med}}}$

$$= \frac{t}{\frac{c}{n}} \qquad \left[\because V_{\text{med}} = \frac{c}{n} \right]$$

$\therefore$ Time taken $= \dfrac{nt}{c}$

40. **(b)** According to snell's law,
$\therefore c =$ speed of light in vaccum 3×10^8 m/s
$i =$ angle of incidence
$= 45°$

$r =$ angle of refractive

$$\mu = \frac{\sin i}{\sin r} = \frac{c}{v}$$

$$\Rightarrow \quad v = c\frac{\sin r}{\sin i} = 3 \times 10^8 \times \frac{\sin 30°}{\sin 45°}$$

$$= 3 \times 10^8 \times \frac{\frac{1}{2}}{\frac{1}{\sqrt{2}}} \Rightarrow 3 \times 10^8 \times \frac{\sqrt{2}}{2} = 3 \times 10^8 \times \frac{1.414}{2}$$

$$= 3 \times 0.707 \times 10^8$$

$$= 2.121 \times 10^8 \text{ m/s}$$

41. **(a)**   **42.** **(b)**

43. **(c)** White colour of cloud is due to scattering of light. Also, Sun is visible two minutes before the actual sunrise due to atmospheric refraction.

44. **(a)** For an incident ray directed towards centre of curvature of a spherical mirror the reflected ray retraces its path.

45. **(b)** From the figure, $u = -20$ cm, $v = 20$ cm, $f = ?$

Using lens formula, $\dfrac{1}{v} - \dfrac{1}{u} = \dfrac{1}{f}$

$$\Rightarrow \frac{1}{20} - \frac{1}{(-20)} = \frac{1}{f} \Rightarrow \frac{1}{20} + \frac{1}{20} = \frac{1}{f}$$
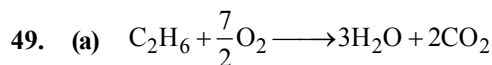
or, $\dfrac{1}{f} = \dfrac{1+1}{20}$

$$\therefore f = \frac{20}{2} = 10 \text{ cm}$$
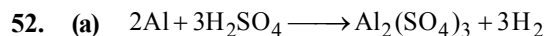
46. **(c)** Power of combination of lenses,
$$P_{eq} = P_1 + P_2 + P_3 = +3.5 + 2.5 + 1 = +7 \text{ D}$$

47. **(d)** When light ray travels from rarer to denser medium, it bends towards the normal and vice-versa.

48. **(d)** Tungsten is used is high melting electrical devices such as bulb. Iodine is soft, shiny, lustrous element, while napthalene and compounds not elementary silver is a very good conductor of electricity but is expensive thus its use is limited.

49. **(a)** $C_2H_6 + \dfrac{7}{2}O_2 \longrightarrow 3H_2O + 2CO_2$

50. **(d)**   **51.** **(b)**

52. **(a)** $2Al + 3H_2SO_4 \longrightarrow Al_2(SO_4)_3 + 3H_2$

53. **(c)**   **54.** **(d)**   **55.** **(b)**   **56.** **(c)**   **57.** **(c)**   **58.** **(c)**

59. **(a)** Dispersion arises because of basic phenomenon refraction.

60. **(d)** Violet deviates the most.