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IN JEE MAIN AND ADVANCED

Solutions All India Test Series

Test-5

PHYSICS

1. (1)
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3. (2)
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26. (3)
27. (2)
28. (3)
29. (4)
30. (3)

CHEMISTRY

31. (4)
32. (1)
33. (4)
34. (1)
35. (1)
36. (4)
37. (3)
38. (1)
39. (2)
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58. (1)
59. (3)
60. (1)

MATHEMATICS

61. (1)
62. (2)
63. (4)
64. (1)
65. (2)
66. (3)
67. (4)
68. (4)
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89. (1)
90. (2)

PHYSICS

1. Answer (1)
2. Answer (3)
3. Answer (2)
4. Answer (3)
5. Answer (4)
6. Answer (3)
7. Answer (1)
8. Answer (1)
9. Answer (1)
10. Answer (4)
11. Answer (3)
12. Answer (4)
13. Answer (2)
14. Answer (3)
15. Answer (1)
16. Answer (3)
17. Answer (4)
18. Answer (3)
19. Answer (1)
20. Answer (2)
21. Answer (1)
22. Answer (4)

Since bodies are moving due to internal forces.

23. Answer (3)

$$\frac{1}{2} \times \frac{2m}{3} \times V_{rel}^2 = \frac{KQ^2}{r}$$

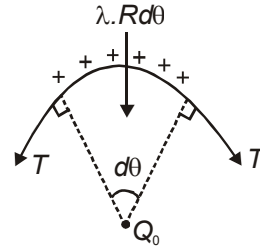
$$V_{rel} = Q \sqrt{\frac{3K}{r}}$$

$$= Q \sqrt{\frac{3}{4\pi\epsilon_0 r}}$$

24. Answer (4)

As there is no external force so C.M. remains stationary.

25. Answer (2)



$$2T \cos \left\{ \frac{\pi - d\theta}{2} \right\} = \frac{KQ_0(\lambda R d\theta)}{R^2}$$

$$T = \frac{KQ_0\lambda}{R}$$

26. Answer (3)

27. Answer (2)

$$I = \frac{E}{\frac{2R}{3} + 3R} = \frac{3E}{11R}$$

$$I_R = \frac{2R}{R + 2R} \times \frac{3E}{11R} = \frac{2E}{11R}$$

28. Answer (3)

$$I_{\text{Battery}} = \frac{E}{2R}$$

$$\therefore I = \frac{E}{8R}$$

29. Answer (4)

30. Answer (3)

$$\frac{10 - V}{2} = \frac{V - 2}{4} + \frac{V - 4}{1}$$

$$\Rightarrow V = \frac{38}{7} V$$

31. Answer (4)

$$\text{Contribution of A atom} = 6 \times \frac{1}{8} = \frac{6}{8}$$

$$\text{Contribution of B atom} = 6 \times \frac{1}{2} = 3$$

∴ Overall composition is $\frac{A_6}{8} B_3$ or $A_6 B_{24}$

32. Answer (1)

Kinetic equation of first order reaction

$$K = \frac{2.303}{t} \times \log \frac{a}{a-x}$$

$$t = \frac{2.303}{6.909} \log \frac{100}{100-75} = \frac{1}{3} \log 4 = \frac{2}{3} \log 2$$

33. Answer (4)

For a equimolar mixture A and B

$$X_A = 0.5, X_B = 0.5$$

$$p = X_A p_A + X_B p_B = 0.5 \times 150 + 0.5 \times 100 = 125$$

Let Y_B the mole fraction of vapour B

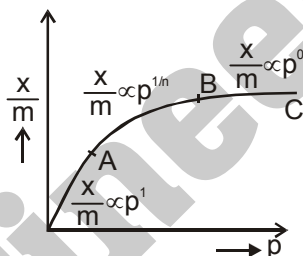
$$Y_B = \frac{X_B Y_B^0}{p} = \frac{0.5 \times 10}{125} = 0.4$$

34. Answer (1)

35. Answer (1)

In the Freundlich adsorption isotherm equation

$$\log \frac{x}{m} = \log k + \frac{1}{n} \log p$$

The value of n is any value from 0 to 1.

36. Answer (4)

37. Answer (3)

Only chloroform and acetone would give a solution with negative deviation.

38. Answer (1)

39. Answer (2)

Fraction of molecules with energy equal to or greater than activation energy = $e^{-E/RT}$

$$= e^{-\frac{209.5 \times 1000 \text{ J/mole}}{3.143(\text{J mol}^{-1}\text{K}^{-1}) \times 581\text{K}}}$$

$$= e^{-43.369}$$

$$= 1.462 \times 10^{-19}$$

40. Answer (1)

41. Answer (2)

$$\text{Rate} = K[\text{CO}]^2[\text{Cl}_2]^x$$

If concentration of CO is doubled

$$\therefore \text{rate}(r') = 4r$$

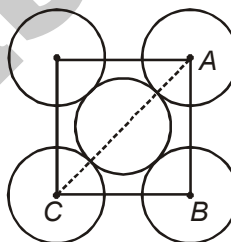
42. Answer (3)

In face centred cubic unit cells, spheres on the face are touching, $AC = 4r$

∴ But from right angle triangle ABC

$$AC = \sqrt{(AB)^2 + (BC)^2} = \sqrt{a^2 + a^2} = a\sqrt{2}$$

$$a = \frac{4r}{\sqrt{2}}$$



$$\therefore \text{Volume of unit cell} = a^3 = \left(\frac{4}{\sqrt{2}}r\right)^3 = \frac{32}{\sqrt{2}}r^3$$

Number of spheres per unit cell

$$= 8 \times \frac{1}{8} + 6 \times \frac{1}{2} = 4$$

$$\text{Volume of 4 spheres will be } 4 \times \left(\frac{4}{3}\pi r^3\right) = \frac{16}{3}\pi r^3$$

43. Answer (2)

Red bauxite is an ore of aluminium. It contains Fe_2O_3 as major impurity.

44. Answer (4)

45. Answer (1)

46. Answer (2)

$$\Delta T_f = 0.5^\circ\text{C}$$

$$\Delta T_f = k_f \times m = 1.86 \times \frac{w \times 1000}{372 \times 60}$$

$$w = \frac{0.5 \times 372 \times 60}{1.86 \times 1000} = 6 \text{ g}$$

47. Answer (1)

48. Answer (4)

49. Answer (4)

50. Answer (1)

51. Answer (3)

52. Answer (1)

Only solvent particle can pass through SPM,

So no change in colour will observe in either of the component

53. Answer (3)

Solvent flows from lower conc. solution (FeCl_3) to higher conc. solution [$\text{K}_4(\text{FeCN})_6$],

So, concentration of FeCl_3 increases

54. Answer (3)

$$\pi = CRT \times i$$

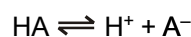
$$= 0.02 \times R \times 300 \times 4 = 24 R$$

55. Answer (1)

56. Answer (4)

$$\alpha(\text{degree of dissociation}) = \frac{\lambda_a}{\lambda_\infty}$$

$$\alpha = \frac{8}{400} = 2 \times 10^{-2}$$

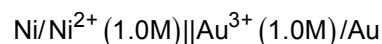


$$K_a = C\alpha^2$$

$$= \frac{1}{32} \times (2 \times 10^{-2})^2 = \frac{4}{32} \times 10^{-4} = 0.125 \times 10^{-4} = 1.25 \times 10^{-5}$$

Galvanic cell representation of a cell given as.

57. Answer (4)



$$E_{\text{cathode}}^{\circ} = E_{\text{Au}^{3+}/\text{Au}}^{\circ} = 0.150\text{V}$$

$$E_{\text{anode}}^{\circ} = E_{\text{Ni}^{2+}/\text{Ni}}^{\circ} = 0.25\text{V}$$

$$E_{\text{cell}}^{\circ} = E_{\text{cathode}}^{\circ} - E_{\text{anode}}^{\circ} \\ = 0.150 - (-0.25) = 0.4 \text{ V}$$

58. Answer (1)

In antifluorite structure like Na_2O , O^{2-} ions occupy half of the cubic holes and Na^+ ions are surrounded by 8 Na^+ and each Na^+ ion is surrounded by 4 O^{2-} ions. Its coordination number is 8.

59. Answer (3)

60. Answer (1)

MATHEMATICS

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