

## Answer Key & Explanations

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**Q1. (b)** 60 J. (Work = Force  $\times$  Displacement = 12 N  $\times$  5 m = 60 J)

**Q2. (c)** Two magnetic field lines can intersect each other near the poles. (Magnetic field lines never cross each other).

**Q3. (c)** Hydrogen. ( $\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2$ )

**Q4. (d)** Increase in wind speed. (Increased wind speed carries away water vapor, increasing evaporation).

**Q5. (d)** Diffusion.

**Q6. (b)** Double. ( $V = IR$ . If V is doubled and R is constant, I must double).

**Q7. (c)** 20 m/s. ( $v = u + at = 0 + 2 \times 10 = 20 \text{ m/s}$ )

**Q8. (a)** 1-c, 2-a, 3-d, 4-b.

**Q9. (c)** Flower bud.

**Q10. (d)** Saprotrophic nutrition.

**Q11. (c)** Protons and neutrons in the nucleus.

**Q12. (b)** Roasting.

**Q13. (b)** 80 J. ( $\text{KE} = \frac{1}{2}mv^2 = \frac{1}{2} \times 10 \times 16 = 80 \text{ J}$ )

**Q14. (c)** Yeast.

**Q15. (c)** Composting.

**Q16. (b)** Fusion of one male gamete with the egg and another with the polar nuclei.

**Q17. (c)**  $\text{Ca}(\text{OH})_2$ .

**Q18. (a)** Atmospheric refraction of starlight.

**Q19. (b)** 12 kg. (Mass remains constant everywhere).

**Q20. (b)**  $2\text{Mg} + \text{O}_2 \rightarrow 2\text{MgO}$ .

**Q21. (d)** Mitochondria.

**Q22. (c)** Zinc. (Zinc is more reactive than Iron).

**Q23. (b)** Dandelion.

**Q24. (c)** Particles of matter have spaces between them.

**Q25. (b)** 4. (In  $2\text{H}_2\text{O}$ ,  $2 \times 2 = 4$  hydrogen atoms).

**Q26. (a)**  $31/20$ . ( $\sin \theta = \frac{3}{5}$ , so opp=3, hyp=5, adj=4.

$$\tan \theta = \frac{3}{4}, \cos \theta = \frac{4}{5} \cdot \frac{3}{4} + \frac{4}{5} = \frac{15}{20} + \frac{16}{20} = \frac{31}{20}$$

**Q27. (c)** 50%. (Let income=100, Exp=75, Sav=25. New income=120, New exp=82.5, New Sav=37.5. Increase=12.5.  $(12.5/25) \times 100 = 50\%$ )

**Q28. (b)** 18. ( $13 \times 6 - 12 \times 5 = 78 - 60 = 18$ )

**Q29. (b)** 12. (Total work=6 units. Done in 2 hrs=2 units. Rem=4. A+B take 8 hrs for 4 units, rate=0.5/hr. C rate =  $1 - 0.5 = 0.5$ /hr. C alone =  $6/0.5 = 12$  hrs)

**Q30. (a)** 50,000. ( $P \times 1.10 \times 0.80 = 44,000 \rightarrow P \times 0.88 = 44,000 \rightarrow P = 50,000$ )

**Q31. (b)** 3 : 2. (Volume hemi = Volume cyl.  $\frac{2}{3}\pi r^3 = \pi r^2 h \rightarrow h = \frac{2}{3}r$ . Ratio =  $\frac{2\pi r^2}{2\pi r h} = \frac{r}{\frac{2}{3}r} = \frac{3}{2}$ )

**Q32. (a)** Scheme A, 32%. (Scheme A:  $20 + 15 - \frac{20 \times 15}{100} = 32\%$ . Scheme B: 1 free on 5 total =  $\frac{1}{5} \times 100 = 20\%$ )

**Q33. (b)** 2. ( $3^{x+2} + 3^x = 3^x(3^2 + 1) = 3^x(10) = 90 \rightarrow 3^x = 9 \rightarrow x = 2$ )

**Q34. (b)** 20. ( $48 \div 12 \times [\{5 + 5\} \div 2] = 4 \times [10 \div 2] = 4 \times 5 = 20$ )

**Q35. (b)** 20. ( $\frac{a^3+b^3}{a^2-ab+b^2} = a + b = 14 + 6 = 20$ )

**Q36. (a)** 30,000 liters. (Vol =  $5 \times 3 \times 2 = 30 \text{ m}^3 = 30 \times 1000 = 30,000$  liters)

**Q37. (a)**  $110^\circ$ . ( $\angle BOC = 90^\circ + \frac{\angle A}{2} = 90^\circ + 20^\circ = 110^\circ$ )

**Q38. (a)** 616  $\text{m}^2$ . ( $2 \times \frac{22}{7} \times r = 88 \rightarrow r = 14$ . Area =  $\frac{22}{7} \times 196 = 616$ )

**Q39. (b)** 48  $\text{cm}^3$ . (TSA =  $2(6x^2 + 2x^2 + 3x^2) = 22x^2 = 88 \rightarrow x = 2$ . Sides = 6, 4, 2. Vol = 48)

**Q40. (b)** ₹ 540. (Diff 5% = 27. 100% =  $27 \times 20 = 540$ )

**Q41. (a)** 18. ( $a^3 + b^3 + c^3 - 3abc = (a + b + c)[(a + b + c)^2 - 3(ab + bc + ca)] = 6[36 - 33] = 18$ )

**Q42. (b)** ₹ 6,305. (Amt =  $40000 \times (1.05)^3 = 46305$ . CI =  $46305 - 40000 = 6305$ )

**Q43. (b)** 30. (Mode =  $3(\text{Median}) - 2(\text{Mean}) = 3(26) - 2(24) = 78 - 48 = 30$ )

**Q44. (b)** 30 m. ( $\tan 45^\circ = \frac{\text{Height}}{30} \rightarrow 1 = \frac{\text{Height}}{30} \rightarrow \text{Height} = 30$ )

**Q45. (b)** 46. (Middle number is 42. Series is 38, 40, 42, 44, 46).

**Q46. (a)** 7.32 m. ( $\tan 30^\circ = \frac{10}{\text{Base}} \rightarrow \text{Base} = 10\sqrt{3}$ .

$$\tan 45^\circ = \frac{10+h}{10\sqrt{3}} \rightarrow 10 + h = 10\sqrt{3} \rightarrow h = 10(1.732 - 1) = 7.32$$

**Q47. (a)** 1.308. ( $1.2 + 0.12 - 0.012 = 1.308$ )

**Q48. (a)** 72 km/hr. (Speed =  $\frac{400}{20}$  m/s =  $20 \times \frac{18}{5}$  = 72 km/hr)

**Q49. (c)** 35. ( $\frac{3}{7} = \frac{15}{x} \rightarrow 3x = 105 \rightarrow x = 35$ )

**Q50. (b)** 30%. ( $\frac{108^\circ}{360^\circ} \times 100 = 30\%$ )

**Q51. (a)** T. (Clockwise: R, T, U, S, Q, P).

**Q52. (a)** A. (Left to right: B, D, E, C, A).

**Q53. (b)** S. (Order from top to bottom: R, M, N, Q, P, O, S).

**Q54. (b)** Minute.

**Q55. (a)** Aunt. (P is sister of Q, Q is father of R).

**Q56. (a)** TVX. (Letters jump by +2).

**Q57. (b)** DTCKP. (+2 shift).

**Q58. (a)** 1. (Only sequence '2 # C' matches).

**Q59. (a)** 2389205. (Numerical alphabet positions).

**Q60. (b)** 73. ( $18 \times 4 - 12 \div 3 + 5 = 72 - 4 + 5 = 73$ ).

**Q61. (b)** (6, 18, 54). (Pattern:  $x, x \times 3, x \times 9$ ).

**Q62. (d)** 3. (Sequences: '2 4 9', '6 4 3', '8 4 7').

**Q63. (c)** 74. (Differences: 2, 4, 8, 16, 32).

**Q64. (c)** E. ( $E > D > C > A > B$ ).

**Q65. (c)** 26th. ( $40 - 15 + 1 = 26$ ).

**Q66. (a)** R. (S faces North, partner R faces South).

**Q67. (b)** Only conclusion II follows.

**Q68. (a)** D. (Order top to bottom ends with F, D).

**Q69. (c)** Father.

**Q70. (b)** Only conclusion II follows.

**Q71. (a)** B. (Sequence  $B > C > E > D > A$ ).

**Q72. (a)** 38. ( $((18 \times 2) + 2 = 38)$ ).

**Q73. (a)** 5 km, East.

**Q74. (c)** S. (Consonants: R, P, R, S, N, T, T, N).

**Q75. (c)** LNO.

**Q76. (c)** 18 - 326. (Others are  $x - x^2$ ).

**Q77. (b)** 95. ( $\times 2 + 1$ ).

**Q78. (b)** South.

**Q79. (c)** 10. ( $12 \div 3 + 6 = 10$ ).

**Q80. (b)** F.

**Q81. (c)** Fixing the benchmark interest rate to control inflation.

**Q82. (a)** Admiral Dinesh K Tripathi.

**Q83. (c)** India.

**Q84. (c)** The Sun.

**Q85. (d)** Services Sector.

**Q86. (a)** L1.

**Q87. (b)** Traditional artisans and craftspeople.

**Q88. (b)** African Union.

**Q89. (b)** To search for unclaimed deposits across multiple banks.

**Q90. (c)** Neeraj Chopra.

**Q91. (b)** Uttarakhand.

**Q92. (c)** Bimal Patel.

**Q93. (c)** June 5.

**Q94. (c)** India and Sri Lanka.

**Q95. (a)** 40th.

**Q96. (d)** Russia.

**Q97. (b)** Vijayawada Railway Station.

**Q98. (a)** M.S. Swaminathan.

**Q99. (b)** Invest in women: Accelerate progress.

**Q100. (b)** National Statistical Office (NSO).