

Exercise-I

1. C	2. A	3. B	4. A	5. B	6. B	7. C
8. C	9. C	10. B	11. D	12. B	13. B	14. D
15. C	16. C	17. B	18. C	19. C	20. B	21. C
22. D	23. A	24. B	25. B	26. C	27. A	28. C
29. B	30. A	31. C	32. D	33. A	34. C	35. B
36. B	37. A	38. E	39. C	40. C	41. C	42. B
43. C	44. D	45. A	46. A	47. C	48. D	

Exercise-II

1. A,B,D	2. A,C	3. C	4. A,D	5. B,C	6. C,E	7. A,C,D
8. A,B,C	9. A,B,C	10. C,D	11. A,C			

Exercise-III

1. 4.0016 u 2. 492 MeV 3. 5.58 MeV 4. 17.34 MeV 5. 1.86 MeV
6. (a) ${}^{40}_{19}\text{K} \rightarrow {}^{40}_{20}\text{Ca} + e^- + \bar{\nu}$, ${}^{40}_{19}\text{K} \rightarrow {}^{40}_{18}\text{Ar} + e^+ + \nu$, ${}^{40}_{19}\text{K} + e^- \rightarrow {}^{40}_{18}\text{Ar} + \nu$
 (b) 1.3034 MeV, 0.4676 MeV, 1.490 MeV
7. 5.304 MeV 8. 11.88 MeV 9. (a) 4.816 MeV (b) 3.254 MeV 10. 1.182 MeV
11. 0.2806 MeV 12. 3.7 mg 13. – 93.1 KeV, No 14. 23.6 MeV
15. $8/3 \times 10^{18}$ sec 16. 2.48×10^{-12} m 17. 28 MeV 18. 9×10^6 19. Fusion, 24 20. 152 min.
21. 4.5×10^{10} y old 22. ($T_{1/2} = 10.8$ sec) 23. (i) ${}^{40}_{19}\text{K} \rightarrow {}^{40}_{18}\text{Ar} + e^+ + \nu$, (ii) 4.2×10^9 years 24. $t = \left(\frac{\ln 5}{\ln 2}\right)\tau$
25. (a) 14 μCi , (b) $1.4 \times 10^{-6} \text{ sec}^{-1}$ 26. (a) 6.49×10^9 y, (b) 4.5×10^9 y, (c) 4
27. (a) β^+ , (b) 24 min 28. 1.92×10^9 y 29. (a) $N = \frac{1}{\lambda}[\alpha(1 - e^{-\lambda t}) + \lambda N_0 e^{-\lambda t}]$ (b) $\frac{3N_0}{2}$, $2N_0$

Exercise-IV

1. 4.87 MeV 2. 3.3×10^{-6} g 3. 7.01366 amu 5. $v = u\lambda t$ 6. $\Delta T = \frac{0.2E_0 \left[\alpha t - \frac{\alpha}{\lambda} (1 - e^{-\lambda t}) \right]}{\text{mS}}$
7. 6.04×10^9 yrs 8. 1.7×10^{10} years 9. 5196 yrs 10. $\approx 33.298 \mu\text{W}$ 11. 6 litre
12. (i) $t_{1/2} = 10$ sec., $t_{\text{means}} = 14.43$ s
 (ii) 40 sec.

Exercise-I

1. D 2. C 3. D 4. $3.847 \times 10^4 \text{ kg}$ 5. (a) 6.25 MeV (b)
227.62 amu
6. (a) $\frac{dN_x}{dt} = -\lambda_x N_x$, $\frac{dN_y}{dt} = \lambda_x N_x - \lambda_y N_y$, $\frac{dN_z}{dt} = \lambda_y N_y$, (b) 16.48 s, (c) $N_x = 1.92 \times 10^{19}$, $N_z = 2.32 \times 10^{19}$
7. A 8. C 9. A 10. A 11. $1.75 \text{ n} = N_0(1 - e^{-4\lambda})$, 6.95 sec, $\frac{2}{\ln\left(\frac{4}{3}\right)}$
12. B 13. 0.259 14. A 15. B 16. C
17. (A) P, Q ; (B) P, R ; (C) S, P ; (D) P, Q, R
18. A 19. B
20. (A) R, P ; (B) Q, S ; (C) P ; (D) Q
21. B, D 22. A 23. D 24. A 25. B 26. 8 27. 1
28. C 29. D