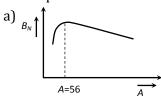
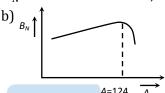
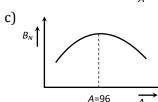


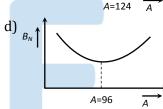
Subject: PHYSICS Class: XIIth **DPP No.: 3** Date:

- 1. Consider α Particles, β Particles and γ rays, each having an energy of 0.5 MeV. In increasing order of penetrating powers, the radiations are
 - a) α,β,γ
- b) α, γ, β
- c) β , γ , α
- d) γ , β , α
- The dependence of binding energy per nucleon, B_N on the mass number, A, is represented by









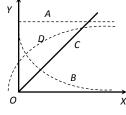
- 3. A radioactive isotope has a half-life of *T* years. How long will it take the activity to reduce to 1% of its original value
 - a) 3.2*T* year
- b) 4.6 *T* year
- c) 6.6 *T* year
- d) 9.2 *T* year
- 4. An artificial radioactive decay series begins with unstable $\frac{241}{94}Pu$. The stable nuclide obtained after eight α — decays and five β — decays is
 - a) $^{209}_{83}Bi$
- b) $^{209}_{82}Pb$
- c) $_{82}^{205}Ti$
- d) $^{201}_{82}Hg$
- 5. A radioactive sample S_1 having an activity of $5\mu Ci$ has twice the number of nuclei as another sample S_2 which has an activity of 10 μ Ci. The half lives of S_1 and S_2 can be
 - a) 20 yr and 5 yr ,respectively

b) 20 yr and 10 yr ,respectively

c) 10 yr each

- d) 5 yr each
- 6. The rest mass of an electron as well as that of positron is 0.51 MeV. When an electron and positron are annihilate, they produce gamma-rays of wavelength(s)
 - a) 0.012 Å
- b) 0.024 Å
- c) $0.012 \text{ Å to } \infty$ d) $0.024 \text{ Å to } \infty$

7. In Fig. *X* represents time and *Y* represents activity of a radioactive sample. Then the activity of sample, varies with time according to the curve



a) A

b) *B*

c) C

- d) *D*
- 8. In the Bohr model of the hydrogen atom, let R,v and E represent the radius of the orbit, the speed of electron and the total energy of the electron respectively. Which of the following quantity is proportional to the quantum number n

a) R/E

b)E/v

c) RE

- d)uR
- 9. In Bohr's model of hydrogen atom, which of the following pairs of quantities are quantized
 - a) Energy and linear momentum
- b) Linear and angular momentum
- c) Energy and angular momentum
- d) None of the above
- 10. Two nucleons are at a separation of one fermi. Protons have a charge of $+1.6 \times 10^{-19}$ C. The net nuclear force between them is F_1 , if both are neutrons F_2 if both are protons and F_3 if one is proton and the other is neutron. Then

a) $F_1 = F_2 > F_3$

- b) $F_1 = F_2 = F_3$
- c) $F_1 < F_2 < F_3$
- d) $F_1 > F_2 > F_3$
- 11. If r_1 and r_2 are the radii of the atomic nuclei of mass numbers 64 and 125 respectively, then the ratio (r_1/r_2) is

a) $\frac{64}{125}$

- b) $\sqrt{\frac{64}{125}}$
- c) $\frac{5}{4}$

- $d)\frac{4}{5}$
- 12. In a material medium, when a positron meets an electron both the particles annihilate leading to the emission of two gamma ray photons. This process forms the basis of an important diagnostic procedure called

a) MR

- b) PET
- c) CAT
- d) SPECT
- 13. If λ_{max} is 6563 Å, then wavelength of second line for Balmer series will be

a) $\lambda = \frac{16}{3R}$

- b) $\lambda = \frac{36}{5R}$
- c) $\lambda = \frac{4}{3R}$
- d) None of the above
- 14. Rest mass energy of an electron is 0.54 *MeV*. If velocity of the electron is 0.8*c*, then *K.E.* of the electron is

a) 0.36 MeV

- b) 0.41 *MeV*
- c) 0.48 *MeV*
- d) 1.32 MeV
- 15. If the binding energies of a deuteron and an alpha particle are 1.125MeV and 7.2MeV, respectively, then the more stable of the two is
 - a) deuteron
 - b) Alpha-particle
 - c) Both (a) and (b)
 - d) Sometimes deuteron and Sometimes Alpha-particle

- 16. Consider the following two statements
 - A. Energy spectrum of α -particles emitted in radioactive decay is discrete
 - B. Energy spectrum of β -particles emitted in radioactive decay is continuous
 - a) Only *A* is correct

b) Only *B* is correct

c) *A* is correct but *B* is wrong

- d) Both A and B are correct
- 17. Two radioactive materials X_1 and X_2 have decay constants 10λ and λ repectively. If initially, they have the same number of nuclei, then the ratio of the number of nuclei of X_1 to that of X_2 will be 1/e after a time

- 18. If half life of radium is 77 days. Its decay constant in day will be
 - a) 3×10^{-13} /day b) 9×10^{-3} /day c) 1×10^{-3} /day
- d) 6×10^{-3} /day
- 19. Which of the following atoms has the lowest ionization potential
 - a) $^{16}_{8}0$
- b) $\frac{14}{7}N$
- c) $\frac{133}{55}$ Cs
- d) $^{40}_{18}Ar$

- 20. Isobars are formed by
 - a) α decay
- b) β decay
- c) γ deacy
- d)h decay

