DPP
DAILY PRACTICE PROBLEMS

Class : XIIth **Subject : PHYSICS**
Date : **DPP No. : 2**

Topic :-Nuclei

1. In which radioactive disintegration, neutron dissociates into proton and electron
   a) He^{+1} emission b) β −emission c) γ −emission d) Positron emission
2. Using the following data
   Mass hydrogen atom = 1.00783 u
   Mass of neutron = 1.00867 u
   Mass of nitrogen atom (${}_7N^{14}$)= 14.00307 u
   The calculated value of the binding energy of the nucleus of the nitrogen atom (${}_7N^{14}$) is close to
   a) 56 MeV b) 98 MeV c) 104 MeV d) 112 MeV
3. The ionization energy of Li^{++} is equal to
   a) $9hcR$ b) $6hcR$ c) $2hcR$ d) hcR
4. In a fission process, nucleus A divides into two nuclei B and C, their binding energies being E_a, E_b and E_c respectively. Then
   a) $E_b + E_c = E_a$ b) $E_b + E_c > E_a$ c) $E_b + E_c < E_a$ d) $E_b . E_c = E_a$
5. According to Bohr's model, the radius of the second orbit of helium atom is
   a) 0.53 Å b) 1.06 Å c) 2.12 Å d) 0.265 Å
6. An electron has a mass of $9.1 \times 10^{-31} kg$. It revolves around the nucleus in a circular orbit of radius $0.529 \times 10^{-10} metre$ at a speed of $2.2 \times 10^{6} m/s$. The magnitude of its linear momentum in this motion is
   a) $1.1 \times 10^{-34} kg - m/s$ b) $2.0 \times 10^{-24} kg - m/s$ c) $4.0 \times 10^{-24} kg - m/s$ d) $4.0 \times 10^{-31} kg - m/s$
7. According to the quark model, it is possible to build all the hadrons using
   a) 2 quarks and 3 antiquarks b) 3 quarks and 2 antiquarks
   c) 3 quarks and 3 antiquarks d) 2 quarks and 2 antiquarks
8. Atomic number of a nucleus is Z and atomic mass is M. The number of neutron is
   a) $M - Z$ b) M c) Z d) $M + Z$
9. An electron of an atom transits from n_1 to n_2. In which of the following maximum frequency of photon will be emitted
   a) $n_1 = 1$ to $n_2 = 2$ b) $n_1 = 2$ to $n_2 = 1$ c) $n_1 = 2$ to $n_2 = 6$ d) $n_1 = 6$ to $n_2 = 2$
10. For uranium nucleus how does its mass vary with volume?
    a) $m \propto V$ b) $m \propto 1/V$ c) $m \propto \sqrt{V}$ d) $m \propto V^2$
11. Which of the following isotopes is normally fissionable
    a) ${}_{92}U^{238}$ b) ${}_{93}Np^{239}$ c) ${}_{92}U^{235}$ d) ${}_{2}He^{4}$
12. Which one of the following statements about uranium is correct
    a) ^{235}U is fissionable by thermal neutrons
    b) Fast neutrons trigger the fission process in ^{235}U
    c) ^{235}U breaks up into fragments when bombarded by slow neutrons
    d) ^{235}U is an unstable isotope and undergoes spontaneous fission

13. Outside a nucleus
    a) Neutron is stable
    b) Proton and neutron both are stable
    c) Neutron is unstable
    d) Neither neutron nor proton is stable
14. If m, m_n and m_p are the masses of ${}_ZX^A$ nucleus, neutron and proton respectively, then
    a) $m < (A-Z)m_n + Zm_p$
    b) $m = (A-Z)m_n + Zm_p$
    c) $m = (A-Z)m_p + Zm_n$
    d) $m > (A-Z)m_n + Zm_p$
15. The average binding energy per nucleon is maximum for the nucleus
    a) ${}_2He^4$
    b) ${}_8O^{16}$
    c) ${}_{26}Fe^{56}$
    d) ${}_{92}He^{238}$
16. In the nuclear reaction: $X(n,\alpha)\,{}_3Li^7$ the term X will be
    a) ${}_5B^{10}$
    b) ${}_5B^{9}$
    c) ${}_5B^{11}$
    d) ${}_2He^4$
17. 3.8 days is the half-life period of a sample. After how many days, the sample will become 1/8th of the original substance
    a) 11.4
    b) 3.8
    c) 3
    d) None of these
18. The radius of nucleus is
    a) Proportional to its mass number
    b) Inversely Proportional to its mass number
    c) Proportional to the cube root of its mass number
    d) Not related to its mass number
19. Energy of an electron in n^{th} orbit of hydrogen atom is $\left(k = \frac{1}{4\pi\varepsilon_0}\right)$
    a) $-\frac{2\pi^2k^2me^4}{n^2h^2}$
    b) $-\frac{4\pi^2mke^2}{n^2h^2}$
    c) $-\frac{n^2h^2}{2\pi\, k\, me^4}$
    d) $-\frac{n^2h^2}{4\pi^2k\, me^2}$
20. The rest energy of an electron is
    a) 510 KeV
    b) 931 KeV
    c) 510 MeV
    d) 931 MeV