Rayat Shikshan Sanstha's

Mahatma Phule A.S.C College, Panvel. Dist. Raigad

Department of Physics

Semester VI (A.Y. 2019-20)

Sample Question Bank of Paper-III (Nuclear Physics)

Sr. No.	All MCQ are sample questions of Unit wise.
	Unit I :
1)	A beta particle is also known as _____ . (a) an electron. (b) a positron (c) a helium nucleus. (d) a photon.
2)	As a result of the process of electron capture ("K-capture") by 211At, the new isotope formed is ---------- (a) 210At (b) 212At (c) 211Po (d) 211Rn
3)	The isotope Cr–53 is produced by the beta decay of which of the following (a) 53Mn (b) 54Cr (c) 52Cr (d) 53V
4)	When the electrons are captured by the nucleus from any quantum level which results in the emission of positron is called ---------- process. (a) K-capture (b) proton emission (c) electron recombination (d) collision
5)	When protons are bombarded with anti-neutrinos they emit ---------- to become neutrons. (a) electrons (b) alpha rays (c) photons (d) positrons
6)	Cowan & Reines were first to observe the direct interaction of ---------- . (a) free electron (b) photon (c) alpha particles (d) free neutrino
7)	Some nuclei have a combination of protons and neutrons which do not lead to stable configuration. These nuclei are therefore called..... a) radioactive b) stable c) energy d)decay
8)	Alpha particle is the nucleus of.....atom a) oxygen

	b) nitrogen c) carbon d) helium
9)	The alpha disintegration energy is the sum of the kinetic energies of the product nucleus and the .....particle a) alpha b)electron c) positron d)photon
10)	The magnetic spectrograph instrument is designed on the principle of ..... magnetic focusing. a) circular b) semicircular c) elliptical d) parabolic
11)	The range of alpha particles depends on their initial..... a) acceleration b) distance c) power d) velocity
12)	The distance from the source at which the intensity is half the initial intensity is called..... a) extrapolated range b) range c) mean range d) path length
13)	The liquid drop model of nucleus was developed by_____. (a) Fermi (b) Rutherford (c) Bhor and wheeler (d) Chadwick
14)	Which of the following part in a nuclear reactor minimizes the neutron leakage? a.) Shield b.) Control Rod c.) Reflector d.) Moderator
15)	The "magic numbers" for atoms are (a) Numbers of electrons that confer atomic stability. (b) Numbers of protons and/or neutrons that confer nuclear stability. (c) n/p ratios that confer nuclear stability. (d) Atomic masses that confer nuclear stability.
16)	In which reactor is fertile material converted into initial fissile material? a.) Breeder Reactor b.) Fast Reactor c.) Burner Reactor d.) Thermal Reactor
17)	70. In Mossbauer experiment, the source & absorber were embedded in_____. a. Crystal Lattice b. Space Lattice c. Basis d. Glass Chamber

18)	In Mossbauer experiment, the frequency of the emitted radiation changed when the source moved it is due to_____. a. Compton effect b. Tunneling effect c. Doppler effect d. Chemical effect
19)	Mossbauer carried out his experiment using a. 120keV Gamma -rays b. 129keV Gamma -rays c. 130keV Gamma -rays d. 121keV Gamma -rays
20)	Who one of the following are contributed for developing liquid drop model? a. Yakove Frenkel b. R. L. Mossbauer c. Fermi d. Geiger
21)	In β-decay process, without neutrino the charge is_____. a. Positive b. Negative c. Neutral d. Conserved
22)	
23)	
24)	
25)	The splitting of a nucleus into smaller nuclei is a.) Fusion b.) Fission c.) Half life d.) Gamma Radiation
26)	The only model which explains the phenomenon of fission is_____. (a) Mass formula (b) Liquid drop model (c) Surface model (d) Volume model
27)	In Nuclear structure of the number 2, 8, 20,28,50,82 and 126 known as_____. (a) Stable numbers (b) Magic numbers (c) Unstable numbers (d) Isobaric numbers
28)	The semi – empirical mass formula for the binding energy of nucleus contains a surface correction term. This term depends on the mass number A of the nucleus as … (a) A (b) $A^{2/3}$ (c) $A^{1/3}$ (d) $A^{-1/3}$
29)	The energy released in symmetric fission is _____. (a) Q=M(Z,A) -2M(Z/2,A/2) (b) Q=2M(Z,A) -2M(Z/2,A/2) (c) Q=M(Z,A) -M(Z/2,A/2) (d) Q=M(Z)-2M(Z/2)

30)	In semi- empirical mass formula, if A=20, av=15.76MeV then what will be the binding energy due to volume (Bv) of nucleus. (a) 315.2 MeV (b) 400.06 MeV (c) 300.15 MeV (d) 350 Mev
31)	The greatest penetration power is of which one? a.) gamma rays b.) alpha rays c.) beta rays d.) neutrons
32)	The number of ion-pairs formed per unit path length at any point in the path of the alpha-particle is called_____. a. Range b. Mean Range c. Specific ionization d. Extrapolated Range
33)	In alpha decay, a plot of the number of ions per cm along the path of α-particle Vs. the range of α-particle is a_____. a. Velocity curve **b. Bragg curve** c. Range curve d. Stopping Curve
34)	According to Geiger & Nuttal experimental study longest lived nuclides emits the _____. a. highest energetic alpha particle **b. least energetic alpha particle** c. less energetic alpha particle d. moderate energetic alpha particle
35)	In 1911, Geiger & Nuttal gave following empirical law: **a. $\log_{10}\lambda = A + B \log_{10} R\alpha$** b. $\log_{10}\lambda = A - B \log_{10} R\alpha$ c. $\log_{10}\lambda = A^2 + B^2 \log_{10} R\alpha$ d. $\log_{10}\lambda = A^2 - B^2 \log_{10} R\alpha$
36)	.In β-decay process, a proton gets converted into neutron with the emission of an a. positron(β^+) & neutron b. electron (β^-) & antineutrino ($\bar{\nu}$) **c. positron(β^+) & neutrino (ν)** d. neutron & neutrino (ν)
37)	Which of the following choices lists the four known types of forces in nature in order of decreasing strength? (a) strong nuclear, electromagnetic, weak nuclear, gravitational (b) electromagnetic, strong nuclear, weak nuclear, gravitational (c) strong nuclear, gravitational, weak nuclear, electromagnetic (d) strong nuclear, electromagnetic, gravitational, weak nuclear
38)	The constituents particles of deuterons are (a) Two neutrons and two protons (b) One neutrons and two protons

	(c) Two neutrons and one protons (d) One neutrons and one protons
39)	The binding energy of deuteron is (a) 1.6 MeV (b) 2.0 MeV (c) 2.224 MeV (d) 2.1 MeV
40)	When the slow neutrons bombarded on hydrogenous matter then binding energy of deuteron is taken from the energy of (a) Alpha rays (b) Beta rays (c) Gamma rays (d) Neutrons
41)	The angular momentum of deuteron is (a) ħ (b) h (c) ħ/2 (d) h/2
42)	The average radius of deuteron is (a) 4.1 Fermi (b) 4.2 Fermi (c) 4.3 Fermi (d) 4.4 Fermi
43)	The deuteron must be formed with spin vectors of (a) Neutron and proton of parallel (b) Neutron and proton of antiparallel (c) Neutron with spin 1/2 and proton with spin -1/2 (d) Neutron with spin 1 and proton with spin -1
44)	Deuteron spends its 96 percent of time in (a) l = 1 in 1s state (b) l = 1 in 2s state (c) l = 0 in 1s state (d) l = 2 in 1s state
45)	According to Yukawa the exchange of mesons gives rise to (a) Electric force (b) Electromagnetic force (c) Neutral force (d) Nuclear force
46)	The rest mass of the meson is given by (a) ħ/2R c (b) h/R c (c) ħ/2 c (d) h/2R c
47)	The uncertainty principle for energy and time for meson is given by (a) $\Delta E\, \Delta t \geq \hbar/2$ (b) $\Delta E\, \Delta t = \hbar/2$ (c) $\Delta E\, \Delta t \sim \hbar$ (d) $\Delta E\, \Delta t \geq h/2$
48)	The Heisenberg potential is defined as $V_H(\varphi) = + \gamma(r)\, \varphi$ for (a) S = 1, L even and S = 0, L odd

	(b) S = 0, L even and S = 1, L odd (c) S = 1, L even and S = 0, L even (d) S = 1, L odd and S = 0, L odd
49)	What are the fundamental particles of an atom? a) Quarks, gluons and electrons b) Protons, neutrons and electrons c) The nucleus and electron orbits d) An atom cannot be broken down into anything smaller than itself
50)	What are mesons? a) A type of composite particle produced by high energy b) A contagious disease caught by subatomic particles c) An antimatter version of the electron d) A type of Japanese soup