

Home Assignment

Subject: Physics (Major)

B.Sc 6th Semester (Both Regular and Arrear)

Paper: 601

Nuclear Physics

Read the Instructions carefully before submission

1. The Assignment contains 20 numbers of Multiple Choice Questions (MCQs), each having one correct answer. Out of 20 you have to attempt only 11 numbers of questions.
 2. Please take your time and read each question carefully, because once you submit it you can't modify the answers.
 3. Students are directed to Send the scan copy of the assignment to the email id: chakravartyrimpi07@gmail.com mentioning their Name, Roll Code and Roll No., Registration No.
 4. Last date of submission is 08/08/2020
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Total Marks = 11

1. The atomic mass number represents –
 - (a) Total number of protons in an atom
 - (b) Total number of electrons in an atom
 - (c) Total number of protons and neutrons in an atom
 - (d) Total number of proton and electrons in an atom
2. Binding energy is –
 - (a) The amount of energy required to break a nucleus apart into protons and neutrons
 - (b) The amount of energy required to break a nucleus apart into protons and electrons
 - (c) The amount of energy released when protons change energy levels
 - (d) The amount of energy released when neutrons change energy levels
3. Which of the following statement regarding nuclear force is true –
 - (a) It is an attractive force between proton and electron in an atom
 - (b) It is an attractive force between electron and neutron in an atom
 - (c) It is a strong, short range, attractive force between the nucleons
 - (d) It is much weaker than gravitational and electromagnetic force
4. Binding energy is represented as –
 - (a) $E = hv$
 - (b) $E = \frac{1}{2} mv^2$
 - (c) $E = mgh$
 - (d) $E = \Delta mc^2$
5. Atom of different element which contain same number of neutron but different number of proton is –

- (a) Isobars
 (b) Isotopes
 (c) Isotones
 (d) None of the above
6. The isotope of Carbon $^{14}_6\text{C}$ consists of –
 (a) 6 protons & 8 neutrons
 (b) 6 protons & 7 neutrons
 (c) 6 protons & 14 neutrons
 (d) 14 protons & 6 neutrons
7. The mass equivalent of 1 amu is –
 (a) 9.1×10^{-31} kg
 (b) 1.66×10^{-27} kg
 (c) 1.602×10^{-19} kg
 (d) None of the above
8. If M_H is the atomic mass of hydrogen, M_n is the mass of neutron, M is the atomic mass of the given element, the mass defect is given as –
 (a) $\Delta m = ZM_H + NM_n + M$
 (b) $\Delta m = M - ZM_H - NM_n$
 (c) $\Delta m = ZM_H + NM_n - M$
 (d) None of the above
9. The nuclear radius is given by the relation –
 (a) $R = R_0 A^{1/3}$
 (b) $R = R_0 Z^{1/3}$
 (c) $R = R_0 N^{1/3}$
 (d) None of the above
10. Packing fraction of a nucleus is given by the relation –
 (a) $\frac{\text{mass defect}}{\text{mass number}}$
 (b) $\frac{\text{mass defect}}{\text{atomic number}}$
 (c) $\frac{\text{atomic number}}{\text{mass number}}$
 (d) None of the above
11. Calculate the radius of $^{70}_{30}\text{Ge}$ where $R_0 = 1.1$ fm.
 (a) 2.11 fm
 (b) 3.76 fm
 (c) 4.96 fm
 (d) 4.53 fm
12. The nuclear mass of $^{56}_{26}\text{Fe}$ is 55.85 amu its nuclear density is –
 (a) 2.9×10^{17} kg m^{-3}
 (b) 1.71×10^{17} kg m^{-3}
 (c) 2.1×10^{17} kg m^{-3}
 (d) None of the above
13. When an α -particle is emitted by an unstable nucleus, the mass number is –
 (a) Increased by 1

- (b) Increased by 2
 - (c) Decreased by 1
 - (d) Decreased by 2
14. Among α , β , γ rays which has the minimum penetrating power?
- (a) α rays
 - (b) β rays
 - (c) γ rays
 - (d) Cannot distinguish
15. Can a neutron be accelerated using a cyclotron?
- (a) Yes
 - (b) No
16. The maximum energy of a ion in a cyclotron is –
- (a) $B^2q^2R^2/2m$
 - (b) $BqR/2m$
 - (c) $B^2q^2R^2/2$
 - (d) None of the above
17. The basic ideas underlying the quantum field theory extended to the case of nuclear interaction was first done by –
- (a) C.F. Powell and G.P.S Occhialini in 1947
 - (b) H. Yukawa in 1935
 - (c) C.F. von Weizsäcker and H.A. Bethe in 1937
 - (d) None of the above
18. Does the intensity of Cosmic Rays depend on the earth's magnetic field?
- (a) Yes
 - (b) No
19. Large Hadron Collider (LHC) is a –
- (a) Particle Detector
 - (b) Particle Accelerator
 - (c) Both (a) & (b)
 - (d) None of the above
20. In a particle detector, positively and negatively charged particles can often be distinguished because –
- (a) Their ionization properties are different and hence their tracks look different
 - (b) They curve differently in a magnetic field
 - (c) The reactions which produce them have different characteristics
 - (d) Only negatively charged ones react strongly with atomic nuclei.
