Higher Secondary Revision Examination - 2018-19 – Unit:8

PHYSICS

N.B. i) Answer all the following.
ii) Choose and write the correct answer with option.

1. The nuclear radius of \(^{8}\text{Be}\) nucleus is
   a) \(1.3 \times 10^{-15}\) m   b) \(2.6 \times 10^{-15}\) m   c) \(1.3 \times 10^{-13}\) m   d) \(2.6 \times 10^{-13}\) m

2. The average energy released per fission is
   a) 200 eV   b) 200 MeV   c) 200 meV   d) 200 GeV

3. The explosion of atom bomb is based on the principle of
   a) uncontrolled fission reaction   b) controlled fission reaction   c) fusion reaction   d) thermonuclear reaction

4. The binding energy per nucleon of \(^{56}\text{Fe}\) nucleus is
   a) 8.8 MeV   b) 88 MeV   c) 493 MeV   d) 413 MeV

5. The energy equivalence of 1 amu is
   a) 931 MeV   b) 931 meV   c) 913 MeV   d) 913 eV

6. In the figure, during the radioactive disintegration of \(^{226}\text{Ra}\) into \(^{222}\text{Rn}\), gamma ray of energy \(\square\) is emitted, when \(^{222}\text{Rn}\) returns from the excited state to the ground state.
   a) 0.187 eV   b) 0.187 eV   c) 0.0187 MeV   d) 0.187 MeV

7. The radioactivity could not be affected by
   a) Temperature   b) Pressure   c) Electric field   d) all these

8. The ratio of radii of two nuclei is 1 : 2. The ratio of their mass number is
   a) 1 : 4   b) 8 : 1   c) 1 : 8   d) 1 : 16

9. The unit of disintegration constant is
   a) no unit   b) second   c) second\(^{-1}\)   d) curie

10. The radioactive disintegration constant of radio phosphorous is
    a) 0.023103 s\(^{-1}\)   b) 0.01155 s\(^{-1}\)   c) 0.0038505 s\(^{-1}\)   d) 0.038505 s\(^{-1}\)

II. Answer for any four of the following. Question No.15 is compulsory:

11. (i) What is meant by mass defect? (ii) Name any two essential parts of a nuclear reactor.
12. Define: one curie.
13. Which ray has high ionizing power? Why?
15. Calculate the radius of \(^{27}\text{Al}\) nucleus.

III. Answer for any four of the following. Question No. 20 is compulsory:

16. Distinguish between Electrostatic accelerator and Cyclic or Synchronous accelerator.
17. Write a short note on: (i) Photon (ii) Baryons.
18. (i) Give any two results of B.E. curve. (ii) Write a note on \(\alpha\)-decay.
19. Obtain the relation between half-life period and decay constant.
20. The half-life of \(^{218}\text{Po}\) is 3 minute. What percentage of the sample has decayed in 15 minutes?

IV. Answer all the following:

21. a) Explain the construction and working of a Geiger-Muller Counter.
   (or)
   b) Obtain an expression to deduce the amount of the radioactive substance present at any moment.

22. a) i) Explain the latitude effect of cosmic rays.
    ii) Give any two applications of radio-isotopes.
   (or)
   b) Discuss the principle and action of a Bainbridge mass spectrometer to determine the isotopic masses.

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