

T.Y.B.SC. SEM – VI (2014 COURSE) : SUMMER - 2018
SUBJECT: PHYSICS: NUCLEAR PHYSICS

Day : **Monday**
Date : **16/04/2018**

Time : **12.00 NOON TO 02.00 PM**

S-2018-0772

Max. Marks: 40.

N.B.:

- 1) All questions are **COMPULSORY**.
 - 2) Figures to the **RIGHT** indicate full marks.
 - 3) Draw neat labeled diagrams **WHEREVER** necessary.
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Q.1 Attempt any **TWO** of the following: **(10)**

- a) Define binding energy of nucleus. Draw the binding energy curve and explain all its features.
- b) Write a note on Cyclotron.
- c) Calculate the Binding energy of ${}_{26}\text{Fe}^{56}$, if its mass is 55.975 amu. Also calculate B.E. per nucleon. (Given: Mass of proton 1.007825 amu, mass of neutron = 1.008665 amu)

Q.2 Attempt any **TWO** of the following: **(10)**

- a) What is mean by Q-value of the nuclear reaction? Obtain an expression for Q-value equation.
- b) Draw a diagram of Swimming pool type Nuclear Reactor and explain it?
- c) What is the successive daughter? Derive an expression for the ratio of activity of daughter to the activity of parent.

Q.3 Attempt any **TWO** of the following: **(10)**

- a) Write a note on nuclear size and density.
- b) Explain with neat labelled diagram the construction and working of G.M. Counter.
- c) One gram of a radioactive substance disintegrates at the rate of 3.7×10^{10} disintegrations per second. The atomic weight of substance is 226. Calculate its mean life.

Q.4 Attempt any **FIVE** of the following: **(10)**

- a) Define (i) Isotope (ii) Isobars (iii) Isomers (iv) Isotone
- b) Write a note on Conservation laws.
- c) Explain the term half-life with expression.
- d) Define packing fraction.
- e) Define exoergic and endoergic reactions.
- f) Define 1 Curie.
- g) Calculate the amount of energy released, when a one microgram of mass is converted into energy.

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