

B.Sc. NUCLEAR MEDICINE TECHNOLOGY
FIRST YEAR
PAPER III – BASIC PHYSICS AND NUCLEAR PHYSICS

Q.P. Code: 802103

Time: Three Hours

Maximum: 100 Marks

Answer all questions

I. Elaborate on:

(3 x 10 = 30)

1. Define physical, biological and effective half-life of a radioactive substance. Derive the equation of effective Half-life.
2. What are the subatomic particles? Describe each one in detail.
3. Define radioactive decay. Compare the properties of alpha, beta and gamma rays.

II. Write notes on:

(8 x 5 = 40)

1. Derive the equation for radioactive decay $A = A_0 e^{(-\lambda t)}$.
2. What is meant by isotopes and radio nuclides? Give examples.
3. Explain the phenomena of Fluorescence and phosphorescence.
4. Difference between Gamma rays and X-rays.
5. The exposure rate from a radioactive material at 1 meter distance is 100 mR/hr. What will be the exposure rate at a distance of a) 2 meter b) 0.5 meter.
6. Binding forces between Nucleons.
7. Structure of atom.
8. Electrostatic forces.

III. Short answers on:

(10 x 3 = 30)

1. Inverse square law.
2. Units of voltage, electric current and resistance.
3. Pair production.
4. Mass attenuation coefficient.
5. Shielding material for β radiation.
6. Ionization and excitation.
7. Tenth value layer.
8. Electromagnetic radiation.
9. State Coulomb's law.
10. What is isomeric transition? Give one example.
