22PHU622

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2025
(Sixth Semester)

Branch – **PHYSICS**

NUCLEAR PHYSICS

Time: Three Hours Maximum: 50 Marks

SECTION-A (5 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (5 x 1 = 5)

1 The maximum energy of a beta particle emitted is only _____ Mev.
(i) 4 to 6 Mev (ii) 2 to 3 Mev
(iii) 8 to 9 Mev (iv) 12 to 14 Mev

2 The radioactive element most commonly detected in humans is
(i) Potassium-40 (ii) Cobalt-60
(iii) Iodine-131 (iv) Plutonium-238

3 In neutral atom, the electrons are bound to the nucleus by
(i) Magnetic force (ii) Electrostatic force
(iii) Friction force (iv) Centripetal force

4 The half life of radioactive nuclei is
(i) 0.693 / λ (ii) 0.793 / λ
(iii) 0.693λ (iv) 0.793λ

5 The Particles that participate in the strong nuclear interaction are called
(i) Neutrinos (ii) Hadrons
(iii) Leptons (iv) Photons

SECTION - B (15 Marks)
Answer **ALL** Questions
ALL Questions Carry **EQUAL** Marks (5 x 3 = 15)

6 a Outline the theory of composition of the Nucleus.
OR
b Explain the Shell model of the nucleus.

7 a Write the properties of Alpha, Beta rays.
OR
b Narrate how the age of the Earth is calculated.

8 a Sketch and explain the principle, construction and working of ionization chamber.
OR
b Sketch and explain the principle, construction and working of linear accelerator.

9 a Analyze the Q value of nuclear reactions and write its significance.
OR
b Explain the principle behind the working of an atom bomb.

10 a Differentiate primary and secondary cosmic rays.
OR
b Discuss about pair production and annihilation.

Cont...

SECTION -C (30 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 x 6 = 30)

11 a Elucidate Weizasacker's semiempirical mass formula based on liquid drop model.

OR

b Summaries in detail the Mesons theory of Nuclear forces.

12 a Explain in detail Gamow's Theory of Alpha Decay.

OR

b Enumerate about law of successive disintegration.

13 a With a neat diagram, explain the Principle, construction and working of Wilson Cloud Chamber.

OR

b Enumerate about the construction and working of cyclotron.

14 a Explain the nuclear fission using liquid drop model.

OR

b Explain the Principle, construction and working of Nuclear Reactor.

15 a Discuss about the classification of Elementary Particles.

OR

b Elucidate the cosmic ray shower, cascade theory.

Z-Z-Z END