

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2024
(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. A beta- particle is also known as
 - (i) an Electron
 - (ii) a Positron
 - (iii) a Helium nucleus
 - (iv) a Photon
2. Radio carbon dating is used to estimate the age of
 - (i) Soil
 - (ii) Soils
 - (iii) Fossils
 - (iv) Buildings
3. A cyclotron can accelerate
 - (i) β particles
 - (ii) α particles
 - (iii) High-velocity gamma rays
 - (iv) High-velocity X rays
4. Which of the following is used as a fuel in Nuclear Reactor?
 - (i) Co-60
 - (ii) U-235
 - (iii) P-32
 - (iv) I-131
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) Discuss the Range of the alpha particles by Experiment measurements.
OR
b) Explain the main features of the nuclear shell model. What are the magic numbers?
7. a) Discuss about the origin of Line and continuous spectrum.
OR
b) Explain about nuclear isomerism.
8. a) With a neat diagram, explain the principle, construction and working of Wilson Cloud Chamber.
OR
b) Discuss about the construction and working of the scintillation counters.

Cont ...

9. a) Explain the Q value of nuclear reactions and write its significance.

OR

- b) Summarize the applications of radioisotopes.

10. a) Describe about Primary and Secondary Cosmic rays.

OR

- b) Discuss about the Pair production and annihilation.

SECTION -C (30 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 x 6 = 30)

11. a) Derive the equation of Gamow's Theory of Alpha Decay.

OR

- b) Discuss about the liquid drop model of the Nucleus and deduce semi-empirical mass formula.

12. a) Explain the Neutrino theory of Beta Decay and k-electron capture.

OR

- b) Infer the law of successive disintegration and Radioactive Dating.

13. a) With a neat diagram, explain the principle, construction and working of Cyclotron.

OR

- b) With a neat diagram, explain the principle, construction and working of Betatron.

14. a) Describe the construction and working of nuclear reactor.

OR

- b) Define chain reaction. Explain the critical size for maintenance of chain reaction.

15. a) Elucidate latitude, altitude and east-west symmetry of cosmic rays.

OR

- b) Enumerate the classification of Elementary Particles.

Z-Z-Z

END