

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BSc DEGREE EXAMINATION MAY 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 Atom has approximately -----diameter
(i) 10^{-12} m (ii) 10^{-10} m
(iii) 10^{-15} m (iv) 10^{-13} m
- 2 ----- radioactive decay process involves the emission of an alpha particle.
(i) beta decay (ii) alpha decay
(iii) gamma decay (iv) electron capture
- 3 GM counter is a device to detect
(i) mass (ii) charge
(iii) momentum (iv) radiation
- 4 ----- particle is commonly used to induce nuclear transmutations.
(i) alpha particle (ii) protons
(iii) electrons (iv) neutrons
- 5 Which of the following is a Boson?
(i) Electron (ii) proton
(iii) neutron (iv) photon

SECTION - B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks

(5 x 3 = 15)

- 6 a Explain the binding energy of a nucleon.
OR
b Give an account of Yukawa's theory of nuclear forces.
- 7 a Explain the Geiger Nuttal law with experiment.
OR
b Mention the properties of gamma rays.
- 8 a Describe the construction and working of ionization chamber.
OR
b Explain the principle and working of a synchrocyclotron.
- 9 a Derive Q value equations for a nuclear reaction.
OR
b Differentiate between nuclear fission and nuclear fusion.
- 10 a Explain primary and secondary cosmic ray.
OR
b Write a note on quark model.

Cont...

SECTION -C (30 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 x 6 = 30)

- 11 a Explain liquid drop model and discuss the semi empirical mass formula.
OR
b Explain the properties of nucleus.
- 12 a Discuss the Gamow's theory of alpha decay.
OR
b Explain the law of successive disintegration. Also discuss about radioactive equilibrium.
- 13 a Describe G.M counter and explain its working as particle detector.
OR
b With diagram explain the theory, construction and working of a cyclotron. Give its limitations.
- 14 a Briefly explain the principle, construction and working of a nuclear reactor.
OR
b Define chain reaction? Discuss the condition for sustained chain reaction.
- 15 a Explain cosmic ray shower.
OR
b Discuss in detail the classification of elementary particles.

Z-Z-Z

END