18. Explain the Gamow's theory of Alpha decay.

19. Write a note on classification of elementary particles.

20. In detail, Discuss about the various types of nuclear reaction with suitable examples.

B 262 NRR

B.Sc. DEGREE EXAMINATION, JULY 2023.

Sixth Semester

Physics

NUCLEAR PHYSICS

(From 2017 – 18 onwards)

Time : Three hours Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Define amu. What is its importance in nuclear physics?

2. What is "mass defect"?

3. Give the demerits of a liquid drop model.

4. Define Nuclear forces.

5. Write any properties of Beta-rays.

6. What is meant by threshold energy of a nuclear reaction?

7. Write any two examples for a particle and an antiparticle.

8. What are Leptons?

9. Give any two uses of radio isotopes

10. Define 'Q Value'.

SECTION B — (5 × 5 = 25 marks)

Answer ALL the questions choosing either (a) or (b).

11. (a) Explain about Nuclear excited states.

Or

(b) Calculate the Binding energy of an Alpha particle and express the result both in Mev and Joules.

12. (a) Discuss the similarities between nucleus and a liquid drop.

Or

(b) Explain the shell model of the nucleus.

13. (a) Describe any five conservation laws in a nuclear reaction.

Or

(b) Distinguish between compound and direct reactions.

14. (a) Write a note of six types of quarks.

Or

(b) Explain strong nuclear interaction.

15. (a) In a fusion reaction two ${}_1H^2$ nuclei fuse into a helium nucleus. 2_1H^2 it gives ${}_2He^4$ 30% of the energy released is Converted Into electrical energy. Calculate the electrical energy produced. Given mass of ${}_2He^4 = 4.002604$ amu, mass of ${}_1H^2 = 2.014102$ amu.

Or

(b) Discuss the Fermi Gas model.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Explain in detail about electric quadrupole moment.

17. Describe the semi empirical formula for a nucleus.