LOYOLA COLLEGE (AUTONOMOUS) CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **PHYSICS**

FIFTH SEMESTER – **NOVEMBER 2024**

PH 5507 – ATOMIC & NUCLEAR PHYSICS

Date: 07-11-2024 Dept. No. Max. : 100 Marks

Time: 09:00 am-12:00 pm

SECTION A

Answer ANY FOUR of the following **4 x 10 = 40 Marks**

1. With a suitable example explain Pauli's exclusion principle.
2. Write a brief note on normal and anomalous Zeeman effects.
3. What are isotopes, isobars and mirror nuclei? Give examples for each.
4. Draw the binding energy per nucleon versus mass number curve and explain it.
5. Describe nuclear fission process using liquid drop model. Distinguish between nuclear fission and nuclear fusion.
6. Write in detail the sources of production of neutron and detection of neutron.
7. Discuss the quark content of proton and neutron with a suitable diagram.
8. What are elementary particles? Explain the classification of elementary particles.

SECTION B

Answer ANY THREE of the following **3 x 20 = 60 Marks**

9. Describe the Dunnington's method of finding e/m of an electron.
10. Explain the properties of alpha, beat and gamma rays of radioactive materials.
11. Obtain an expression for binding energy of nucleus based on the semi-empirical mass formula.
12. Describe the construction and working of nuclear reactor with a neat diagram.
13. Explain the construction and working of Mossbauer spectroscopy.
14. Explain carbon-nitrogen cycle and proton-proton cycle as source of stellar energy.

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