

Register Number  
Name of the Candidate:

**M.Sc. DEGREE EXAMINATION, May 2015**

**(PHYSICS)**

**(SECOND YEAR)**

**230: NUCLEAR PHYSICS**

Time: Three hours

Maximum: 100 marks

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**SECTION-A**

**(5×4=20)**

**Answer any FIVE questions**

1. Discuss the exchange character of nuclear forces.
2. Explain a few basic properties of nucleus.
3. Explain the Q value of nuclear reactions.
4. List the reasons for the formulation of the collective model.
5. Give an account of four factor formula for thermonuclear reactor.
6. Distinguish between nuclear fission and nuclear fusion.
7. What is nuclear reactors? Name the essential parts of nuclear reactor.
8. Write a note on CPT theorem.

**SECTION-B**

**(5×16=80)**

**Answer any FIVE questions**

9. Discuss the construction and working of a double focusing mass spectrometer using cyclotron principle.
10. Discuss the diffusion of fast neutrons and derive Fermi age equation.
11. What is nuclear resonance? Obtain Breit Wigner formula for nuclear reaction.
12. Outline the interaction processes a neutron beam will under go when it passes through matter.
13. What are thermonuclear reactions? Give an account on the source of energy in stars.
14. What are elementary particles? Discuss the classification of elementary particles based on their interaction wherever possible. Mention the symmetries behind the conservation laws.
15. What is meant by critical condition of a reactor? Obtain an expression for thermal utilization factor. Explain the effective multiplication factor.
16. Write down the semi-empirical mass formula for a nucleus and discuss the contribution of each term to the total binding energy.

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