



Code No. : **837**

**FACULTY OF SCIENCE**  
**M.Sc. IV Semester Examination, April/May 2013**  
**PHYSICS**  
**Paper – I (401) : Nuclear Physics**

Time: 3 Hours]

[Max. Marks: 64

**Note :** Answer *all* questions from Section **A** and Section **B**. Each question carries **3** marks in Section **A** and **10** marks in Section **B**.

SECTION – A

**(8×3=24 Marks)**

1. Explain Majorana force.
2. Write the semiempirical mass formula and name each term in it.
3. Explain Kurie Plots.
4. Explain Pauli's neutrino hypothesis.
5. Define and explain the stopping power.
6. Describe the pair production process.
7. What is direct nuclear reaction ?
8. What is strangeness ? Explain.

SECTION – B

**(4×10=40 Marks)**

9. a) Describe the theory of deuteron and obtain the expression for potential depth.  
OR  
b) Discuss the shell model of nucleus.
10. a) Discuss the Fermi's theory of  $\beta$ -decay and mention the selection rules.  
OR  
b) Explain the multipole radiation and selection rules for gamma decay.

(This paper contains 2 pages)



11. a) Derive Bethe's stopping power formula.

OR

b) Explain the principle and working of scintillation detector.

12. a) Explain the theory of nuclear fission.

OR

b) Describe classification of elementary particles.

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