M.Sc.(Physics) (CBCS Pattern) Sem-IV

PSCPHYT13 - Paper-XIII (Core-XI/II) : Nuclear and Particle Physics

P. Pages : 1 **GUG/W/22/11412**

Time : Three Hours * 0 5 1 0 * Max. Marks : 80

Either:

1. a) Explain size, shape, charge distributions, spin and parity of nucleus. **8**

b) Obtain the expression for semi-empirical mass formula. Show graphically, the contribution of various factors to binding energy per nucleon of nucleus. **8**

OR

e) Discuss single particle shell model. What are its limitations? **8**

f) Explain liquid drop model. **8**

Either:

2. a) Briefly explain the compound nucleus hypothesis for nuclear reactions. **8**

b) Derive an expression for Fermi distribution for the emitted β - particles in allowed β - decay. **8**

OR

e) Discuss Fusion in detail. **8**

f) Discuss nuclear fission and neutron released in the fission process. **8**

Either:

3. a) Discuss construction and working of proportional counter. **8**

b) Discuss construction and working of Van de Graaf accelerator. **8**

OR

e) Discuss construction and working of cyclotron. **8**

f) Explain construction and working with different processes in scintillation counter. **8**

Either:

4. a) Explain Electromagnetic interactions between elementary particles. **8**

b) Explain each terms of Geli – Mann – Nishijima formula. **8**

OR

e) Discuss mesons and Bargons. **8**

f) Explain Higgs Bosons. **8**

5. Answer all the followings.

a) Discuss law of radioactive decay. **4**

b) Explain alpha decay process. **4**

c) Discuss in short ion beam accelerators. **4**

d) Explain Quark model in brief. **4**

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