

M.Sc. S.Y. (Physics) (CBCS Pattern) Semester-IV
PSCPHYT13 - Core-11 Paper-XIII - Nuclear and Particle Physics

P. Pages : 2

Time : Three Hours



GUG/W/24/11412

Max. Marks : 80

Either:

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| 1. | a) | Explain liquid drop model in details. | 8 |
| | b) | Discuss binding energy of the nucleus. Also derive semi-empirical mass formula for binding energy of the nucleus. | 8 |

OR

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| | e) | Explain single particle shell model with its validity and limitations. | 8 |
| | f) | Discuss electric and magnetic moments of nuclei. | 8 |

Either:

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| 2. | a) | Discuss the Gamow's theory of alpha decay. | 8 |
| | b) | What are nuclear reactions? Give their conservation laws and mechanism of nuclear reaction. | 8 |

OR

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| | e) | Explain fission and fusion reactions in details. | 8 |
| | f) | Explain forbidden and allowed states in β -decay . | 8 |

Either:

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| 3. | a) | Explain the interaction of charged particles and electromagnetic radiation with matter. | 8 |
| | b) | Discuss construction and working of GM counter. | 8 |

OR

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| | e) | Explain the construction and working of cyclotron. | 8 |
| | f) | Give a brief account of principle of particle accelerator. Explain in detail linear accelerator. | 8 |

Either:

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| 4. | a) | Give the classification scheme of elementary particles. | 8 |
| | b) | Derive Gellmann-Nishijima formula. | 8 |

OR

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|-----------|----|---|----------|
| | e) | Explain quark structure of Mesons and nucleons. | 8 |
| | f) | State elementary ideas of CP and CPT invariance. Explain in detail. | 8 |
| 5. | | Answer all the followings. | |
| | a) | What are the properties of nuclear forces. | 4 |
| | b) | Explain direct reactions. | 4 |
| | c) | What are the advantages and limitations of proportional counter. | 4 |
| | d) | Explain Higg's Bosons. | 4 |
