

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

P. Pages : 2

Time : Three Hours



GUG/S/25/11412

Max. Marks : 80

Either :

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|----|----|--|---|
| 1. | a) | Explain details Nuclear Binding energy per nucleon curve light and heavy nuclei. | 8 |
| | b) | Explain the single particle shell model of nucleus. | 8 |

OR

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|----|--------------------|---|---|
| e) | Explain the terms: | | |
| | i) | Magnetic moment. | 4 |
| | b) | Electrical quadrupole moment for the nucleus. | 4 |
| f) | | Explain element of deuteron nuclei problem. | 8 |

Either :

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| 2. | a) | Show that the nuclear direct reaction with suitable examples. | 8 |
| | b) | What are nuclear reactions? Give their conservation laws and mechanism of nuclear reaction. | 8 |

OR

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|----|---|--|---|
| e) | What are the assumptions made in compound nucleus hypothesis? Give suitable examples of nuclear reactions to support your answer. | | 8 |
| f) | | Discuss the elementary idea of alpha, beta and gamma decays. | 8 |

Either :

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| 3. | a) | Explain the interaction of charged particles and electromagnetic radiation with matter. | 8 |
| | b) | Stating the principles of nuclear radiation detectors, explain construction and working of a G-M counter. | 8 |

OR

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| e) | Explain the working principle of Betatron in detail. | | 8 |
| f) | | Explain with neat diagram the working of semiconductor detector. | 8 |

Either :

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| 4. | a) | Explain each term of Gell Mann-Nishijima formula. | 8 |
| | b) | Discuss the conservation laws for elementary particles in detail. | 8 |

OR

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|-----------|----|--|----------|
| | e) | What are strong, weak and electromagnetic interactions? Explain. | 8 |
| | f) | Discuss the quark model of elementary particles. | 8 |
| 5. | | Answer the followings. | |
| | a) | What are the properties of nuclear forces? | 4 |
| | b) | Explain the fission and fusion reactions? | 4 |
| | c) | What is proportional counter? | 4 |
| | d) | Discuss the properties of meson. | 4 |
