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Total No. of Pages : 02

Total No. of Questions : 09

M.Sc. (Physics) (Sem.-3) PLASMA PHYSICS Subject Code : MSPH-537-21 M.Code : 92541 Date of Examination : 23-12-22

Time: 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

- 1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- 2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
- 3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

- 1. Write briefly :
 - a) Differentiate between naturally existing and artificially created plasma.
 - b) Why electrostatic probe is used for plasma diagnostics?
 - c) What are magnetosonic waves?
 - d) What are the consequences of particle motion in large amplitude waves?
 - e) What do you mean by Lorentz force?
 - f) What is the difference between dielectric constants of field free plasma and cold magnetized plasma?
 - g) Write Liouville's equation and its significance.
 - h) Write two fluid equations for plasma.
 - i) Discuss the term 'equilibrium of plasma'.
 - j) What is the significance of Vlasov equation for plasma?

SECTION-B

- 2. Describe how the plasma can be produced in the laboratory.
- 3. Describe the principle of magnetic probe technique for plasma diagnostics. Discuss the same with neat diagram.
- 4. Derive the expression for dielectric constant of field free plasma.
- 5. Discuss the origin of space charge waves of warm plasma and write the expression for their dispersion relation.
- 6. Explain how plasma is supported against gravity by magnetic field?

SECTION-C

- 7. Describe breakdown of a gas in a discharge tube. Derive expression for Townsend criterion for spark breakdown.
- 8. Derive the dispersion relation for the electromagnetic waves in plasma when no magnetic field is applied.
- 9. What are the parametric instabilities in plasma? Discuss each instability in detail.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.