647510 **MSC1PhyC004x** **Seat No :_____**

M.Sc.(Phy.) Semester - 1 (*CBCS*) Examination
Jan/Feb.-2022 [NEW COURSE]
Electrodynamics and Plasma Physics(Core (New))

Time: 1:30 Hours **Marks: 42**

Instructions:

1. Figures to the right indicate marks.
2. There are five questions in the question paper.
3. Answer any three of the following questions.

Q.1 Answer the followings (Any Seven). 14

1. Define monochromatic plane waves.
2. What are the characteristics of electromagnetic waves?
3. Define the skin depth of electromagnetic waves?
4. What is gauge transformer?
5. Define: group velocity
6. Explain displacement current in electrodynamics.
7. What is retarded potential?
8. What is the meaning of collective behavior of plasma?
9. What are the principal techniques used for plasma confinement?
10. What are the different types of plasma instability?

Q.2 Answer the followings (Any two) 14

1. Write a detailed note: Gauge transformations.
2. Derive expression for real and imaginary parts of wavevector.
3. Describe electrodynamics before and after Maxwell and prove Maxwell's modifications in Ampere's law.

Q.3 Answer the followings (any two) 14

1. Derive Maxwell's equation for the materials that are subject to electric and magnetic polarizations.
2. Derive expressions for Lienard-Wiechert potentials.
3. Write a detailed note on retarded potentials.
4. Explain in deep the propagation of electromagnetic waves in linear media.

Q.4 Answer the followings (Any two) 14

1. Discuss the motion of charged particles under the influence of Electric field $(\bar{E})$ and Magnetic field $(\bar{B})$.
2. Explain the applications of plasma in various fields.
3. Derive an equation for dielectric constant of plasma.

Q.5 Answer the followings (Any two) 14

1. Explain: Hydro Magnetic waves.
2. Explain: Magneto sonic of Alfven waves.
3. Explain: Phase velocity and Group velocity.
4. Describe plasma oscillations and faraday rotation.

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