Roll No.							

24-PH-23

M.Sc. II SEMESTER [MAIN/ATKT] EXAMINATION
JUNE - JULY 2024

PHYSICS
Paper - III
[Electrodynamics and Plasma Physics]

[Max. Marks : 75] *[Time : 3:00 Hrs.]* *[Min. Marks : 26]*

Note : Candidate should write his/her Roll Number at the prescribed space on the question paper.
Student should not write anything on question paper.
Attempt five questions. Each question carries an internal choice.
Each question carries **15 marks.**

Q. 1 Write down Maxwell's field equations and prove Poynting's theorem relating to the flow of energy at a point in space in an electro magnetic field. **(15 Marks)**

OR

Discus the features of fields produced by uniformly moving charge. How does Biot Savart law follow from Magnetic field equation. **(15 Marks)**

Q. 2 a) Define four vector of potential by using Lorentz condition and establish the relativistic transformation of potential components. **(7½ Marks)**

b) On the basis of four vectors of charge and potential. Write two inhomogeneous wave equations in four vector notation and throw light on four vector formulation of electro dynamics. **(7½ Marks)**

OR

Express Maxwell's field equation in tensor form and there by define E.M. field tensor. How does this formulation load to covariance of the theory ? **(15 Marks)**

Q. 3 Derive plasma oscillation equation by utilizing Maxwell's equation. **(15 Marks)**

OR

What is Pinch Effect ? Explain its mechanism and obtain equivalent pressure at the plasma boundary. What are the instabilities associated with this effect ? **(15 Marks)**

Q. 4 Differentiate Alfven waves and Magnetosonic waves. Obtain an expression for the velocity of magnetosonic waves. **(15 Marks)**

P.T.O.

OR

Derive dispersion relation in Plasma. **(15 Marks)**

Q. 5 Write short notes on (**any two**) - **(7½ Marks each)**

i) Gange Transformation.

ii) Lorentz Transformation.

iii) Plasma Confinement.

iv) Theory of Single and Double Probe.

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