

Roll No.....

Total No. of Sections : 03

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Code No. : 02/301(B)

Second Semester Examination, May-2018

M.Sc. PHYSICS

Paper - III

E.D. & PLASMA PHYSICS

Time : 3 Hrs.

Max.Marks : 80

Note : Section 'A' consists of 10 very short answer type questions, all of which are compulsory and should be attempted first. Section 'B' consists of four short answer type questions with internal options. Section 'C' consists of four long answer type questions with internal choice.

Section - 'A'

Answer the following very short-answer-type questions in one or two sentences : (2×10=20)

- Q.1 What are space like and time like four vectors?
- Q.2 What do you mean by Lorentz-transformation? Write its expression.
- Q.3 What is necessary for Maxwell's field to be invariant?
- Q.4 Define radiation damping.
- Q.5 What happens when the electromagnetic field becomes non uniform.
- Q.6 Define plasma frequency.
- Q.7 What is Debye length?
- Q.8 What do you mean by plasma propulsion?
- Q.9 Define guiding center in plasma.
- Q.10 Explain electron plasma oscillation.

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Section - 'B'

Answer the following short-answer-type questions with word limit 200-250 : (5 4=20)

Q.1 Deduce an equation for Lorentz transformation of electric and magnetic field.

OR

Derive an equation for the invariants of electromagnetic field.

Q.2 Explain Synchrotron radiation.

OR

Explain radiation from an accelerated charge at low velocity.

Q.3 Explain particle interaction and collective behaviour of plasma.

OR

What is Debye's shielding?

Q.4 Discuss phase space and its types.

OR

Derive general transport equation and hence deduce continuity equation from it.

Section - 'C'

Answer the following long-answer-type questions with word limit 400-450 : (10 4=40)

Q.1 What are Lienard-Wiechart potentials? Calculate the electromagnetic fields from Lienard-Wiechart potentials of a moving point charge.

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OR

Discuss Maxwell field equation in terms of four vectors and in covariance four tensor form.

Q.2 Discuss angular distribution of power radiation emitted by an accelerated charge.

OR

Explain electric and magnetic field due to a uniformly moving charge.

Q.3 Discuss Thermonuclear fusion in detail.

OR

Explain motion of charged particles in electromagnetic field.

Q.4 Define distribution function number density and average velocity. Derive collisionless Boltzmann equation.

OR

What do you mean by ionization potential? Derive Saha ionization equation.

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