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PG CBCS

M.Sc. Semester-I Examination, 2022

PHYSICS

PAPER: PHS 103

(ELECTRODYNAMICS & MATERIAL PREPARATION AND CHARACTERIZATION)

Full Marks: 40 **Time: 2 Hours**

Write the answer for each unit in separate sheet

UNIT- 103.1
ELECTRODYNAMICS

GROUP-A

1. Answer any TWO from the following questions: **2×2=4**

a) What do you mean by electromagnetic field tensor?

b) Give difference between plasma state and Bose-condensation state.

c) What is Leinard-Wiechard potential?

d) Show that equation of continuity in covariant form.

GROUP-B

2. Answer any TWO from the following questions: **2×4=8**

a) Following Rayleigh scattering explain "blue of the sky".

b) Obtain Maxwell equation in four vector form.

c) Derive the plasma-Einstein coefficient for diffusion.

d) Derive the formula of Lorentz force in covariant form.

GROUP-C

3. Answer any ONE from the following questions: **1×8=8**

a) Find the expression for the power radiated by an oscillating dipole.

b) Obtain the expression for the intensity of radiation coming from an accelerated charged particle with high velocity

P.T.O.

UNIT- 103.2
MATERIAL PREPARATION AND CHARACTERIZATION

GROUP-A

1. Answer any TWO of the following questions: **2×2=4**

a) What is difference between secondary electron and Auger electron?

b) What are the use of DTA and TGA technique?

c) What is photo and electro luminescence?

d) How can you study the phase change by thermal methods?

GROUP-B

2. Answer any TWO of the following questions: **2×4=8**

a) Describe working principle of STM.

b) How do identify a direct and an indirect band gap using UV-VIS spectroscopy?

c) Compare Photoluminescence and Raman spectroscopy.

d) Explain the basic differences between PVD and CVD process.

GROUP-C

3. Answer any ONE of the following questions: **1×8=8**

a) Give the account of interaction with matter & high velocity electron. Describe working principle and applications of SEM with schematic diagram. 4+6

b) Explain working principle of UV-VIS spectro-photometer with neat sketch. Describe one of the growth mechanism involved in the PVD technique for growing thin film on a substrate. 5+5

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