

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
- What do you mean by electromagnetic field tensor?
 - Give difference between plasma state and Bose-condensation state.
 - What is Leinard-Wiechard potential?
 - Show that equation of continuity in covariant form.

GROUP-B

2. Answer any **TWO** from the following questions: 2×4=8
- Following Rayleigh scattering explain “blue of the sky”.
 - Obtain Maxwell equation in four vector form.
 - Derive the plasma-Einstein coefficient for diffusion.
 - Derive the formula of Lorentz force in covariant form.

GROUP-C

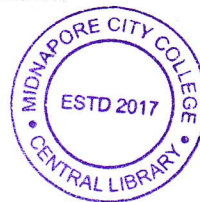
3. Answer any **ONE** from the following questions: 1×8=8
- Find the expression for the power radiated by an oscillating dipole.
 - Obtain the expression for the intensity of radiation coming from an accelerated charged particle with high velocity

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
