DSB – 210 (PHY-UG)

Second B.Sc. Degree Examination, August/September 2008
Directorate of Correspondence Course
PHYSICS
Paper – II : Sound, Optics, Electricity and Electromagnetism

Time : 3 Hours

Max. Marks : 75

Instructions : *1) Answer **all** questions in Section A.*
*2) Answer **any FIVE** from Section **B**, **any FIVE** from Section **C** and **any TWO** from Section **D**.*
*3) Draw **neat** labelled diagrams.*
*4) Take the **necessary** data from the tables.*

SECTION – A

I. Answer **all** the questions : **(10×1=10)**

1) What is beat frequency ?

2) Explain the term "phase" as applied to vibrating particle.

3) What is wave front ?

4) What is high pass R.C. filters ?

5) Write down the expression for dispersive power of a diffraction grating.

6) What is double refraction ?

7) Write any two applications of choke.

8) What is displacement current ?

9) Write the equation of continuity.

10) State Gauss theorem in vector field.

P.T.O.

SECTION – B

II. Answer **any FIVE** questions : **(5×3=15)**

11) State any three characteristics of wave motion.

12) Obtain the expressions for RMS value of AC.

13) Explain Laplace's corrections to the velocity of sound and obtain Newton-Laplace formula.

14) Describe an experiment to determine R.I. of liquid by Newton's rings method.

15) Distinguish between Fresnel and Fraunhofer diffractions.

16) Derive an expression for ripple factor in case of full wave rectifier.

17) State and explain Ampere's circuital law.

SECTION – C

III. Answer **any FIVE** questions : **(5×6=30)**

18) Derive an expression for the velocity of longitudinal waves in a rod.

19) How circularly and Elliptically polarised light are produced and detected ?

20) Derive an equation for Damped Oscillation.

21) Describe the construction and action of Huygen's eye piece. Why cross-wires can not be used in a Huygen's eye piece ?

22) Derive an expression for the current in an LCR series circuit to which an AC voltage is applied by the " J " operator method.

23) Obtain an expression for the velocity of electromagnetic waves and hence show that the EM waves travel with the velocity of light.

24) Obtain an expression for intensity of a plane-progressive wave.

SECTION – D

IV. Answer **any TWO** questions : **(2×10=20)**

25) a) Describe the construction and working of the Michelson's interferometer. **6**

b) The distance between two coherent sources is 1 mm and the screen is 1 m away the sources. The second dark band is 0.1 cm from the central bright fringe. Find the wavelength and the distance of the second bright fringe. **4**

26) a) Give the construction of Zone plate. Derive a formula for its focal length. **6**

b) A diffraction grating containing 6×10^5 lines per meter is used at normal incidence. Calculate the dispersive power of the grating in the second order spectrum of wavelength region 5×10^{-7} m. **4**

27) a) Give the theory of ballistic galvanometer. Explain the damping correction. **6**

b) An inductance of 10 mH and a resistance of 50 ohm are connected in series to a 220 V, 50 Hz ac mains. Calculate the value and phase of the current. What is the power dissipated in the circuit ? **4**

28) a) Set up Maxwell's Electromagnetic equations. **7**

b) Estimate the value of permittivity of free space from the knowledge of velocity of electromagnetic waves in free space. **3**