End Sem(IV) —
Phy (GE – 4)

2022

Time : 3 hours

Full Marks : 75

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Answer from both the Groups as directed.

Group – A

(Compulsory)

1. Answer in very short of the following questions : $1 \times 10 = 10$

   (a) Define progressive wave.

   (b) What are various types of progressive wave ? Name them.

   (c) Define wave front.

   (d) Define Biprism.

(e) What do you mean by electromagnetic wave ? Define.

(f) What is interferometer ?

(g) What are conditions for Fraunhofer diffraction ?

(h) Define resolving power.

(i) Define diffraction of light.

(j) What are coherent light waves ?

2. Write any **one** short answer type question : 5×1 = 5

(a) Discuss differential equation of progressive wave.

(b) What are Fresnel's assumptions of Fresnel diffraction ?

Group – B

Answer any **four** questions of the following : 15×4 = 60

3. Derive expression for the energy density of plane progressive wave.

4. Derive an expression for velocity of longitudinal waves in a fluid in a pipe.

5. Discuss the Newton's formula for the velocity of sound in air and Laplace's correction.

6. Describe with a neat diagram the construction and working of Michelson interferometer.

7. Derive expression for the resolving power of a plane diffraction grating.

8. What are Fresnel's half period zones ? Show that the radii of half period zones are proportional to the square root of the natural number.