This question paper contains 3 printed pages]

Your Roll No. .....

5190

B.Sc. (Prog.) PHYSICAL SCIENCES/ III Sem. B

Paper—PHPT-303—WAVES AND OPTICS

Time : 3 *Hours* *Maximum Marks* : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt any *Five* questions.

All questions carry equal marks.

1. (*a*) Give the theory of compound pendulum. Show that there are four points on pendulum having same time period. 10

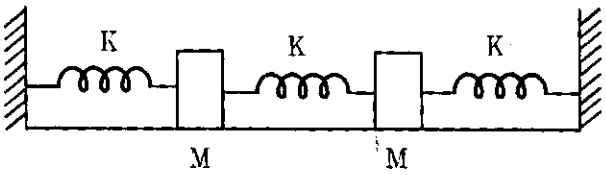
(*b*) If two simple harmonic motion having angular frequency 440 rad/sec and 396 rad/sec are superimposed, calculate number of Beats produced. 5

2. Obtain the differential equation for damped harmonic motion. Derive its possible solutions. Derive expressions for Relaxation time, Logarithmic decreament and quality factor. 15

P.T.O.

3. (*a*) Define degrees of freedom and normal co-ordinates. Explain by giving examples. 5

(*b*) Two equal masses M are connected with three springs of same spring constant. Calculated frequencies of oscillation in longitudinal mode. 10



4. (*a*) Explain the formation of standing waves on a stretched string, giving necessary theory. 10

(*b*) A string of length L is fixed at its two ends. Discuss and obtain different harmonics. 5

5. (*a*) Give necessary theory of Newton's rings for determination of λ, wavelength of light. 10

(*b*) In case of Newton's rings experiment, calculate the diameter of Ninth Ring having radius of curvature of planoconvex lens 10 cm and wavelength of light $\lambda = 400$ n.meter 5

6. (*a*) Explain the difference between Fresnel and Fraunhofer class of diffraction. 5

(*b*) Derive an expression for the intensity due to fraunhofer's diffraction in single slit. Discuss the intensity distribution. 10

7. (*a*) State Rayleigh's criterion of resolution. 3

(*b*) Derive an expression for resolving power of a grating. 7

(*c*) Explain the term double refraction. How is it used to obtain polarised light ? 5

8. (*a*) Give theory and construction of Zone plate. 10

(*b*) Explain approximate rectilinear propagation of light. 5