[This question paper contains 2 printed pages.]

Sr. No. of Question Paper : 1532   E   Your Roll No................

Unique Paper Code   : 222465

Name of the Course   : **B.Sc. Industrial/Analytical Chemistry**

Name of the Paper   : Physics-II: waves & optics [PHPT-303]

Semester   : IV

Duration : 3 Hours   Maximum Marks : 75

Instructions for Candidates

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

2. Attempt any **five** questions.

3. All question carry equal marks.

1. (a) Set up a differential equation of motion for a body executing S.H.M. Find its general solution and obtain an expression for its total energy.   (10)

    (b) If y = 0.4 sin (90t + 0.40) find the amplitude and angular frequency (5)

2. (a) What are Lissajous figures? Obtain Lissajous figures for two SHMs with a phase difference of: (5)

        (i) Zero and

        (ii) $\dfrac{\pi}{2}$

    (b) Obtain an expression for the motion of a particle subject to two perpendicular simple harmonic motions of equal frequency but different-amplitudes and phases.   (10)

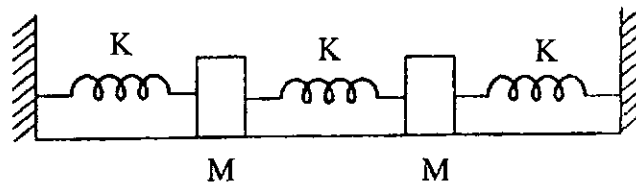3. (a) What is meant by "degrees of freedom and "co-ordinates" Explain with the help of examples.   (5)

(b) Two equal masses M are connected with three spring & long the same spring constant. Calculate frequencies of the normal modes for logitudial oscillations.

(10)

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

(b) For a string of length L fixed at its two ends, find the different harmonics produced? (5)

5. (a) Describe an experimental setup and the necessary theory to the find the wavelength of a monochord a light source by Newton's rings method.

(10)

(b) The 5th ring If the planoconvex lens has a focal length? 10 cm and the wavelength of light used in 4000 Å, find the diameter of the 5th ring. (5)

6. (a) What are the basic differences between Fresnel and Fraunhofer class of diffraction? (5)

(b) Derive an expression of the intensity due to Faunhofer's diffraction in single slit and plot the intensity distribution graphically. (10)

7. (a) obtain an expression for the resolving power of a grating. (8)

(b) State the explain Malus' law. (3)

(c) How is a Nicol Prism used to get polarised light? (4)

8. Write short notes on

(a) Rayleigh's Criterion of resolution. (7)

(b) Zone plate. (8)

(200)