[This question paper contains 3 printed pages]

Your Roll No

5798 **J**

B.Sc. (Hons.) I

BIOCHEMISTRY Paper III

(Physics)

(Admissions of 2000 and onwards)

Time . 3 *Hours* *Maximum Marks* 60

(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) Explain the advantages of a compound pendulum over a simple pendulum for determination of g Prove that there are four points collinear with centre of gravity for which its time of oscillation are equal Hence obtain the equivalent length of simple pendulum 8

(b) Explain the term "Moment of Inertia" of a rotating body State and prove the theorem of parallel and perpendicular axes 4

2 (a) Define coefficient of viscosity of a liquid What are its dimensions and unit? Deduce Poiseulle's formula for flow of a liquid through a horizontal tube

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explaining how the viscosity of a liquid can be determined with it 10

(b) Calculate the work done in blowing a soap bubble of radius 4 cm What additional work will be done if on further blowing its radius becomes 6 cm? 2

3 (a) Distinguish between free and forced oscillations Solve the equations of a forced harmonic oscillator and obtain the condition for resonance How is the sharpness of resonance affected by damping? 8

(b) What is meant by forward biasing and reverse biasing of a *p-n* junction diode? Draw the V-I characteristics of the junction diode explaining why there is very small current in reverse bias 4

4 (a) Explain the formation of various fringes in Michelson's interferometer Hence determine how this interferometer can be used to determine the wavelength of a given monochromatic source of light 10

(b) A shift of 100 circular fringes is observed when the movable mirror of the Michelson interferometer is shifted by 0 0295 mm Calculate the wavelength of light 2

5 (a) Give the construction and working of Laurent's half shade polarimeter Describe how it can be used to determine specific rotation of sugar 8

(b) What is meant by resolving power of an optical instrument? Explain Rayleigh's criterion for resolution 4

6 (a) Describe with necessary theory Millikan's oil drop experiment to determine the charge of the electron 6

(b) Solve the one dimensional Schroedinger wave equation for a particle in a box with infinite walls Determine the energy and the normalized wave functions 6

7 (a) Deduce the exponential law of radioactive disintegration and define the terms decay constant, half life and mean life, of a radioactive substance, deduce relations for them 6

(b) 1 gm of radium is reduced by 2 1 mg in 5 years Find its half life 3

(c) Find the de-Broglie wavelength associated with an electron with a velocity 10^7 m/s 3

8 Write short notes on any *two* of the following 6 + 6

(i) Liquid drop model of nucleus

(ii) Newton's rings

(iii) Thomson's determination of e/m of electron

(iv) Carey Foster bridge

(v) Bohr's theory of Hydrogen atom