

**LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034****B.Sc. DEGREE EXAMINATION – MATHEMATICS****FIRST SEMESTER – APRIL 2023****UPH 1301 – PHYSICS FOR MATHEMATICS**

Date: 08-05-2023

Dept. No.

Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

PART – A**(10 x 2 = 20 Marks)**

Q. No.	Answer ALL questions
1	Draw the velocity – time graph for a particle moving with constant velocity.
2	Define angular acceleration.
3	State Newton's law of gravitation.
4	Define escape velocity.
5	How does viscosity vary with temperature and pressure?
6	State Hooke's law.
7	Draw the circuit diagram of OR gate using diodes and give its truth table.
8	What is an extrinsic semiconductor?
9	Write the postulates of special theory of relativity.
10	What are inertial and non – inertial frames of references?

PART – B**(4 x 7.5 = 30 Marks)****Answer any FOUR questions**

11	Define escape velocity. Show that the escape velocity from the surface of the earth is 11 km/s.
12	Determine the range of a particle in projectile motion and hence determine the condition for maximum range.
13	Derive Poiseuille's formula for the rate of flow of a liquid through a capillary tube.
14	Describe the Quincke's method of determining the surface tension of mercury.
15	Derive the Einstein's mass – energy relation.
16	With neat diagrams, explain the operation of a forward biased and a reverse biased pn junction diode.

PART – C**(4 x 12.5 = 50 Marks)****Answer any FOUR questions**

17	Obtain the relation connecting the three moduli of elasticity.
18	Explain the horizontal and vertical oscillations of a spring mass system.
19	Explain in detail the Boy's method of determining the gravitational constant G.
20	Describe Michelson Morley experiment with a neat diagram and explain the physical significance of negative results.
21	Use the NAND gate as the universal gate and explain its working as AND, OR and NOT gates.
22	(a) Deduce an expression for the excess pressure inside a curved liquid surface. (7.5) (b) Explain the molecular theory of surface tension. (5)

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