



# LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

## B.Sc. DEGREE EXAMINATION – MATHEMATICS

FIRST SEMESTER – APRIL 2017

### 16UPH1A01- PHYSICS FOR MATHEMATICS - I

Date: 02-05-2017  
01:00-04:00

Dept. No.

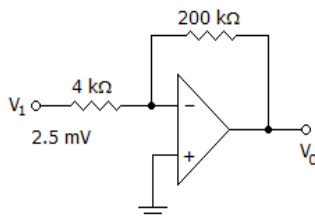
Max. : 100 Marks

## PART A

**Answer all questions:**

**(10×2=20 marks)**

1. A car travels at uniform velocity a distance of 100 m in 4 seconds. What is the velocity of the car?
2. Draw the displacement - time graph for a particle moving with constant velocity.
3. State Newton's law of Gravitation.
4. Calculate the mass of the earth.
5. Define Poisson's ratio.
6. The pressure of air in soap bubble of  $7 \times 10^{-3}$  m diameter is  $8 \times 10^{-3}$  m of water above the atmospheric pressure. Calculate the surface tension of the soap solution.
7. Draw the circuit of AND gate and give its truth table.
8. State the basic postulates of special theory of relativity.
9. Determine the output voltage for this circuit with a sinusoidal input of 2.5 mV



10. If you were to board a craft and travel at  $0.9c$  and were 6 feet tall, how tall would you appear to the earth's reference frame?

## PART B

**Answer any four question:**

**(4 × 7.5 = 30 marks)**

11. Define escape velocity. Show that the escape velocity from the surface of the earth is 11 km/s.
12. Define simple harmonic motion. Explain displacement, velocity and acceleration in SHM.
13. Derive Poiseuille's formula for the flow of liquid through the capillary tube.
14. Explain the working of an inverting amplifier with a neat diagram.
15. Discuss length contraction and time dilation.
16. Derive an expression for the torsional couple per unit twist.

**PART C**

**Answer any four questions:**

**(4 ×12.5=50 marks)**

17. Describe in detail the Boy's method for determining G.

18. Obtain an expression for the pressure inside a spherical soap bubble and a spherical liquid drop.

19.(a) Explain the working of a half and full binary adders with a circuit diagram.

**( 9 marks)**

**(b)** Give the symbol and pin configuration of IC 741.

**(3.5 marks)**

20. Describe Michelson - Morley experiment with a neat diagram and explain the physical significance of negative results.

21. Explain the oscillation of liquid column in a u tube and the oscillations of a simple pendulum.

22. Obtain the relation connecting three elastic moduli of elasticity.

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