



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – MATHEMATICS

THIRD SEMESTER – APRIL 2016

PH 3104 – PHYSICS FOR MATHEMATICS - I

(06th BATCH TO 11th BATCH)

Date: 06-05-2016

Dept. No.

Max. : 100 Marks

Time: 09:00-12:00

PART A

Answer ALL questions:

(10x2=20) Marks

1. Define relative velocity.
2. Distinguish between holonomic and non holonomic constraints.
3. State any two of Kepler's law of planetary motion.
4. What is called gravitational red shift?
5. A 4m long aluminium wire with cross sectional area $1.0 \times 10^{-6} \text{ m}^2$ is used to support a weight of 50N. If the elongation of the wire is 2.5mm, calculate the young's modulus for aluminium.
6. Define co-efficient of viscosity of a liquid. Give its unit and dimension.
7. What is CMRR in an operational amplifier?
8. Mention the types of counter in digital electronics based on the clock pulse applied to the flip-flop.
9. A particle of a mass $10 \times 10^{-24} \text{ kg}$ is moving with a speed of $1.8 \times 10^8 \text{ m/s}$. Calculate its mass when it is in motion.
10. Write the Galilean transformation equations of a moving system.

PART B

Answer any FOUR questions:

(4x7.5=25) Marks

11. Derive an expression for maximum height and range of a body projected at an angle with the horizontal in the vertical plane of the earth.
12. Define escape velocity. Calculate the escape velocity of a satellite from the surface of the earth.
13. Discuss about the molecular theory of surface tension.
14. With a neat circuit diagram, explain the working of a summing amplifier using op-amp.
15. Show that the length of a stationary object with respect to an observer in motion is shorter than the length measured by the observer at rest.
16. Calculate the excess of pressure inside a soap bubble.

PART C

Answer any FOUR questions:

(4x12.5=50) Marks

17. Solve Lagrange's equation for i) Simple Pendulum ii) Atwood's machine.
18. Determine the gravitational constant 'G' by Boy's method.
19. Describe Quincke's method to find i) the surface tension and ii) the angle of contact of mercury and hence derive the formula.
20. With a neat circuit diagram explain the construction and working of J-K flip flop
21. Derive Einstein's relativity equation of variation of mass with velocity.
22. Explain the working of half and full binary adder with a neat circuit diagram.

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