LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

**B.Sc.** DEGREE EXAMINATION – **MATHEMATICS**

THIRD SEMESTER – **APRIL 2012**

# PH 3104/3100 - PHYSICS FOR MATHEMATICS - I

Date : 28-04-2012 Dept. No. Max. : 100 Marks

Time : 9:00 - 12:00

**PART - A**

Answer **ALL** questions: (10x2=20)

1. What is the range of a Projectile?
2. Define holonomic and non-holonomic constraints.
3. What do you understand by parking orbit?
4. State Newton’s law of gravitation.
5. State Hooke’s law of elasticity.
6. Distinguish between cohesive and adhesive forces.
7. Define common mode rejection ratio(CMRR) of operational amplifier.
8. State the postulates of special theory of relativity.
9. Define the term ‘frame of reference’.
10. State Einstein mass-energy relation.

**PART - B**

**Answer any FOUR questions: (4x7.5 = 30)**

1. a) Explain velocity-time graph for an object.

b) Apply Lagrange’s equation of motion for Atwood’s machine. (4+3.5)

1. a) State kepler’s laws of planetary motion. (4.5)  
   b) Write a note on gravitational redshift. (3)
2. Derive an expression for the work done per unit volume in stretching a wire.
3. On the basis of Lorentz transformation, derive an expression for length contraction.
4. Draw a circuit diagram to solve the equations x+y=2; x-y=1using Operational amplifier.

**PART - C**

**Answer any FOUR questions: (4x12.5 =50)**

1. Obtain an expression for i) Resultant velocity of the projectile at any instant   
   ii) Maximum height reached by the projectile iii) Time taken to attain maximum height iv) Time of flight and v) Horizontal range. (5x2.5).
2. Describe Boy’s experiment to determine Universal gravitational constant G with a neat diagram.
3. With a neat sketch explain how will you determine the surface tension of a given liquid by capillary rise method
4. Explain Op-amp as i) adder ii) subractor and iii) integrator. (4.5+4+4)
5. Describe Michelson-Morley experiment. Discuss the result obtained.

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