



**LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034**

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

THIRD SEMESTER – NOVEMBER 2011

**PH 3104/3100 - PHYSICS FOR MATHEMATICS - I**

Date : 09-11-2011  
Time : 9:00 - 12:00

Dept. No.

Max. : 100 Marks

**PART – A**

Answer **ALL** the questions

(10 X 2 = 20)

1. Define relative velocity.
2. What are constraints? Give an example.
3. State any two laws of planetary motion.
4. Explain the principle of equilibrium in general relativity.
5. Write Stoke's formula for surface tension.
6. Define Poisson's ratio. What is its limit?
7. What are the characteristics of an ideal operational amplifier?
8. What is a redundant group in Karnaugh map?
9. State the postulates of special theory of relativity.
10. The mean life of  $\mu$ -meson is  $2 \times 10^{-8}$  seconds. Calculate the mean life of meson moving with a velocity 0.8 times the velocity of light.

**PART – B**

Answer any **FOUR** questions

(4 X 7.5 =30)

11. Discuss the significances of distance-time, velocity graphs.
12. How are the following estimated? (i) mass and density of the earth (ii) mass of the sun.
13. Define surface tension. Calculate the excess pressure over a curved surface. Discuss the same in the case of (i) spherical drop (ii) cylindrical drop.
14. With the help of a circuit, explain the working of a binary ripple up counter.
15. Derive an expression for the variation of mass with velocity.

**PART – C**

Answer any **FOUR** questions

(4 X 12.5 =50)

16. a) Derive an expression for the couple per unit twist in a torsion wire.  
b) Explain the static torsion method of determining the rigidity modulus of a material.
17. With circuit diagrams explain the working of a (i) half adder and (ii) full adder
18. Explain the construction and working of Michelson's Morley experiment. Discuss the results.
19. Define escape velocity. Derive expressions for kinetic and potential energy of a satellite.
20. Solve Lagrange's equations for, i) simple pendulum and ii) Atwood's machine.

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