LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

THIRD SEMESTER – NOVEMBER 2016

PH 3104 - PHYSICS FOR MATHEMATICS - I

Date: 12-11-2016   Dept. No.   Max. : 100 Marks
Time: 09:00-12:00

PART A

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

1. Draw distance-time graph of a body moving with uniform velocity.
2. Distinguish between holonomic and non-holonomic constraints.
3. State the first law of planetary motion.
4. What is gravitational red shift?
5. State Hooke's law.
6. Write Stoke's formula for surface tension.
7. Define CMRR of an Op-amp.
8. Convert the given decimal number into a binary number: 562.19
9. The rest mass of an electron is 9.1×10^{-28} gm. What will be its mass if it moving with the speed of 0.8c.
10. State the postulates of special theory of relativity.

PART B

Answer any four questions: **(4x7.5=25) Marks**

11. Derive an expression for maximum height, time of flight and range of a body projected at an angle θ with the horizontal.
12. Define escape velocity. Show that the escape velocity from the surface of the earth is 11km/s.
13. Derive Poiseuille's formula for the rate of flow of liquid through a capillary tube.
14. With a neat circuit diagram explain the working of full-adder.
15. Deduce expressions for length contraction and time dilation. Discuss the results.

PART C

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

16. Solve Lagrange's equation for i) Simple Pendulum ii) Atwood's machine.
17. a) What is gravitational constant?   *(2.5marks)*
    b) Describe in detail the Boy's method for its determination.   *(8 marks)*
18. Obtain the relation between the three moduli of elasticity.
19. With a neat circuit diagram explain the construction and working of J-K flip flop.
20. Describe Michelson-Morley experiment. Discuss the negative results of the experiment.

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