



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – MATHEMATICS

FIRST SEMESTER – NOVEMBER 2018

16/17/18UPH1AL01 – PHYSICS FOR MATHEMATICS - I

Date: 02-11-2018

Dept. No.

Max. : 100 Marks

Time: 09:00-12:00

PART A

ANSWER ALL THE QUESTIONS

10×2=20

1. Define simple harmonic motion.
2. Draw the distance- time graph for an object moving with uniform velocity and non uniform velocity.
3. Define gravitational potential.
4. Define surface tension of a liquid and give its dimensions.
5. Write the characteristics of an ideal operational amplifier.
6. Construct a logic circuit for the expression $Y=A+BC$ using AND,OR&NOT gates.
7. State the postulates of special theory of relativity.
8. What is a frame of reference?
9. Define Poisson's ratio.
10. State Newton's law of gravitation.

PART B

ANSWER ANY FOUR QUESTIONS

4×7.5=30

11. Derive an expression for the time period of a simple pendulum.
12. Define escape velocity. Show that the escape velocity from the surface of the earth is 11 km/s.
13. Explain in detail the length contraction and time dilation.
14. Simplify the Boolean expression , $Y= F(A,B,C,D) = \Sigma(0,1,10,11,14,15)$ using K-Map.
15. Derive Poiseuille's formula for the rate of flow of liquid through a capillary tube.
16. Explain with a neat circuit diagram the working of an inverting amplifier.

PART C

ANSWER ANY FOUR QUESTIONS

4×12.5 = 50

- 17.a) What is a projectile? (2 marks)
- b) Derive an expression for the time of flight,range and maximum height for an object at an angular projection. (10.5 marks)
18. Describe Michelson Morley experiment with a neat diagram and explain the physical significance of the negative results.
19. Describe the Boy's method for determining gravitational constant G with the diagram.

- 20.a) Define the three types of elastic moduli (4.5 marks)
b) Obtain the relation connecting them. (8 marks)
21. a) State and explain Kepler's law of planetary motion. (6 marks)
b) Explain the molecular theory of surface tension. (6.5 marks)
22. Explain the working of JK flip flop with a neat circuit diagram and give its truth table.

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