LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

U.G. DEGREE EXAMINATION –**ALLIED**

FIRST SEMESTER – **APRIL 2019**

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

Date: 09-04-2019 Dept. No. Max. : 100 Marks

Time: 01:00-04:00

PART - A

Answer **ALL** questions (10×2=20)

1. Draw velocity –time graph for a particle moving with constant velocity.
2. What is a Flip flop?
3. Mention any two characteristics of an ideal operational amplifier.
4. State Newton's law of gravitation.
5. State the basic postulates of special theory of relativity.
6. Distinguish between inertial and non-inertial frames of reference.
7. What is surface tension? Give its unit and dimensions
8. A car moving with a velocity of 15 ms^{-1} accelerates uniformly at the rate of 2 ms^{-2} to reach a velocity of 20 ms^{-1}. Find the time taken.
9. State any two Kepler's law of planetary motion.
10. Define gravitational potential.

PART - B

Answer any **FOUR** questions (4×7.5=30)

11. What is a projectile motion? Derive an expression for time of flight and range of a body projected at an angle with the horizontal.
12. Derive an expression for the couple per unit twist of a wire.
13. Derive the Poiseuille's formula for the flow of liquid through a capillary tube.
14. What is time dilation? Obtain the expression for time dilation.
15. With a neat diagram explain the OPAMP based non-inverting amplifier.
16. Calculate the density of the earth and mass of the sun.

PART - C

Answer any **FOUR** questions (4×12.5=50)

17. (a) Define simple harmonic motion
    (b) Explain displacement, velocity and acceleration in SHM.
18. (a) Define escape velocity. Show that the escape velocity from the surface of the earth is 11 km/s. (7.5marks)
    (b) Determine the potential energy and kinetic energy of a satellite orbiting around the earth. (5 marks)
19. Define the three moduli of elasticity. Establish the relation between them.
20. Describe the Michelson –Morley experiment with a neat diagram and explain the physical significance of negative results.
21. (a)Simplify the Boolean expression using K-map $F(A,B,C,D)=\Sigma(0,1,2,4,5,10,11,14,15)$
    (b)Explain NAND latch. (9+3.5 marks)
22. (a) Explain the molecular theory of surface tension. (7marks)
    (b)With a neat circuit diagram and truth table,explain the working of half adder. (5.5 marks)

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