LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

THIRD SEMESTER – **APRIL 2016**

PH 3100 – PHYSICS FOR MATHEMATICS

(2002 - BATCH)

Date: 06-05-2016 Dept. No. Max. : 100 Marks

Time: 09:00-12:00

PART A

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

1. Write the differential equation of simple harmonic wave motion.
2. What is called moment of inertia of a body in rotatory motion?
3. State Newton's law of gravitation.
4. Give the relation between 'g' and 'G'.
5. Draw stress- strain graph.
6. Define surface tension. Give its unit.
7. What are called generalized co-ordinates of a material system?
8. If 4kg of a substance is fully converted into energy, how much energy is produced?
9. Mention the important characteristic of musical sound.
10. Distinguish between longitudinal and transverse wave.

PART B

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

11. Derive the expression to calculate the time period of a spring when it's fixed at one end and loaded at the other.
12. Estimate the mass and density of the earth by using the following data, where the radius of the earth = 6371 km, $G=6.66 \times 10^{-11}$ Nm^2/kg^2.
13. Describe the Poiseulle's flow method to determine the co-efficient of viscosity of a liquid.
14. Discuss about the variation of mass with velocity by using Einstein's special theory of relativity.
15. Calculate the velocity of transverse wave in a stretched string.

PART C

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

16. Show that the acceleration of a body rolling down in an inclined plane is independent of the mass of the body. Discuss about in the case of solid sphere, a disc, a ring, a spherical shell. **(8.5+4)**
17. Describe Boy's method to measure the gravitational constant 'G'.
18. Obtain the relation between the three moduli of elasticity.
19. Describe the Michelson –Morley experiment and explain the physical significance of negative results.
20. What is Doppler Effect? Discuss about changes in the frequency i) When the observer in rest and source in motion ii) When the observer in motion and source in rest ii) When both are in motion.

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