Reg. No……..…..…….…… Name……...…… **U 136**

BSc DEGREE EXAMINATION - OCTOBER 2015

SEMESTER: 1, PHYSICS - (COMPLEMENTARY FOR BSc MATHEMATICS)

COURSE: U1CPPHY1: PROPERTIES OF MATTER, MECHANICS AND FOURIER ANALYSIS

(Supplementary / Improvement)

Time: Three Hours Max. Marks: 60

Part A

Answer **all** questions, 1 mark each

1. What are the different types of elasticity?
2. Give two examples for Conservation of angular momentum.
3. What is elastic after effect?
4. What is the principle behind the action of ballet dancing?
5. Explain torque.
6. What is torsion pendulum?
7. What is meant by even and odd functions?
8. What is meant by Fourier analysis? (1 x 8 = 8)

Part B

Answer **any six** questions, 2 marks each

9. State Dirichlet's condition.
10. Explain periodic and harmonic motion with examples.
11. Explain (1)) Neutral Axis (2) Bending moment
12. Define the different moduli of elasticity.
13. Discuss the effect of temperature on the modulus of elasticity
14. A point mass m is suspended by a weightless spring and it has a time period T when oscillating in the horizontal position. Show that its time period remains unaffected when the system is turned in the vertical position.
15. Prove that frequency of SHM does not depend on amplitude.
16. Define Fourier's theorem. What are the limitations under which it holds?

(2 x 6 = 12)

Part C

Answer **any four** questions, 5 marks each

17. Explain the theorem of perpendicular axes by applying it to particular case.
18. Derive the expression for depression of the loaded end of a cantilever.
19. Distinguish between linear Simple harmonic motion and angular Simple harmonic motion.

20. A rigid rod 1m long is fixed horizontally at one end and loaded at the other by a mass of 0.5kg. Calculate depression of a point distant 0.25m from free end. Diameter of the rod is 0.02m. Y of the material of the rod is 9*109 N/m2
21. Develop f(x) in Fourier series in the interval (-2,2) if f(x)=0 for -2<x<0 and f(x)=1 for 0<x<2.
    Period is 4.
22. Write down the Fourier series in a general form, and calculate the coefficients of the series.

(5 x 4 = 20)

Part D

Answer **any two**, 10 marks each

23. What is damped oscillation? Discuss analytically the motion of a particle executing damped Simple harmonic motion.
24. Derive an expression for moment of inertia of a solid cylinder about a diameter.
25. Define simple harmonic motion. Derive expression for (1) velocity, (2) energy of a particle executing simple harmonic motion.
26. Expand a square wave into a Fourier series.

(10 x 2 = 20)

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