TB142360A **Reg.No……..**
Name…….

B.Sc. DEGREE (CBCSS) EXAMINATION, APRIL 2015
SECOND SEMESTER - CORE COURSE (PHYSICS)
PHY2MPM-MECHANICS AND PROPERTIES OF MATTER

Time: 3 Hours **Maximum: 60Marks**

PART A
Answer *all* questions (Each question carries 1 mark)

1. A particle moving under gravity alone is moving in a …… under constant acceleration.
2. In the absence of ……, the total angular momentum of a system remains conserved.
3. The relation between moment of inertia and radius of gyration is……..
4. Resonance occurs when the frequency of applied force becomes equal to the …….. of the body
5. Write an example of SHM
6. What are the limiting values of poisson's ratio ?
7. Surface tension of liquids …… with increase in temperature.
8. Write down the Stoke's formula.

(8 × 1 = 8 marks)

PART B
(Answer *6* questions. Each question carries 2 marks)

9. What is meant by length of equivalent simple pendulum?
10. State and explain the theorem of perpendicular axis.
11. The mass of a flywheel is mostly concentrated at the rim. Why?
12. What is meant by torque? Define moment of inertia of a body in terms of torque.
13. What is meant by elasticity? Explain the terms elastic limit, permanent set and breaking point
14. Distinguish between stream line and turbulent flow.
15. What are the conditions for the oscillations of a harmonic oscillator to be 1) over damped 2) critically damped and 3) under damped

16. A particle of mass m is executing S H M of frequency υ. Give values of its K E, P E and total energy.

17. Obtain the expression for velocity of a particle executing S H M.

18. Explain Doppler effect in sound.

(6 × 2 = 12 marks)

PART C
Answer *4* questions. (Each question carries 4 marks)

19. The excess pressure inside a soap bubble of radius 1cm is balanced by a 1.4mm column of oil, of specific gravity 0.8. Calculate the surface tension of soap solution.
20. A brass bar $1cm^2$ in cross section is supported on two knife edges 1m apart. A load of 1Kg at the centre of the bar depresses that point by 2.51mm. What is Young's modulus for brass?

21. An engine blowing a whistle of frequency 128Hz moves with a velocity of 45km/hour towards a hill from which a well defined echo is heard. Calculate the frequency of echo as heard by the driver. Velocity of sound in air 332m/s.

22. A particle executes SHM with amplitude 7cm and angular velocity 3π. If the initial phase is π/3, frame the equation of SHM. Find the displacement, velocity and acceleration at t = 2sec. Find also the period of oscillation.

23. Calculate the M I of a solid cylinder of mass 10Kg and radius 0.4m about its own axis. Also calculate the M I about a parallel axis distant 0.1m from this axis.

24. Assume that the earth's orbit around the sun is a circle. The earth-sun distance is $1.5x\ 10^{11}$m. Find the centripetal acceleration of the earth towards the sun.

(4 × 4 = 16 marks)

PART D
(Answer any *two* questions. Each question carries 12 marks)

25. Explain with necessary theory, how to determine moment of inertia of a fly wheel about its axis of rotation

26. Explain with detailed theory the formation of beats.

27. Describe with theory the Stoke's method of determining the viscosity of a highly viscous liquid.

28. Describe with theory the torsion pendulum method of determining the rigidity modulus of the material of the wire (2 × 12 = 24 marks)