

B.Sc. DEGREE END SEMESTER EXAMINATION MARCH 2016**SEMESTER: 2, PHYSICS (CORE COURSE)****COURSE: U2CRPHY2-MECHANICS AND PROPERTIES OF MATTER***(Common for 2015 Admission & 2014 Admission)*

Time: Three Hours

Maximum Marks : 60

Part A

Very short answer questions. Answer **all** questions, each question carries 1 mark.

1. Distinguish between centripetal and centrifugal forces.
2. Explain law of conservation of angular momentum
3. What is meant by damping?
4. Distinguish between standing waves and progressive waves.
5. Explain principle of superposition of waves.
6. Define excess pressure of a liquid drop.
7. What are the factors affecting surface tension.
8. Define critical velocity.

(1 x 8 = 8)

Part B

(Short answer Questions). Answer **any six** questions. Each question carries 2 marks

9. What is meant by torsional oscillations?
10. Explain I -form of girders.
11. The gravitational force of sun or earth does not constitute torque. Why?
12. Distinguish between streamline flow and turbulent flow.
13. Distinguish between uniform bending and non-uniform bending.
14. A ring, a disc and a sphere all of same radius and mass roll down an inclined plane from the same height. Which of the three reach ground (i) first (ii) the last?
15. "Mercury does not spread on sheet of glass while water does". Why?
16. Define Poisson's ratio. Obtain the limiting values of Poisson's ratio. (2 x 6 = 12)

Part C

(Problem/ Derivations). Answer **any four** questions. Each question carries 5 marks.

17. Calculate the work done in increasing the angular velocity of a wheel of moment of inertia 200 kgm^2 from 20 revolutions/s to 60revlutions/s

18. A particle of mass 15 kg executing SHM along a straight line has a velocity 2.5 m/s at its equilibrium position and acceleration 4.2 m/s^2 at the extreme position. Calculate its Kinetic energy, potential energy and total energy when it is at a distance of 2 cm from the mean position.
19. A steel wire of diameter 2 mm is bent to form a circle of radius 20 cm. Calculate the bending moment and the maximum stress. (Young's modulus of the material of the wire is 200 GPa)
20. A liquid drop of radius 1 cm is sprayed to form 1000 droplets. Calculate the increase in surface area and work done. (Surface tension of water $72 \times 10^{-3} \text{ N/m}$)
21. A bus is approaching a stationary man with a velocity 54 km/hr. It produces a sound of frequency 600 Hz. Calculate the frequency received by the man.
22. The mass of a disc is 3.0 kg and its radius is 10 cm. Calculate the radius of gyration of the disc about an axis passing through its centre of gravity and perpendicular to it.

(5 x 4 = 20)

Part D

(Long answer questions). Answer 2 questions. Each question carries 10 marks

23. Derive an expression for the moment of inertia of a sphere about (i) an axis passing through the centre and (ii) about an axis tangent to the sphere.
24. Explain how rigidity modulus of a wire can be determined using mirror and telescope.
25. Explain Stokes method for the determination of coefficient of viscosity of a liquid.
26. Explain the theory of damped oscillator. Discuss under damped and over damped oscillations.

(10 x 2 = 20)
