

Reg. No.....

Name.....

B.Sc. DEGREE END SEMESTER EXAMINATION - JULY 2021
SEMESTER - 2: PHYSICS (CORE COURSE)

COURSE: 15U2CRPHY2, MECHANICS AND PROPERTIES OF MATTER

(Common for supplementary 2018/2017/2016/2015/2014 admissions)

Time: Three Hours

Max.

Marks: 60

PART A (Very short answer questions)

Answer all questions, each question carries 1 mark.

1. Distinguish between centripetal and centrifugal forces.
2. Define Radius of gyration.
3. State Hooke's law.
4. What is a kater's pendulum?
5. Explain principle of superposition of waves.
6. Define critical velocity.
7. Define velocity gradient
8. Write the differential equation of a SHM.

(1 x 8 = 8)

PART B (Short answer Questions).

Answer any six questions. Each question carries 2 marks

9. Explain I -form of girders.
10. Explain why "girders are made in the form of the letter I".
11. Distinguish between streamline flow and turbulent flow.
12. State the differential equation of a damped harmonic oscillator?
13. "Mercury does not spread on sheet of glass while water does". Why?
14. In some cases, engineers prefer liquids of low viscosity. But in some cases they prefer liquids of high viscosity. Give example for each.
15. Obtain the differential equation of a damped harmonic oscillator?
16. Define Flexural rigidity

(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 60 revolutions/s
18. A liquid flows through two capillary tubes under the same pressure head. The lengths of the

tubes are in the ratio 2:1 and the ratio of their diameters is 2:3. Compare the ratios of volumetric

flow rate of liquid through the tubes?

19. A bus is approaching a stationary man with a velocity 54km/hr. It produces a sound of

frequency 600Hz. Calculate the frequency received by the man.

20. Calculate the poisson's ratio for steel. Given that $Y=2 \times 10^{11}$ N/m² and Rigidity modulus

8×10^{10} N/m².

21. A circular disc of mass M is rolling on a horizontal plane with velocity v. Prove that its KE

is $\frac{3}{4} Mv^2$.

22. The mass of a disc is 0.4kg and its radius is 20 cm. Calculate the radius of gyration of the disc

about an axis passing through its center of gravity and perpendicular to its length.

(5 x 4 = 20)

PART D (Long answer questions)

Answer any Two question. Each question carries 10 Marks

23. Derive the Poiseuille's formula for the flow of a liquid through a pipe. Mention the correction to

be applied to the formula

24. 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.

25. Discuss, with necessary theory, the experiment to determine the moment of inertia of a

flywheel

26. Explain the theory of damped oscillator. Discuss under damped and over damped oscillations

(10 x 2 = 20)
