



K21U 6808

Reg. No. :

Name :

I Semester B.Sc. Degree (C.B.C.S.S.-O.B.E.-Regular/Supplementary/
Improvement) Examination, November 2021
(2019 Admission Onwards)
COMPLEMENTARY ELECTIVE COURSE IN PHYSICS
1C01PHY – Mechanics

Time : 3 Hours

Max. Marks : 32

PART – A

All questions are **compulsory**. Each question carries **1** mark.

1. The breaking stress of a wire of unit cross-section is called _____.
2. When a spiral spring is stretched by suspending a load in it, the strain produced is called _____.
3. The excess pressure inside a soap bubble is _____.
4. Two liquid drops of the same radius are falling through the air with a terminal velocity of r . If the two drops coalesce, the terminal velocity will be _____.
5. The tension of the stretched string is increased by 69%. In order to keep its frequency of vibration constant its length must be increased by _____. (5×1=5)

PART – B

Answer **any four** questions. Each question carries **2** marks.

6. Explain why a hollow cylinder is stronger than a solid one having the same length, mass and material.
7. Write down the expression for the depression of a loaded cantilever and explain the symbol.
8. Explain why particles of camphor exhibit a vigorous movement on the surface of the water.
9. Why the surface of the water is concave and the surface of mercury is convex when it is kept in contact with solid ?

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10. Draw graphs showing the variation of the amplitude of forced harmonic oscillator with displacement when damping is high and low.
11. Prove that the velocity of longitudinal waves in a rod depends on Young's modulus and density of the material. (4×2=8)

PART – C

Answer **any three** questions. **Each** question carries **3** marks.

12. Find the stress to be applied to a steel wire to stretch it by 0.25% of its original length. Young's modulus for steel is 90 GPa.
13. Derive an expression for the couple per unit twist of a uniform solid cylinder.
14. Calculate the displacement of a body executing simple harmonic motion in terms of its amplitude at which the kinetic energy is three times the potential energy.
15. A particle executing SHM has a maximum displacement of 4 cm and its acceleration at a distance of 1 cm from the mean position is 3 cm/sec^2 . What will be its velocity when it is at a distance of 2 cm from the mean position ?
16. A sitar wire is under a tension of 30N and the length of the bridges is 0.8m. If 10m of the sitar wire weighs $2.2 \times 10^{-3} \text{ kg}$, find : a) speed of the transverse waves on the wire; b) fundamental frequency of vibration. (3×3=9)

PART – D

Answer **any two** questions. **Each** question carries **5** marks.

17. Show that surface energy is numerically equal to surface tension. Find a relation between the surface tension and the excess pressure on a Curved Surface.
 18. Deduce the differential equation for a damped harmonic oscillator and discuss in detail the cases of critical damping and under damping.
 19. State and prove the theorem of the parallel axis. Hence derive the moment of a thin rod about an axis passing through one of its ends and through its center.
 20. What are the conditions necessary for the formation of stationary waves ? Investigate mathematically the characteristics of progressive and stationary waves. Show how they differ from each other. (2×5=10)
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