



Date: 05-04-2019
Time: 01:00-04:00

Dept. No.

Max. : 100 Marks

Part A

Answer **ALL** questions.

(10 x 2 = 20 Marks)

1. Define Poisson's ratio. Give its limits.
2. What is a a) bar (or) beam b) cantilever
3. Define coefficient of viscosity. Give its unit and dimension
4. What is relative density?
5. Define surface tension and surface energy.
6. A capillary tube of 0.5 mm bore stands vertically in a wide vessel containing a liquid of surface tension 0.03 N/m. The liquid wets the tube and has a specific gravity of 0.8. Calculate the rise of the liquid in the tube.
7. Give any two differences between transverse and longitudinal waves.
8. A tuning fork A of frequency 384 Hz gives 6 beats per second when sounded with another tuning fork B. On loading B with a little wax, the number of beats per second becomes 4. What is the frequency of B?
9. Write any two applications of ultrasonic waves in the field of physics.
10. What is reverberation and reverberation time?

Part B

Answer any **FOUR** questions.

(4 x 7.5 = 30 Marks)

11. Derive the relation connecting q , n and K .
12. Explain a) Gaede's rotary oil pump and b) Waran diffusion pump
13. Describe the Quincke's method of measuring the surface tension of mercury involving angle of contact.
14. A) Write any two conditions for the interference of sound waves. **(2.5+2.5+2.5)**
B) Calculate the frequency of the fundamental note of a string, 1m long and weighing 2 g when stretched by a weight of 400 kg.
C) State three laws of transverse vibrations on a stretched string
15. Derive the Sabine Formula.
16. a. Obtain the expression for the internal bending moment of a beam.
b. Use it to calculate for i) rectangular cross section ii) circular cross section. **(5 + 2.5)**

Part C

Answer any **FOUR** questions.

(4 x 12.5 = 50 Marks)

17. Derive an expression for the couple acting on a cylindrical wire. Use this formula to calculate the rigidity modulus of a torsional pendulum without masses.
18. Explain with necessary theory Rankine's method for the determination of viscosity of gas.
19. Show that the excess pressure acting on the curved surface of a membrane is $P = 2T(1/r_1 + 1/r_2)$. Use this formula to get the excess pressure in a liquid drop and air bubble.
20. Derive the formula for the velocity of sound waves in gases. What is Laplace correction? Deduce the corrected formula.
21. Explain the method of producing ultrasonic waves by magnetostriction method. Write any four conditions for good acoustical aspects of an auditorium.
22. Explain Doppler effect and find an expression for the relative shift in frequency for different situations.

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