



Date: 06-11-2017

Dept. No.

Max. : 100 Marks

Time: 01:00-04:00

PART - A

Answer **ALL** Questions :

(10 x 2 = 20 marks)

- [1]. What is Poissons's ratio?
- [2]. Write the units of stress and strain
- [3]. What do you mean by terminal velocity?
- [4]. State the principle of diffusion pump.
- [5]. Find the amount of work done if a soap bubble is slowly enlarged from a radius of 0.1 m to a radius of 0.2 m. Surface tension is $30 \times 10^{-3} \text{ Nm}^{-1}$.
- [6]. Define angle of contact.
- [7]. Distinguish between transverse and longitudinal waves.
- [8]. What is resonance?
- [9]. State the similarities between ultrasonic and acoustical waves.
- [10]. Mention the factors deciding the good acoustical design of an auditorium.

PART – B

Answer **ANY FOUR** Questions :

(4 x 7.5 = 30 marks)

- [11]. Obtain the relation between Young's modulus, rigidity modulus and bulk modulus.
- [12]. Explain the working of Pirani gauge with necessary theory.
- [13]. Discuss the Jaegar's method of determination of surface tension.
- [14]. (a) Obtain the differential equation of wave motion. **(5 + 2.5)**
(b) At a time $t = 0$, a train of waves has the form, $y = 4 \sin 2 (x/100)$. The velocity of the wave is 30 cm/s. Find the equation giving the wave form at a time $t = 2$ s.
- [15]. Discuss the piezo electric method of production of ultrasonic waves.
- [16]. Calculate the apparent pitch of a note when the observer is at rest and source is in motion.

PART – C

Answer **ANY FOUR** Questions:

(4 X 12.5 = 50 marks)

- [17]. (a) Outline the theory of a cantilever. **(6 + 6.5)**
- (b) Explain Koenig's method of determination of Young's modulus.
- [18]. (a) Obtain Poiseuille's formula for the flow of liquid through a capillary tube. **(8 + 4.5)**
- (b) Discuss the pressure head and length of tube correction for Poiseuille's formula.
- [19]. (a) Discuss the theory of pressure difference across a curved surface with special cases. **(7.5 + 5)**
- (b) Calculate the work done in spraying a spherical drop of water of 10^{-3} m radius into million droplets, all of the same size. The surface tension of water is $72 \times 10^{-3} \text{ Nm}^{-1}$.
- [20]. (a) Obtain the expression for the energy transfer per second through progressive waves. **(10 + 2.5)**
- (b) A source of sound has frequency of 512 Hz and amplitude of 0.25 cm. What is the flow of energy across a square cm per second if the velocity of sound in air is 340 m s^{-1} and the density of air is $0.00129 \text{ g cm}^{-3}$.
- [21]. (a) Derive Sabine's reverberation formula. **(10 + 2.5)**
- (b) A hall of volume 5500 m^3 is found to have a reverberation time of 2.3 s. The sound absorbing surface of the hall has an area 750 m^2 . Calculate the average absorption coefficient.
- [22]. (a) A steel wire of diameter $3.6 \times 10^{-4} \text{ m}$ and length 4 m extends by $1.8 \times 10^{-3} \text{ m}$ under a load of 1 kg and twists by 1.2 radians when subjected to a total torsional torque of $4 \times 10^{-5} \text{ Nm}$ at one end. Find the values of Young's modulus, rigidity modulus and Poisson's ratio. **(7.5 + 5)**
- (b) Explain why a hollow rod is a better shaft than a solid one of the same mass, length and material.
