



Date: 03-11-2018

Dept. No.

Max. : 100 Marks

Time: 09:00-12:00

PART - A

Answer **ALL** Questions :

(10 x 2 = 20 marks)

- [1]. State Hooke's law.
- [2]. State the theoretical limits of Poisson's ratio.
- [3]. Define terminal velocity.
- [4]. State the effect of temperature and pressure on viscosity.
- [5]. What is angle of contact? Give its effect.
- [6]. Distinguish between cohesive and adhesive forces.
- [7]. What is simple harmonic motion?
- [8]. A particle of mass 0.5 kg executes simple harmonic motion. If it crosses the centre of oscillation with a speed of 10 ms^{-1} , find its maximum kinetic energy.
- [9]. Distinguish between intensity and loudness of sound.
- [10]. State magnetostriction effect.

PART - B

Answer **ANY FOUR** Questions :

(4 x 7.5 = 30 marks)

- [11]. (a) Derive the expression for twisting couple for a cylinder. **(5)**
(b) Calculate the work done in twisting a steel wire of radius 10^{-3} m and length 0.25 m through an angle 45° . Given rigidity modulus of the material of the wire is $8 \times 10^{10} \text{ Nm}^{-2}$. **(2.5)**
- [12]. Obtain Stoke's formula and hence determine the coefficient of viscosity of a liquid.
- [13]. With necessary theory, describe an experiment to determine the interfacial tension between water and kerosene.
- [14]. (a) Show that the oscillations of a gas enclosed in a cylinder is simple harmonic and thus obtain the frequency of oscillation. **(5)**

(b) A particle of mass 0.8 kg is executing simple harmonic motion with the amplitude of 1 m and time period $11/7$ second. Calculate the velocity and the kinetic energy of the particle when the displacement is 0.6 m. (2.5)

[15]. Write a note on the factors affecting acoustics of buildings.

[16]. (a) What is a cantilever? (2.5)

(b) Derive the expression for bending moment of a beam fixed at one end and loaded at the other.

(5)

PART - C

Answer **ANY FOUR** Questions :

(4 X 12.5 = 50 marks)

[17]. With necessary theory, determine the Young's modulus of a beam by Koenig's method.

[18]. (a) Obtain Poiseuille's formula for viscosity. (7)

(b) Discuss the modifications on Poiseuille's formula. (5.5)

[19]. (a) Explain the theory of excess pressure inside curved liquid surface for different special cases.

(10)

(b) The pressure of air in a soap bubble of 7×10^{-3} m diameter is 8×10^{-3} m of water above the atmospheric pressure. Calculate the surface tension of the soap solution. (2.5)

[20]. (a) What is Doppler effect? (1.5)

(b) Calculate the apparent pitch of a note due to the relative motion of the source and the listener.

(11)

[21]. Explain (a)The production of ultrasonic waves by piezoelectric method. (7.5)

(b)The determination of depth of sea using ultrasonic waves. (5)

[22]. With necessary theory, explain the determination of surface tension of mercury using Quincke's method.
