Total No. of Printed Pages:3

SUBJECT CODE NO:- B-2013
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. F.Y (Sem-I)
Examination November/December- 2022
Physics Paper-I
Mechanics Properties of Matter and Sound

[Time: 1:30 Hours] **[Max. Marks: 50]**

Please check whether you have got the right question paper.

N.B
1) Attempt all question
2) Use of logarithm table and electronic pocket calculator is allowed.

Q. 1 (a) What is a compound pendulum? Find an expression for it's periodic time and show that the centre of suspension and the centre of oscillation can be interchanged 10

(b) Explain young's modulus, Bulk modulus, and modulus of rigidity. State it's S.I units and dimensions with figure. 10

OR

(a) Derive and expression for difference of pressure across curved surface. 10

(b) Define magnetostriction effect and explain magnetostriction oscillator with a circuit diagram. 10

Q. 2 (a) Write a short note on gravitational field 05

(b) A sphere of mass 40kg is attached by another sphere of mass 80kg with a force equal to the weight of $\frac{1}{6}$ milligram. If their centres are 40cm apart. Calculate the constant of gravitation. (If g= 9.81 m/s^2) 05

(c) Write a short note on "surface tension" with example. 05

(d) Calculate the excess of pressure between the inside and outside of a soap bubble of radius 0.01m. surface tension of soap solution is 3.5×10^{-2} N/m. 05

OR

(a) Explain the term "Cantilever loaded at center" 05

(b) A steel wire of 0.01cm diameter is bent to form a circle of 10cm. radius. What is the bending moment and maximum stress, if $Y=2\times10^{12}$ dyne/cm^2 05

(c) Briefly explain an Acoustical demands of and auditorium 05

(d) Calculate fundamental frequency of resonance for quartz crystal with thickness 0.001m, if velocity of longitudinal wave in crystal is 6×10^3 m/s 05

Q. 3 Multiple choice questions 10

1. The gravitational force between two bodies is

a) Attractive at all places.
c) Attractive at short distances.
b) Repulsive at large distances
d) Repulsive at short distances

2. If the distance between two point masses is doubled, the gravitational attraction between them

a) Is double
c) Reduced to half
b) Become four time
d) Is reduced to quarter.

3. The modulus of elasticity is dimensionally equivalent to

a) Strain b) Stress c) Surface tension d) Poisson's ratio

4. If by applying a force, the shape of a body is changed then the corresponding stress is known as

a) Tensile stress b) Bulk stress c) Shearing stress d) Compressive stress

5. Volume of liquid that flows per unit time through any cross-section is called

a) Reverberation b) Surface tension c) Viscosity d) Ultrasonic

6. If velocity of liquid is less than critical velocity then this flow is called

a) Stream line b) Gas flow c) Turbulent d) Water flow

7. K.E per unit volume of liquid flow is given as

a) $\frac{1}{2}\rho V^2$ b) ρV^2 c) $\frac{1}{2}MV^2$ d) $\frac{1}{2}V^2$

8. Ultrasonic frequencies are

a) Less than 20 KHZ
b) Equal to 19 KHZ
c) Less than 18 KHZ
d) Greater than 20KHZ

9. Piezo electric effect is observed in

a) Diamond b) Nickel c) Quartz crystal d) Gold

10. Ultra-sonography is an application of

a) x-rays
b) Supersonic waves
c) Reverberation
d) Digital photography