B-2007

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SUBJECT CODE NO:- B-2007
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. F.Y. (Sem-I) Examination Oct/Nov 2019
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.
   i)   Attempt all questions.
   ii)   Use of logarithm table and electronic pocket calculator is allowed.

Q.1   (a) What is compound pendulum? Obtain an expression for the time period of oscillation of   10
            compound pendulum.

       (b) Derive an expression for the depression of loaded end of a cantilever if weight of beam is   10
            ineffective.

                                            OR

       (c) Describe with necessary theory of jaeger's method for the measurement of surface   10
            tension of liquid.

       (d) Derive Sabine's formula for reverberation time.   10

Q.2   (a) Explain gravitational potential and gravitational field.   05

       (b) Calculate gravitational potential and Intensity of gravitational field of a thin spherical   05
            shell of mass 12 kg and radius 30cm at a point 20 cm outside from the surface.
            $(G = 6.6 \times 10^{-11} Nm^2/Kg^2)$.

       (c) Write a note on surface tension.   05

       (d) A small hollow sphere which has a small hole in it is immersed in water to depth of   05
            40 cm before any water penetrates into it. If the surface tension of water is 73 dynes/cm.
            Find the radius of the hole.
                                            OR

       (a) Write a short note on elastic constant.   05

       (b) What couple must be applied to a wire one meter long 1mm in diameter in order to twist   05
            one end of it through 90°, the other end remaining fixed? The rigidity of the material of
            the wire is 2.8×10^{11} dynes / cm^2.

       (c) Write a applications of ultrasonic waves.   05

       (d) A hall of volume 5500m^2 is found to have a reverberation time of 2.3 sec. The sound   05
            absorbing surface of the hall has an area 750 m^2. Calculate the average absorption
            coefficient.

Q.3   Multiple choice questions.   10

1) For good acoustical design of hall reverberation should be
   (a) Infinite   (b) zero   (c) Proper   (d) maximum

2) Kinetic energy per unit volume of the liquid is
   (a) $\frac{1}{2}\rho V^2$ (b) PV^2 (c) $\frac{1}{2}V^2C$ (d) $\frac{1}{2}\rho V$

3) Excess pressure in soap bubble is ----------
   (a) $\frac{T}{R}$ (b) $\frac{4T}{R}$ (c) $\frac{4R}{T}$ (d) $\frac{2T}{R}$

4) Ultra Sonography is an application of -------------
   (a) X-ray
   (b) Digital photography
   (c) Reverberation
   (d) Supersonic waves

5) The gravitational potential at a point on the surface of the earth is
   (a) g   (b) gR   (c) $\frac{gR}{2}$ (d) zero

6) The unit of gravitational potential is -------------
   (a) J   (b) $\frac{J}{Kg}$ (c)   J.Kg   (d) Kg

7) The modulus of elasticity is dimensionally equivalent to---------------
   (a) Strain   (b) Stress   (c) Surface tension   (d) Poission's ratio

8) The Bulk modulus of gas is $6 \times 10^3 N/m^2$ the additional pressure needed to reduce the volume of the gas by 10% is -----------
   (a) 300 N/m^2 (b) 600 N/m^2
   (c) 1000 N/m^2 (d) 400 N/m^2

9) The symbol y, k and η represents the young's modulus; Bulk modulus and modulus of rigidity of material of body if $\eta = 3K$ then y =
   (a) Y=2.5K   (b) Y=9.5K   (c) Y=4.5K   (d) Y=3.5K

10) Piezo electric effect is observed in ----------------
    (a) Diamond   (b) Nickel
    (c) Gold   (d) Quartz crystal