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SUBJECT CODE NO: - YY-2335
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. F.Y (Sem-I)
Examination May / June - 2023
Physics Paper-I Mechanics & Properties of Matter

[Time: 1:30 Hours] **[Max. Marks: 40]**

Please check whether you have got the right question paper.

N. B 1) All questions are compulsory.
2) Use of Logarithmic table is allowed.

Q1 Derive the expression for gravitational potential at a point inside the solid sphere. 10

OR

a) Derive the expression for curvature of a beam / bar. 05

b) A steel rod of circular cross section of radius 1 cm is rigidly fixed at one end and a load of 8kg is at the other end which is 100 cm from the fixed end. Calculate depression of end if $y = 20 \times 10^{11}\ dynes/\ cm^2$. 05

Q2 Explain the equation of Continuity and derive its expression. 10

OR

a) Explain difference of pressure across the curved surface. 05

b) Calculate excess pressure in a water drop of radius $10^{-4}m$, when its surface tension is $6.8 \times 10^{-2}\ N/m$. 05

Q3 Solve any two of the following. 10

a) Calculate the gravitational force based on given data.
$m_1 = 80kg, m_2 = 30kg, r = 20m, G = 6.67 \times 10^{-11} Nm^2/kg^2$.

b) Define the following terms
i) Deformation ii) Elasticity iii) Stress iv) Strain v) Hook's law.

c) Calculate the total energy of liquid. if 200gm of liquid flowing per second with velocity 40 cm/sec, from height 50m. It pressures imparted on liquid is 5000 N/m^2 and having density 1000 kg/m^3.

d) Write a short note on applications of source tension.

Q4 Multiple Choice Question (MCQ). 10

1) When center of suspension and oscillation of compound pendulum is reversed, its time period is _____.
a) Increased b) Decreased c) Unchanged d) Depends on axis of rotation

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2) The gravitational potential between point A and B is _____ when point B is at infinite distance.
   a) $V = \frac{-MG}{r}$ b) $V = \frac{MG}{r}$ c) $V = 0$ d) $V = 1$

3) According to Hook's law of Elasticity, within elastic limits, if the stress is increased, the ratio of stress to strain _____.
   a) Increased b) Decreased c) Becomes zero d) Remains constant

4) Shearing Strain is given by
   a) Deforming Force b) Shape of shear
   c) Angle of shear d) Change in the volume of the body

5) The expression for geometrical moment of inertia is _____.
   a) $I_g = \frac{bd^3}{12}$ b) $I_g = \frac{\pi r^4}{4}$ c) Both a and b d) None of these

6) The C.G.S. unit of coefficient of Viscosity is _____.
   a) Poise b) N-S / m^2 c) N / m^2 d) Dyne-cm

7) The Filter pump is used to generate.
   a) Force b) Vacuum c) Pressure d) Temperature

8) The Kinetic Energy per unit volume of liquid flow is given by
   a) $\frac{1}{2}V^2$ b) $\frac{1}{2}mV^2$ c) $\frac{1}{2}\varrho V^2$ d) ϱV^2

9) Jager's method is used to determine _____.
   a) Surface Tension b) Density c) Elasticity d) Pressure

10) Excess pressure in soap bubble in air
   a) T/R b) 2T/R c) 3T/R d) 4T/R

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