(ix) In torsional pendulum the time period is given by :

(a) $T = 2\pi\sqrt{\frac{I}{C}}$ (b) $T = 2\pi\sqrt{IC}$

(c) $T = \pi\left(\sqrt{\frac{I}{C}}\right)$ (d) $T = \frac{1}{2\pi}\sqrt{\frac{I}{C}}$

(x) y by bending of beam is given by :

(a) $y = \frac{WL^2}{4ybd^3}$ (b) $y = \frac{WL}{4bd^3}$

(c) $y = \frac{WL^3}{4ybd^3}$ (d) None of these

(Theory)

2. Attempt any *five* of the following questions : 10

(i) Define Kepeler's law of elliptical orbit and law of equal area.

(ii) Define and explain gravitational potential energy.

(iii) Define surface tension and give its C.G.S. unit.

(iv) Explain stream line and turbulent flow.

(v) Explain the term :

(a) Coefficient of viscosity

(b) Critical velocity.

(vi) Define stress and strain.

(vii) Write down the relation connecting three elastic constant.

3. Attempt any *two* of the following questions : 1

(i) Explain ferguson method to determine the surface tension liquid.

(ii) Explain bending of beam.

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(iii) State and explain the intensity of gravitational field.

(iv) Write notes on :

(a) Bernoulli's theorem

(b) Bulk modulus.

3. Attempt any *one* of the following questions : 10

(i) Explain Jaegers method for the determination of surface tension of liquid.

(ii) Explain deformation of cube and obtain expression for modulus of rigidity.

(9) The expression for time period of a Torsional pendulum is :

(a) $T = 2\pi\sqrt{\frac{I}{C}}$ (b) $T = \frac{1}{2\pi}\sqrt{\frac{I}{C}}$

(c) $T = \pi\sqrt{\frac{I}{C}}$ (d) $T = \pi^2\sqrt{\frac{I}{C}}$

(10) The expression for depression of a beam supported at its ends and loaded in the middle :

(a) $\frac{wl^2}{48yI}$ (b) $\frac{wl^3}{48yI}$

(c) $\frac{wl}{46yI}$ (d) $\frac{wl^2}{46yI}$

Theory

2. Attempt any *five* of the following questions : 10

(i) State Newton's first law of motion.

(ii) Define torque. Give its S.I. unit and dimensions.

(iii) Explain gravitational potential energy.

(iv) Define modulus of rigidity. State S.I. unit and dimensions of it.

(v) What are cohesive and adhesive forces ? Give their examples.

(vi) Explain the terms :

(a) critical velocity

(b) viscosity.

(vii) State *three* types of elastic stresses and strains.

P.T.O.

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3. Attempt any *two* of the following questions : 10

(*i*) State and explain Kepler's laws of planetary motion.

(*ii*) Obtain an expression for excess pressure inside a liquid drop.

(*iii*) Derive poiseuille's equation for the flow of liquid through a tube.

(*iv*) Obtain relation connecting *three* elastic constants.

4. Attempt any *one* of the following questions : 10

(*i*) Explain Kepler's deduction from Newton's laws of gravitation.

(*ii*) Explain Jaeger's method for determination of surface tension of liquid.

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Theory

2. Attempt any *five* questions from the following : 10

(*a*) Define and explain gravitational potential.

(*b*) Define modulus of rigidity. Obtain its unit and dimensions.

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(c) Define surface tension of a liquid. State its CGS unit and obtai its dimensions.

(d) Explain the terms :

(i) Viscous force

(ii) Velocity gradient.

(e) State Hooke's Law ? What are three types of stresses an strains ?

(f) State and explain Newton's law of gravitation.

(g) Define critical velocity. What is Reynolds number ?

3. Attempt any *two* questions from the following : 10

(a) Derive an expression for gravitational potential and intensity at a point outside a uniform solid sphere.

(b) Derive an expression for the excess pressure inside a spherical soap bubble.

(c) Write a short note on Torsional Pendulum.

(d) Describe Poiseuille's method for determination of coefficient of viscosity.

Attempt any *one* of the following : 10

(a) Explain an experiment for the determination of Young's modulus of a beam supported at both the ends and loaded at the centre.

(b) State and prove Bernoulli's Theorem for flow of liquid.

(Theory)

2. Attempt any *five* of the following questions : 10

(*i*) Define and explain intensity of gravitational field.

(*ii*) Define surface tension of a liquid. State its S.I. and C.G.S. unit.

(*iii*) Define coefficient of viscosity. State S.I. unit and dimensions of coefficient of viscosity.

(*iv*) Distinguish between streamline flow and turbulent flow.

(*v*) Explain the terms :

(*a*) Molecular range

(*b*) Sphere of influence.

(*vi*) Define elasticity. State *three* types of stresses.

(*vii*) Define bulk modulus. State S.I. unit and dimensions of bulk modulus.

3. Attempt any *two* of the following questions : 10

(*i*) State and explain Kepler's laws of planetary motion.

(*ii*) Derive an expression for the excess pressure inside the liquid drop.

(*iii*) Explain bending of beam in brief.

(*iv*) Give construction of Searle's viscometer and explain the determination of coefficient of viscosity with it.

4. Attempt any *one* of the following questions : 10

(*i*) Derive an expression for twisting couple acting on a cylinder or wire when it is clamped at one end and twisted at the other end.

(*ii*) Describe Jaeger's method for the determination of surface tension of a liquid.

(*ix*) In Maxwell's needle experiment, the oscillations are given :

(*a*) Horizontal

(*b*) Vertical

(*c*) Torsional

(*d*) None of the above

(*x*) The equation of bending moment is :

(*a*) $\frac{YI_g}{R^2}$

(*b*) $\frac{YI_g^2}{R^2}$

(*c*) $\frac{Y^2I_g}{R}$

(*d*) $\frac{Y \cdot I_g}{R}$

(Theory)

2. Attempt any *five* questions from the following : 10

(*i*) Define and explain Gravitational field.

(*ii*) Distinguish between Adhesive force and Cohesive force.

P.T.O.

(*iii*) Explain the terms :

(*a*) Viscosity

(*b*) Coefficient of Viscosity.

(*iv*) Define the terms : Surface tension and Surface energy.

(*v*) Define Young's Modulus and obtain its units and dimensions.

(*vi*) Explain the terms :

(*a*) Velocity gradient

(*b*) Critical velocity.

(*vii*) Define elasticity. State *three* types of strain.

3. Attempt any *two* questions from the following : 10

(*i*) Define and explain gravitational potential and potential energy of gravitational field.

(*ii*) Explain with necessary diagrams the pressure difference across a curved surface.

(*iii*) State and explain Bernoulli's theorem.

(*iv*) Describe an experiment for the determination of Young's modulus of a beam supported at both the ends and loaded at the centre.

4. Attempt any *one* of the following : 10

(*a*) Describe static torsion experiment to determine modulus of rigidity of the rod and deduce the necessary formula.

(*b*) Describe the Fergusson's method for determining the value of surface tension of a liquid.