22240

Seat No.

Instructions – (1) All Questions are *Compulsory.*

(2) Illustrate your answers with neat sketches wherever necessary.

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

(5) Use of Non-programmable Electronic Pocket Calculator is permissible.

(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. **Attempt any FIVE of the following:** **10**

a) Explain principle of transmissibility of force.

b) Differentiate between mass and weight.

c) Define mechanical advantage and velocity ratio.

d) Explain Hooke's law.

e) Classify various types of bearings.

f) Explain stroke of the follower.

g) Enlist two factor affecting friction.

Marks

2. **Attempt any <u>THREE</u> of the following:** **12**

   a) Define equilibrium and explain the graphical way of finding resultant of forces.

   b) Differentiate between potential energy and kinetic energy giving example.

   c) In a lifting machine, an effort of 400 N is to be moved by a distance of 2 m to raise the load of 8000 N by a distance of 0.8 m. Determine the velocity ratio, mechanical advantage and efficiency of the machine.

   d) Classify various types of belts and give one application of each.

3. **Attempt any <u>THREE</u> of the following:** **12**

   a) Explain the construction and working of worm and worm wheel and give it's applications in industry.

   b) Describe isotropic and othrotropic materials with their applications.

   c) A steel rod is subjected to a axial load of 8 kN. The length of rod is 4 m and maximum limit for stretch is 4mm. Determine the required diameter of the rod, if the normal stress must not exceed 150 MPa and E = 200 GPa.

   d) Draw a stress - strain diagram for ductile material and define various points in it.

4. **Attempt any <u>THREE</u> of the following:** **12**

   a) Enlist four points to be considered while selecting bearings in textile machinery.

   b) Define factor of safety. It working stress is 200 MPa. Calculate the strength required considering factor of safety = 2.

   c) Classify various lubricant. Enlist four desirable properties of lubricants useful in textile machinery.

Marks

d) Differentiate between simple and compound gear trains giving example from textile industry.

e) A square threaded screw of mean diameter 25 mm and pitch of thread 6 mm is utilised to lift a weight of 10 kN by a horizontal force applied at the circumference of the screw. Find the magnitude of the force if the coefficient of friction between the nut and the screw is 0.02.

5. **Attempt any TWO of the following:**   **12**

   a) Define inversions of mechanism and draw inversions of four bar chain mechanism.

   b) Explain the bearing specifications and describe the system of code used for bearings.

   c) Explain Newton's laws of motion and differentiate between centripetal and centrifugal force.

6. **Attempt any TWO of the following:**   **12**

   a) Classify various types of stress and differentiate between modulus of elasticity and modulus of rigidity.

   b) Explain interference in gears and define undercutting, backlash in it.

   c) Differentiate linear and angular motion, giving examples from textile machine components.

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