22240

21222

3 Hours / 70 Marks Seat No. | | | | | | | | |

15 minutes extra for each hour

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

(2) Answer each next main Question on a new page.

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

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(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) Define work and state its unit.

b) Define centripetal and centrifugal forces.

c) State law of machine and its equation.

d) Define stress and strain.

e) Enlist the type of bearings and give application of any two.

f) State any four criteria of selecting bearing.

g) Sketch and lable epicyclic gear train.

Marks

2. Attempt any THREE of the following: **12**

a) Explain principle of transmissibility of force.

b) Resolve the following forces along X and Y-axis. (Fig.: 1)

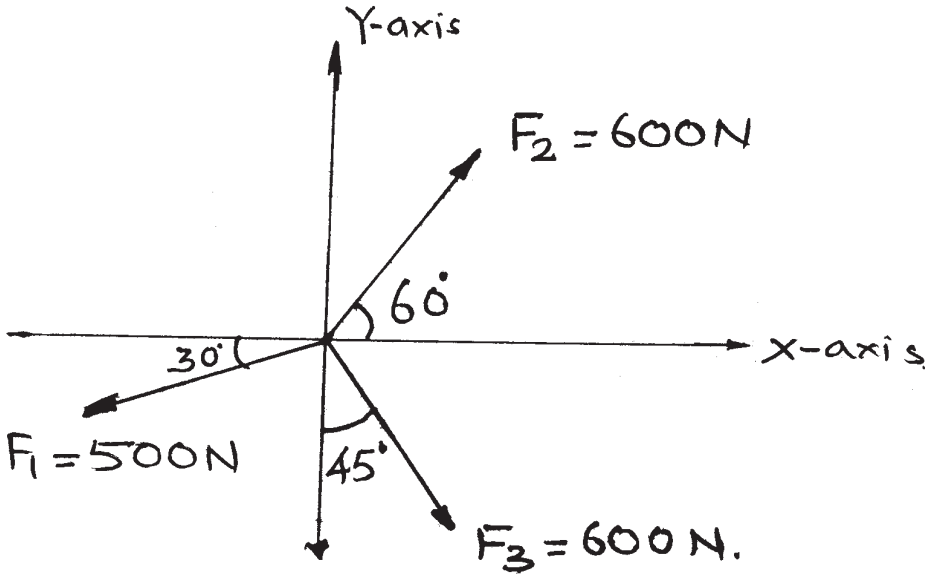

Fig.: No. 1

c) In a simple axle and wheel, the diameter of wheel is 150 mm and that of effort wheel is 30 mm. If the efficiency of machine is 60%, determine the effort required to light a load of 50 N.

d) Explain with neat sketch geometry of V-belt.

3. Attempt any THREE of the following: **12**

a) Certain machine has law P = (0.25W + 20)N with velocity ratio is 60. Find efficiency at a load of 1KN.

b) Draw stress and strain curve for ductile material.

c) Discuss any four criteria for selection of factor of safety.

d) A steel rod 500 mm and 20 mm x 10 mm in section is subjected to an axial pull of 300KN. If the modulus of elasticity is 2×10^5 MPa, calculate stress, strain and elongation of rod.

Marks

4. Attempt any THREE of the following: **12**

a) State any four types of lubricants and their properties.

b) A steel cable subjected to an 85 N tension force. E = 3.3 GPa and that the length of cable increases by 1.2% determine.

i) diameter of cable

ii) Stress in cable.

c) If a force P = 200 N is pulling a block of weight 50 Kg. Find the coefficient of friction developed between block and ground.

d) Explain knife edge follower with neat diagram.

e) Explain any four factors affecting friction and state any two uses of bearing in textile industry.

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

a) Explain any two inversion of four bar mechanism with diagram.

b) Explain bearing specification with example.

c) State and explain Newton's laws of motion.

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

a) Distinguish between homogenous and orthographic materials. (any six points)

b) Explain Velocity Ratio (V.R.) for reverted gear train with neat diagram.

c) Explain concept of:

i) Centrifugal force

ii) Centripetal force

And state any two uses of each in dryer machine.
