22240

22223

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

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

(7) 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) State the type of followers.

b) State the uses of bearings in textile industry.

c) Define:

i) Isotropic Material

ii) Orthotropic Material

d) State the factors affecting friction.

e) Define:

i) Mechanism

ii) Inversion of mechanism

f) Define angular motion.

g) State the principle of trasmissionbility of forces.

P.T.O.

Marks

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

a) Explain:

i) Elastic potential Energy

ii) Work of couple moment.

b) An effort of 15 N lifts a load of 120 N. During lifting, the load moves through 5 cm. and effort moves through 150 cm. Determine

i) Mechanical Advantage

ii) Velocity Ratio &

iii) Efficiency.

c) Four forces of magnitude 10N, 8N, 12N & 5N act at a point O, all away from it. The forces make angle of 36°,125°, & 227° with the 10N force which may be taken at horizontal. Find resultant and equilibrant.

d) State the factors upon which selection of belt drive depends.

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

a) Define stress and discuss the types of stresses in materials.

b) Explain with neat sketch 'Epicyclic Gear Train.'

c) Define reversible machine and state whether the machine is reversible or not if it follows P = (0.025 w + 50)N. The velocity ratio is 50.

d) A steel rod 25 mm in diameter and 2 m long is subjected to an axial pull of 45 KN. find,

i) Intensity of Stress

ii) Strain &

iii) Elongation.

Take $E = 2 \times 10^5$ N/mm^2

Marks

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

a) A 5 kg box on a horizontal table is pushed by a horizontal force of 15 N. If coefficient of friction is 0.4, will the box move?

b) Define factor of safety. Bridge was originally designed for 100 KN. force, How ever currently it is carrying 50 KN. force.

c) Illustrate bearing selection procedure.

d) Explain modulus of rigidity and tenacity.

e) Define:

i) Pitch circle

ii) Dedendum

iii) Module

iv) Circular pitch.

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

a) State the types of lubricants with their properties and applications.

b) Explain with neat sketch stress-strain diagram for ductile materials.

c) State and explain Newton's Laws of motion. State 02 applications for each.

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

a) Discuss the principles of centrifugal and centripetal forces. State 02 applications for each force.

b) Explain inversions of slider crank Mechanism. (Any two)

c) Explain the term undercutting and backlash with neat sketch.
