22370

24225

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

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

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

(3) Illustrate your answer 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) Define successfully constrained motion.

b) Enlist different types of follower motion.

c) Define module and state it's unit.

d) Define co-efficient of fluctuation of energy.

e) Define Kinematic pair and classify it.

f) Why roller - follower is preferred over a knife edge follower?

g) Define angle of lap in belt drive.

P.T.O.

Marks

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

a) State chemical composition, properties and applications of tool steels.

b) State four properties and four applications of Acrylonitrile Butadiene Styrene (ABS).

c) Memorize the advantages and disadvantages of chain drive over other drives.

d) State the necessity of balancing. List different types of balancing methods.

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

a) Justify with neat sketch Oldham's coupling as an inversion of double slider crank chain.

b) Draw basic 'Cam and follower' diagram showing it's terminology. (Minimum four points)

c) Explain Acrylic. State its applications.

d) State the chemical composition, properties and applications of cartridge brass.

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

a) Suggest suitable steel for following application –

i) Crank shaft

ii) Shear blade

iii) Car bodies

iv) Machine tool beds.

b) Explain laminate composites and fibre reinforced composites.

c) Distinguish between mechanism and machine.

d) Draw following displacement diagrams for follower –

i) S.H.M.

ii) Uniform Acceleration and Retardation.

e) Compare flywheel and Governer.

Marks

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

a) A cam is to be designed for a roller follower with the following data –

i) Valve lift/open = 40 mm during 110° of cam rotation with S.H.M.

ii) Valve remains open for the next 80°.

iii) During the next 120° of cam rotation, the valve returns to its original position with uniform acceleration and retardation.

iv) Valve remains close during the remaining cam rotation.

Draw the profile of the cam when, the line of stroke of the follower passes through the axis of the cam shaft, the radius of the base circle of the cam is 30 mm and roller radius is 20 mm.

b) Explain with neat sketch working of quick return mechanism of shaper.

c) A pulley is driven by the flat belt running at a speed of 600 m/min and transmit 4 kW power. The co-efficient of friction between belt and pulley is 0.3 and angle of lap is 160°. Find maximum tension in belt.

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

a) Explain with neat sketch reverted type gear train. Write its applications.

b) Explain the following terms of centrifugal governor with neat sketch –

i) Height of Governor

ii) Equilibrium speed

iii) Sleeve lift.

c) Why different alloying elements are used in steel? Explain any four alloying elements and their effects on properties of steels.

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