22370

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

Marks

1.   **Attempt any <u>FIVE</u> of the following :**   **10**

a) Define Ductility and hardness

b) Define Polymer. Name any two Polymeric materials.

c) State any two advantages of roller follower over knife edge follower.

d) Define fluctuation of energy and coefficient of fluctuation of energy.

e) Define kinematic link with one example.

f) Give four advantages of chain drive over belt drive.

g) State Law of Gearing.

Marks

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

a) Give the detail classification of engineering materials.

b) Give properties and applications of ABS.

c) Draw a neat sketch of radial cam with roller follower and show on it :

    i) Base circle

    ii) Pitch circle

    iii) Trace point

    iv) Pressure angle

d) Compare flat belt and V belt

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

a) Explain function of flywheel with turning moment diagram for single slider four stroke I.C. engine.

b) Define following terms.

    i) Stability

    ii) Hunting of governor

    iii) Sensitivity

    iv) Isochronism

c) Define composite material. Give two examples.

d) Draw only a neat labelled sketch of elliptical trammel and label it.

e) The central distance of two shaft is 4 m. having two pulleys with diameter having 500 mm and 700 mm respectively.

    Find the length of belt required -

    i) for open belt drive

    ii) for cross belt drive

Marks

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

a) Define Gear train. Also state types of gear train.

b) State application of cams and followers.

c) Differentiate between white cast - Iron and grey cast - Iron.

d) Differentiate between machine and structure.

e) State the types of chains and sprockets.

5.   Attempt any <u>TWO</u> of the following :   **12**

a) A cam is to be designed for knife edge follower with the following data.

   i)   Cam lift = 40 mm during 90° of cam rotation with simple harmonic motion.

   ii)   Dwell for next 30°

   iii) During the next 60° of cam rotation the follower returns to its original position with simple harmonic motion.

   iv)   Dwell during the remaining 180°.

   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 40 mm.

b) Draw neat sketch of Iron Carbon equilibrium diagram and show important temperature and phases on it.

c) Explain with neat sketch working of whit worth Quick Return Mechanism.

Marks

6. **Attempt any <u>TWO</u> of the following :** 12

   a) Three masses 10 kg, 20 kg and 15 kg are attached at a point at radii of 20 cm, 25 cm and 15 cm respectively. If the angle between successive masses is 60° and 90°. Determine analytically the balancing mass to be attached at radius of 30 cm.

   b) Calculate the power transmitted by a belt running over a pulley of 600 mm diameter at 200 rpm. The coefficient of friction between the belt and the pulley is 0.25, angle of lap is 160° and maximum tension in the belt is 2500 N.

   c) List different characteristics and application of stainless steel.

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