

22344

22232

3 Hours / 70 Marks

Seat No.

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- 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) Enlist inversion of double slider crank mechanism.
- (b) Define : Relative velocity and Relative acceleration.
- (c) Classify followers according to the surface in contact.
- (d) State law of gearing.
- (e) State the application of v-belt drive.
- (f) State the major functional difference between a clutch and brake.
- (g) State whether links arrangement shown in Fig. 1 is kinematic chain.

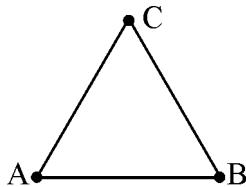


Fig. 1



2. Attempt any THREE of the following : 12

- (a) State inversion of four bar chain mechanism. Explain any one inversion with neat sketch.
- (b) Explain slip and creep in belt drive.
- (c) State different types of cam and follower motion.
- (d) Explain epicyclic gear train with neat sketch.

3. Attempt any THREE of the following : 12

- (a) Draw a neat labelled sketch of elliptical trammel.
- (b) Enlist the types of constrained motion. Explain any one with neat sketch.
- (c) Explain the principle of working of Internal Expanding Brake.
- (d) Define following terms used in Radial Cam
 - (i) Base circle
 - (ii) Pitch circle
 - (iii) Pitch curve
 - (iv) Lift
- (e) Explain procedure for balancing of a single rotating mass by single masses rotating in same plane.

4. Attempt any TWO of the following :

12

- (a) Draw a neat sketch of Oldham's Coupling and explain its working.
- (b) In a four bar chain ABCD, AD is fixed and is 15 cm long. The crank AB is 4 cm long and rotates at 100 r.p.m. clockwise, while the link CD = 8 cm oscillates about D. BC and AD are of equal length. Find the angular velocity of link CD when angle BAD = 60°. (fig. 2)

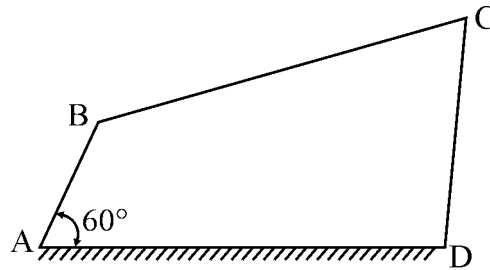


Fig. - 2

- (c) A cam is to be designed for a knife edge follower with the following data :
- Cam lift = 40 mm during 90° of cam rotation with simple harmonic motion.
 - Dwell for the next 30°.
 - The follower returns to its original position with simple harmonic motion for next 60° cam rotation.
 - Dwell during the remaining 180°.

Draw the profile of the cam when line of stroke of the follower passes through the axis of the cam shaft.

5. Attempt any TWO of the following :

12

- (a) Define gear train. List various types of gear trains, and explain compound gear train with neat sketch.
- (b) The crank and connecting rod of a reciprocating engine are 200 mm and 700 mm respectively. The crank is rotating in clockwise direction at 120 rad/s. Find with the help of Klein's construction, velocity and acceleration of the piston when the crank is at 30° to I.D.C.
- (c) Explain Turning moment diagram for a four stroke cycle internal combustion engine with neat sketch.

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

- (a) In a flat belt drive the initial tension is 2000 N. The coefficient of friction between the belt and the pulley is 0.3 and the angle of lap on the smaller pulley is 150° . The smaller pulley has a radius of 200 mm and rotates at 500 r.p.m. Find the power in kW transmitted by the belt.
 - (b) Compare flywheel and Governor.
 - (c) Explain with neat sketch construction of cone clutch.
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