

Time : 3 Hrs

Marks : 80

- NB**
1. Question No. 1 is Compulsory.
 2. Attempt any three questions out of remaining 5 questions.
 3. Figures to the right indicates full marks.
 4. Assume suitable data wherever necessary but justify the same.

Q 1 Solve any four

[20]

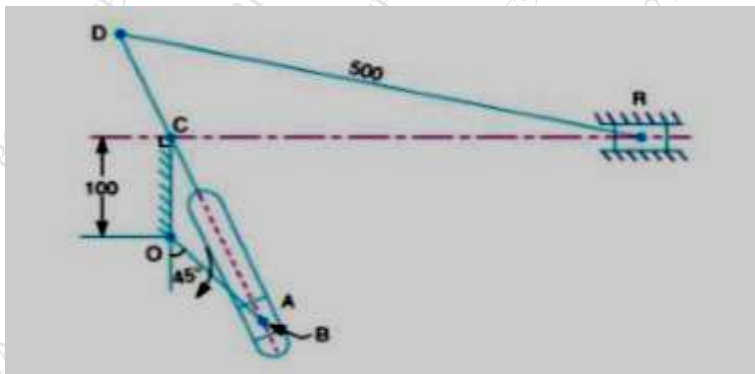
1. Illustrate with neat sketch Crank and slotted lever mechanism.
2. Illustrate with neat sketch elliptical trammel.
3. Illustrate with neat sketch Ackerman's Steering gear mechanism.
4. What are the different types of instantaneous centres?
5. Classify various types of chains with suitable example.

Q 2 A The driving shaft of a Hooks Joint rotates at a uniform speed of 400 rpm. If the maximum variation in speed of the driven shaft is $\pm 5\%$ of the mean speed, Determine the greatest permissible angle between the axes of shaft and maximum and minimum speed. Also derive the equation used for maximum and minimum speed. [10]

Q 2 B Derive the equation for ratio of tension for flat belt drive

[10]

Q 3 (A) In a Whitworth quick return motion, as shown in Fig. OA is a crank rotating at 30 r.p.m. in a clockwise direction. The dimensions of various links are : OA = 150 mm; OC = 100 mm; CD = 125 mm; and DR = 500 mm. Determine the acceleration of the sliding block R and the angular acceleration of the slotted lever CA. [14]



Q 3 (B) With neat sketch explain undercutting in Cams

[6]

Q 4 (A) Two 20° involute spur gear have a module of 10mm. The addendum is one module. The larger has 50 teeth and the pinion has 13 teeth. Does interference occur? If it occurs, to what value the pressure angle be changed to eliminate interference. [10]

Q 4 (B) Derive the equation for minimum number of teeth on wheel in order to avoid interference [10]

Q 5 (A) Cam is rotating at 200 rpm operate a reciprocating roller follower of radius 2.5 cm. The least radius of cam is 30mm, stroke of follower is 5cm. Ascent takes place by uniform acceleration and deceleration and descent by simple harmonic motion. Ascent takes place by 70° and descent during 50° of cam rotation. Dwell between ascent and descent 60° . Sketch displacement, velocity, acceleration and jerk diagram [14]

Q 5 (B) Explain types of brake with neat sketch [6]

Q 6 Solve any four [20]

1. Explain slip and creep in belt drive
2. Explain types of constrained motion with suitable example
3. Explain Harts Mechanism
4. Classify gear train.
5. Explain centrifugal tension.
