

B.Tech. SEM -IV Mechanical 2014 Course (CBCS) : WINTER - 2018

SUBJECT: MECHANISMS OF MACHINES

Day: Tuesday
Date: 13/11/2018

W-2018-2357

Time: 02.30 PM TO 06.30 PM
Max. Marks: 60

N.B:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Draw neat labeled diagrams **WHEREVER** necessary.
- 4) Assume suitable data if necessary.

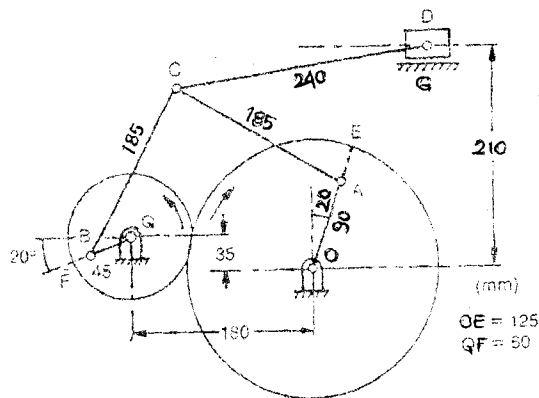
Q.1 Define inversion and Grashof's law for a four bar mechanism. Explain with neat sketch different inversions of Quadric cycle chain. (10)

OR

Q.1 Explain with neat sketches Whitworth Quick Return Mechanism and scotch-Yoke Mechanism. (10)

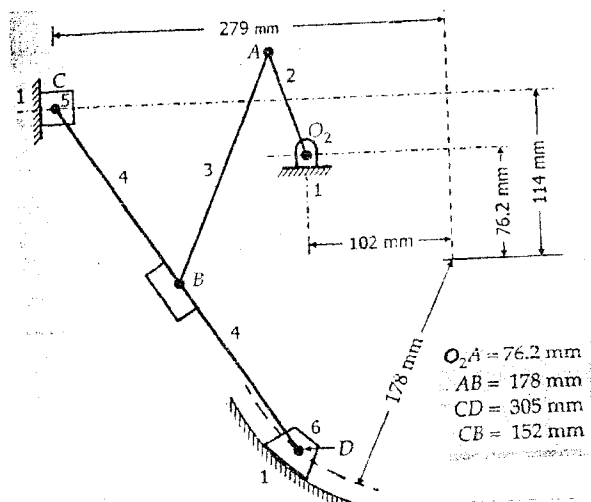
Q.2 Air Andrew variable stroke engine mechanism is shown in figure. The crank OA rotates at 100 rpm. Find: (10)

- i) The linear acceleration of the slider at D.
- ii) The angular acceleration of the links AC, BC and CD



OR

Q.2 For the configuration shown in figure, determine V_D by instantaneous centre method if $V_A = 635$ mm/sec. with ω_2 turning counter clockwise. (10)



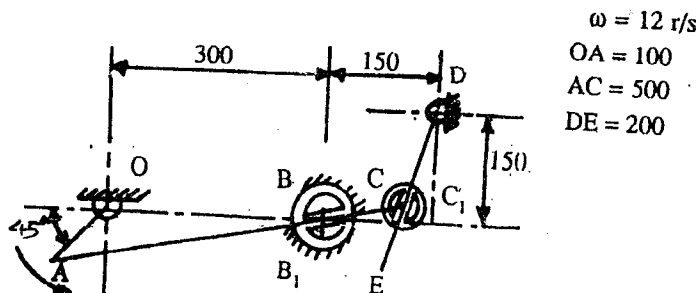
P.T.O.

- Q.3 Derive an expression for Coriolis component of acceleration and Explain the procedure to decide direction of them. (10)

OR

- Q.3 In the mechanism shown in fig the crank OA is rotating at the uniform angular velocity of 12 rad/sec. B and C are the swivel joints. For the configuration shown find: (10)

- i) Sliding velocities at the swivels
- ii) Sliding acceleration at the swivels and
- iii) Angular acceleration of link DE



- Q.4 In a slider crank mechanism, the crank is 200mm long and connecting rod 750mm long. Find analytically, the velocity and acceleration of slider and angular velocity and angular - acceleration of connecting rod when the slider has moved through 350mm from top dead centre position. Assume crank rotates at uniform speed of 600 rpm. (10)

OR

- Q.4 Explain the method of chance solution: (10)
- i) When magnitude and direction of the same vector are unknown
 - ii) When magnitudes of two different vectors are unknown

- Q.5 Synthesize a four bar linkage that will, in one of its positions satisfy the following values for the angular velocities and accelerations. (10)
- $y = x^{1.2}$ for $1 \leq x \leq 5$ using chebyshev spacing for three precision points.
- Take $\phi_0 = 30^\circ$, $\Psi_0 = 60^\circ$ and $\Delta\phi = \Delta\Psi = 90^\circ$ and $r_1 = 10$ cm.

OR

- Q.5 Explain synthesis of mechanisms and describe the classifications of synthesis problem. (10)
- Q.6 A compound pendulum is suspended from an axis such that the frequency of pendulum is maximum. Find the position of axis about which the pendulum will show frequency 20% less than the maximum frequency. (10)

OR

- Q.6 Explain the following terms: (10)
- a) Dynamically equivalent system
 - b) Correction couple

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