

Duration: 3 hours

Max Marks: 80

Note: Attempt any 4 questions
Figures to the right indicate full marks
Assume data wherever required and mention it clearly

- Q1 (i) Select suitable link proportions of crank and rocker mechanism. Draw mechanism in its general phase and explain using Euler Savory relation how to find the center of curvature of an arbitrary located coupler point. 10

- (ii) Design Four Bar Linkage to meet the following requirements

Input Crank	Output Crank
50°	45°
70°	75°
90°	120°

10

- Q2 (i) Explain usefulness of double points with suitable examples 10

Synthesis a slider crank mechanism using relative pole techniques. The positions are

- (ii) $\theta_{12}=30^\circ$ $S_{12}=25\text{mm}$
 $\theta_{12}=45^\circ$ $S_{23}=25\text{mm}$ 10

Off set = 10mm The input θ moves in counter clockwise direction and the slider moves away from the fixed center

- Q3 (i) Write short notes on 10
- (i) Synthesis of a mechanism
 - (ii) Properties of a pole triangle

- (ii) Explain the procedure to get approximate dwell linkages using four accuracy points with suitable sketches 10

- Q4 Design a four bar linkage to generate the function $y = x^{3/2}$ for the range of $x=2$ to $x=6$. The input and the output sectors of angles are 60° and 90° respectively. Determine angle co-ordination. Take three accuracy points. 20

Turn Over

The coordinates of six poles corresponding to four successive finite 20 positions ($P_1 P_2 P_3 P_4$) of a moving plane are as follows:-

Q5

$P_{12}(50, 90)$, $P_{13}(100, 80)$, $P_{14}(40, 60)$
 $P_{23}(60, 80)$, $P_{24}(00, 45)$, $P_{34}(100, 120)$

Select one of the opposite pole quadrilateral and construct circle point curve for the first position of the coupler (Take minimum 8 points other than poles). Select the circle point C at P_{24} and locate the corresponding center point C_0 . All coordinates are in mm.

Q6

Write short notes on (Any Two)

- (i) Short note on the following 10
 (ii) Link (iii) Kinematic pair (iv) Degrees of freedom (v) Kinematic chain
- (ii) Derive two point coupler curvature equation 10
- (iii) Explain the following 10
 (i). Classification of Mechanisms
 (ii). Equivalent mechanisms