



	InSem Examination-II Summer 2024		
	Exam Seat No.:		
	Academic Year: 2023-2024	Semester: IV	
	Name of Programme: SY B.Tech (Mechanical Engineering)	Pattern: 2022	
	Name of Course: Theory of Machines	Course Code: MEC222012	
	Max. Marks: 30	Duration: 1 hour	

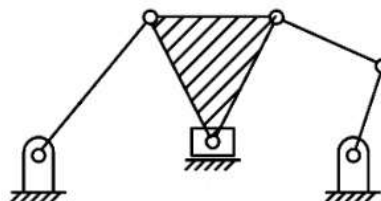
	<p><b>Instructions:</b> Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.</p> <ol style="list-style-type: none"><li>1. This question paper contains 3 page(s).</li><li>2. Answer to each new question is to be started on a new page.</li><li>3. Assume suitable data wherever required, but justify it.</li><li>4. Draw the neat labelled diagrams, wherever necessary.</li><li>5. The last column indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.</li></ol>	
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**Question No. 1 Attempt following Question**

- a) Explain the following terms with neat sketch: (7) CO1
1. Kinematic link
  2. Kinematic pair
  3. Kinematic chain
  4. Mechanism

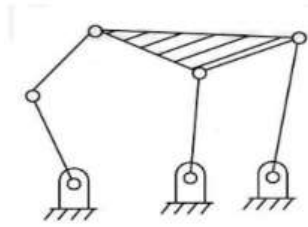
**OR**

- b) Explain inversions of the Double slider crank chain. (7) CO1
- c) Determine number of links, number of pairs and obtain degrees of freedom for the given kinematic linkage. (8) CO1



OR

- d) Determine number of links, number of pairs and obtain degrees of freedom for the given kinematic linkage. (8) CO1



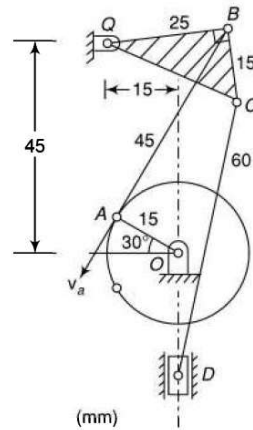
**Question No. 2 Attempt following Question**

- a) State and prove Kennedy's theorem. (5) CO2

OR

- b) Explain Velocity of rubbing. How is it obtained? (5) CO2

- c) Figure shows the mechanism of a sewing machine needle box. For the given configuration, find the velocity of the needle fixed to the slider D when the crank OA rotates at 40 rad/s. (10) CO2

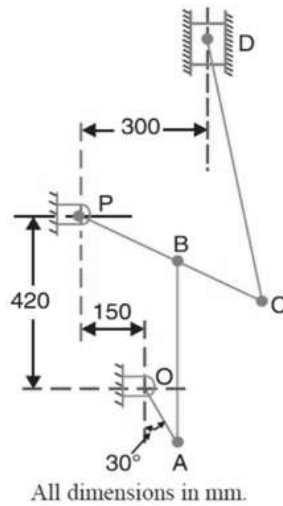


OR

- d) Find out the acceleration of the slider D and the angular acceleration of link CD for the mechanism (10) CO2 shown in Figure.

The crank OA rotates uniformly at 180 r.p.m. in clockwise direction. The various lengths are:

OA= 150 mm, AB= 450 mm, PB= 240 mm, BC= 210 mm, CD= 660 mm.



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