B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

August 2024 Semester End Main Examinations

Programme: B.E.   **Semester: III**
Branch: Aerospace Engineering   **Duration: 3 hrs.**
Course Code: 23AS3PCTOM   **Max Marks: 100**
Course: Theory of Mechanisms

Instructions: 1. Answer any FIVE questions, choosing one full question from each unit.
                        2. Missing data, if any, may be suitably assumed.

			UNIT - I	CO	PO	Marks
1	a)		Explain with a neat sketch, the single slider mechanism and its two inversions.	CO 1	PO2	**12**
	b)		Differentiate: i. Machine and Structure ii. Higher pair and Lower pair iii. Closed and Unclosed pairs iv. Machine and Mechanisms	CO 1	PO 1	**8**
			OR			
2	a)		Describe with neat sketch two inversion of double slider-crank chain mechanism.	CO 1	PO 2	**12**
	b)		Define the following : i. Inversion ii. Partially constrained motion iii. Completely constrained motion iv. Incompletely constrained motion	CO 1	PO 1	**8**
			UNIT - II			
3	a)		Draw a neat sketch of Peaucellier's straight line mechanism. Explain with proof how the tracing point describes a straight-line path.	CO 1	PO 2	**10**
	b)		Explain Ackerman Steering gear with neat sketch and Conditions for correct steering.	CO 1	PO 2	**10**
			UNIT - III			
4	a)		In a four bar chain ABCD, AD is fixed and is 150 mm long. The crank AB is 40mm long and rotates at 120 rpm. clockwise, while the link CD = 80 mm oscillates about D. BC and AD are of equal length. Find the angular velocity of link CD when angle BAD = 60°.	CO 2	PO 3	**10**

		b)	A pin-jointed four-bar linkage having the following dimensions: Fixed Link AD = 4m Driving Link AB = 1.5m, Driven Link CD = 2.5 m, Connecting Link BC = 3m and < BAD = 60 deg, Link AB rotates at 25 rpm. Determine: (i) Angular velocity of link CD, (ii) Angular Velocity of Link BC.	*CO 2*	*PO 3*	**10**
			UNIT - IV			
5	a)		Derive an equation to determine the length of path of contact by a pair of mating spur gear.	*CO 3*	*PO 2*	**10**
		b)	Two involute gears of 20° pressure angle are in mesh. The number of teeth on pinion is 20 and the gear ratio is 2. If the pitch expressed in module is 5 mm and the pitch line speed is 1.2 m/s, assuming addendum as standard and equal to one module, find: i) The angle turned through by pinion when one pair of teeth is in mesh ii) The maximum velocity of sliding.	*CO 3*	*PO 2*	**10**
			OR			
6	a)		Explain with neat sketches the classification of cam and followers also explain the classification of gears.	*CO 3*	*PO 2*	**12**
		b)	Two gears in mesh have a module of 8 mm and a pressure angle of 20°. The larger gear has 57 teeth while the pinion has 23 teeth. If the addenda on the pinion and gear wheel are equal to one module (1m), find i). The number of pairs of teeth in contact and ii). The angle of action of the pinion and the gear wheel.	*CO 3*	*PO 3*	**08**
			UNIT - V			
7	a)		Explain the types of gear train with sketches.	*CO 4*	*PO 1*	**20**

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