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**PRESIDENCY UNIVERSITY  
BENGALURU**

**SCHOOL OF ENGINEERING  
END TERM EXAMINATION - AUG 2024**

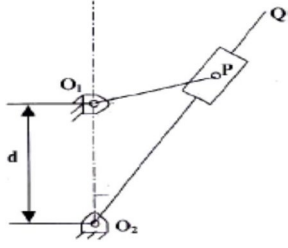
<b>Semester : IV</b>	<b>Date : 09 AUG 2024</b>
<b>Course Code : MEC4002</b>	<b>Time : 9.30am to 12.30pm</b>
<b>Course Name : KINEMATICS OF MACHINES</b>	<b>Max Marks : 100</b>
<b>Program : B.TECH</b>	<b>Weightage : 50%</b>

**Instructions:**

- (i) Read all questions carefully and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) Scientific and non-programmable calculator are permitted.
- (iv) Do not write any information on the question paper other than Roll Number.

<b>PART A</b>			
<b>ANSWER ANY 5 QUESTIONS</b>		<b>5Q X 2M=10M</b>	
1	Define Grashof's law	(CO 1)	[Knowledge]
2	Define a Mechanism.	(CO 1)	[Knowledge]
3	A point on a link connecting a double slider crank chain will trace which shape.	(CO 2)	[Knowledge]
4	Identify the maximum number of inversions for 6 links.	(CO 2)	[Knowledge]
5	Define a Machine.	(CO 1)	[Knowledge]
6	Identify the inversion used in shaper machines.	(CO 2)	[Knowledge]
7	What is the degree of freedom for a super structure?	(CO 1)	[Knowledge]

<b>PART B</b>			
<b>ANSWER ANY 4 QUESTIONS</b>		<b>5Q X 10M=50M</b>	
8	Define Instantaneous center in a Mechanism and identify all the Instantaneous center in a 4 bar link mechanism. Assume any Mechanism to locate the Instantaneous centers.	(CO 3)	[Comprehension]

9	Explain completely constrained and successfully constrained motion with neat sketch.	(CO 1)	[Comprehension]
10	Identify any 3 types of Pairs in a mechanism with neat sketch.	(CO 1)	[Comprehension]
11	<p>A simple quick return mechanism is shown in the figure. The forward to return ratio of the quick return mechanism is 2: 1. If the radius of the crank <math>O_1P</math> is 200 mm, then the distance 'd' (in mm) between the crank center to lever pivot center point should be</p> 	(CO 2)	[Comprehension]
12	Kennedy theorem is used for calculating the instantaneous centers of the links. Assume a 4 link Mechanism with links namely 1,2 ,3 and 4. Link 1 is fixed and the length of link 1 and link 2 is b units. If the link 2 is moving with an angular velocity of 20 rad/sec and the angle between link 1 and link 2 is 180 degree at any instant. Identify the angular velocity of link 3 using the Kennedy theory.	(CO 3)	[Comprehension]
13	Define Instantaneous center in a Mechanism and identify all the Instantaneous center in a 4 bar link mechanism. Assume any Mechanism to locate the Instantaneous centres.	(CO 3)	[Comprehension]

### PART C

**ANSWER ANY 2 QUESTIONS**

**2Q X 20M=40M**

14	A Gear train is represented as follows to transmit the power. The Ring Gear has 75 teeth and contains 3 Planetary Gears connected by an Arm or Carrier and a Sun Gear at the center. The speed of arm is 5 times the speed of Sun Gear and Assume the rpm of planetary gear as zero. Calculate the no of teeth in planetary gear and Sun gear	(CO 5)	[Application]
15	Construct the cam profile for a simple harmonic motion of the follower having lift of 40 mm and radius of base circle is 30 mm. The follower follows the Ascent of 60 degree and then a dwell of 30 degree and again the descent for next 60 degree. The follower is a inline follower.	(CO 4)	[Application]

16	A follower follows the constant velocity profile and is in line with the base circle. The maximum lift for the follower is 30 mm and radius of base circle is 40 mm. It has an Ascent for 60 degree and a dwell for 20 degree and again the descent is for 60 degree. Assuming suitable parameters construct the cam provide talked about in the above statements.	(CO 4)	[Application]