PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
MID TERM EXAMINATION - APR 2023

Semester : Semester IV - 2021
Course Code : MEC4002
Course Name : Sem IV - MEC4002 - Kinematics of Machines
Program : MEC

Date : 17-APR-2023
Time : 2PM - 3:30PM
Max Marks : 50
Weightage : 25%

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.

PART A

ANSWER ALL THE QUESTIONS   (5 X 2 = 10M)

1. The minimum number of links in a single degree-of-freedom planar mechanism with both higher and lower kinematic pairs is

(CO1) [Knowledge]

2. When a cylinder is located in a Vee-block, then number of degrees of freedom which are arrested is

(CO1) [Knowledge]

3. The number degrees of freedom of a planar linkage with 8 links and 9 simple revolute joints is

(CO1) [Knowledge]

4. A point on a link connecting a double slider crank chain will trace a

(CO2) [Knowledge]

5. The mechanism used in a shaping machine is

(CO2) [Knowledge]

ANSWER ALL THE QUESTIONS   **(2 X 10 = 20M)**

6. kinematic linkages shown in figure below, calculate the following:
   a) the number of binary links (Nb)
   b) the number of ternary links (Nt)
   c) the number of quaternary links (Nq)
   d) the number of total links (N)
   e) the number of loops (L)
   f) the number of joints or pairs (P1)
   g) the number of degrees of freedom (F)
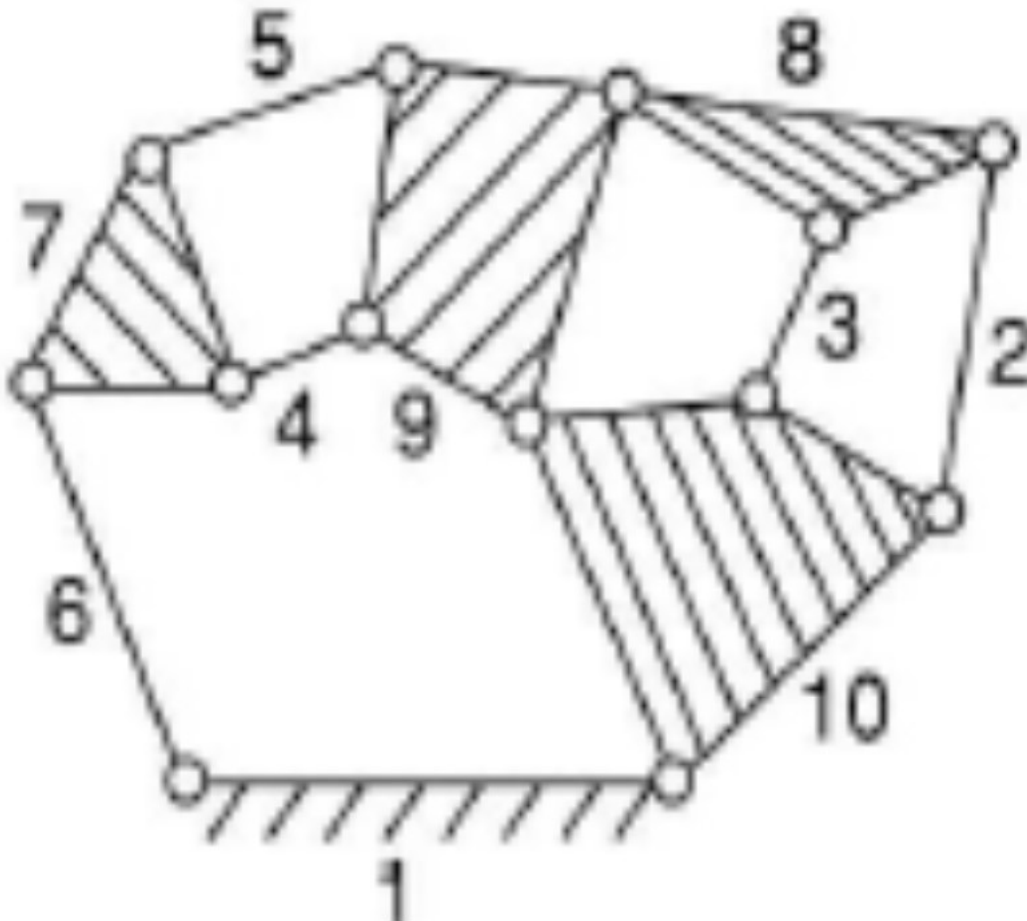
(CO1) [Comprehension]

7. Define Grashof's law. State how is it helpful in classifying the four-link mechanisms into different types.
                                                        (CO2) [Comprehension]

PART C

ANSWER THE FOLLOWING QUESTION   **(1 X 20 = 20M)**

8) How are the kinematic pairs classified? Explain with examples.   (CO1)

OR

The length of the fixed link of a crank and slotted-lever mechanism is 250 mm and that of the   (CO2)
crank is 100 mm. Determine
a) the inclination of the slotted lever with the vertical in the extreme position
b) ratio of the time of cutting stroke to the time of return stroke
c) Length of the stroke, if the length of the slotted lever is 450 mm and the line of stroke passes
through the extreme positions of the free end of the lever.