

**CMR ENGINEERING COLLEGE: : HYDERABAD**  
**UGC AUTONOMOUS**

**II–B.TECH–II–Semester End Examinations (Supply) - June - 2025**

**KINEMATICS OF MACHINERY**

**(MECH)**

**[Time: 3 Hours]**

**[Max. Marks: 70]**

**Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 20 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

**PART-A**

**(20 Marks)**

1. a) What is Kinematics? [2M]
- b) What is sliding pair? [2M]
- c) List the points of velocity analysis by using graphical method. [2M]
- d) Describe the concept of velocity analysis [2M]
- e) What is the condition of perfect steering? [2M]
- f) What is the use of Hook's joint? [2M]
- g) What is cam? [2M]
- h) What is Pressure Angle? [2M]
- i) What is gear train? [2M]
- j) Define total depth. [2M]

**PART-B**

**(50 Marks)**

2. Sketch and describe the working of two different types of quick return mechanisms. [10M]  
Give examples of their application?

**OR**

3. Derive an expression for the ratio of times taken in forward and return stroke for Crank and Slotted lever quick return motion mechanism? [10M]
4. In a Four bar chain ABCD, link AD is fixed and the crank AB rotates at 10 rad/sec clockwise. Lengths of the links are AB=60MM, BC=CD=70MM, DA=120MM. When angle DAB=60° and both B & C lie on the same side of AD, find 1. Angular velocities of BC and CD 2. Angular acceleration of BC and CD [10M]

**OR**

5. Derive an expression for the Magnitude and direction of Coriolis component of acceleration? [10M]
6. Give a neat sketch of the straight line motion "Heart Mechanism". Prove that it produces an exact straight line motion? [10M]

**OR**

7. Derive an expression for the Davis Steering gear Mechanism? [10M]
8. Derive expressions for Displacement, velocity and acceleration for tangent cam operating on a radial translating roller follower 1. when the contact is on straight flank and when the contact is on circular nose. [10M]

**OR**

9. Derive the expression for velocity and acceleration during out stroke and return stroke of the follower of SHM. [10M]

10. Derive an expression for the length of the arc of contact in pair of meshed spur gears? [10M]

**OR**

11. Two parallel shafts about 600mm apart are to be connected by spur gears. One shaft is to run at 360 rpm and the other at 120 rpm. Design the gears, if the circular pitch is to be 25mm. [10M]

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