

R18

Code No: 154BF

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year II Semester Examinations, February - 2024

KINEMATICS OF MACHINERY

(Common to ME, MCT)

Time: 3 Hours

Max. Marks: 75

Note: i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, answer all questions.

iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

- 1.a) What is link and Kinematic pair? [2]
- b) What is machine and mechanism? [3]
- c) Locate instantaneous center for slotted- lever mechanism. [2]
- d) What is velocity and angular velocity? [3]
- e) What types of pairs used in Pantograph? [2]
- f) What are the applications of Ackerman's steering gear? [3]
- g) What are the different cams used in practice? [2]
- h) Sketch and explain working of knife-edged follower? [3]
- i) What is pressure angle? [2]
- j) What is addendum, dedendum and circular pitch? [3]

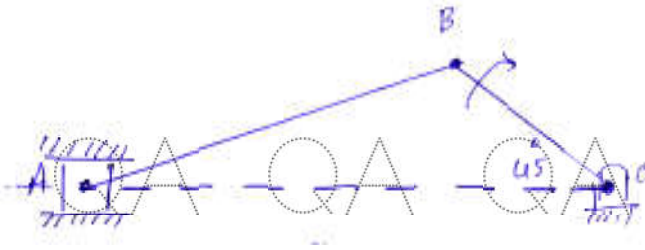
PART – B

(50 Marks)

- 2.a) What are the applications of inversion of four bar chain?
 - b) Differentiate between single and double slider crank chain. [5+5]
- OR**
- 3.a) What are the various inversions obtained by slider crank chain and mention their applications?
 - b) Explain about machine, structure and inversion. [5+5]
- 4.a) How the velocities of a slider and connecting rod are obtained in a slider crank mechanism?
 - b) What is the rubbing velocity at a pin joint and how the rubbing velocity is calculated when the two links move in the same and opposite directions? [5+5]

OR

5. Locate all the instantaneous centers of the slider crank mechanism shown in figure the length of the crank OB is 80mm and connecting rod AB is 320mm. If the crank rotates clockwise with an angular velocity of 10rad/sec, find the velocity of slider A and angular velocity of connecting rod AB. [10]



- 6.a) Sketch and explain the working of Grasshopper straight-line mechanism.
b) What are the advantages and limitations of Davis steering mechanism? [5+5]

OR

- 7.a) Sketch and explain the construction and working of Ackerman steering gear.
b) What are the advantages and applications of Universal joint? [5+5]

8. Draw the profile of cam with knife-edged follower and the outstroke during 60° of rotation. Dwell for the next 40° of cam rotation. The follower returns to its original position during next 90° , follower dwells for the rest of rotation. The lift of the follower is 30mm during outward and return strokes, it follows simple harmonic motion the least radius of cam is 35mm. [10]

OR

- 9.a) Why roller follower is preferred over knife-edged follower?
b) Draw the displacement and acceleration diagram. When the follower moves with uniform acceleration and retardation. [5+5]

- 10.a) What are the different types of gears used in practice and mention their relative advantages?

- b) What is a reverted gear and where it is used? [5+5]

OR

11. In an epi-cyclic gear train, an arm carries two gears A and B having 32 and 48 teeth respectively. If the arm rotates at 200 rpm in anti-clockwise direction about the centre of the gear A, which is fixed, find the speed of gear B. If the gear A, instead of being fixed, makes 450rpm in the clockwise direction, what will be the speed of gear B? [10]