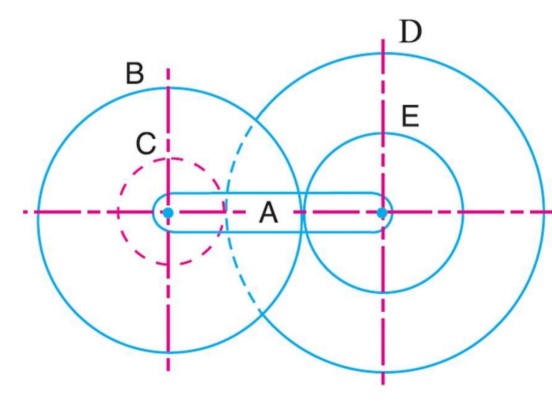
**18ME404**

**Hall Ticket Number:**

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| **II/IV B.Tech (Regular/Supplementary) DEGREE EXAMINATION** | | | |
| **August, 2021** | **Mechanical Engineering** | | |
| **Fourth Semester** | **Kinematics Of Machines** | | |
| **Time:** Three Hours | | **Maximum: 5**0 Marks | |
| *Answer Question No. 1 Compulsorily.* | | | (10X1 = 10 Marks) |
| *Answer* ***ANY ONE*** *question from each Unit.* | | | (4X10=40 Marks) |

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| 1. | a) | Contrast between machine and mechanism. | CO1 | |  |
|  | b) | Give any two examples for inversions of four bar mechanism? | CO1 | |  |
|  | c) | Explain Kutz-bach criteria. | CO1 | |  |
|  | d) | If velocities of links are 17 rad/s CW and 3rad/s CW, Find the rubbing velocity of a pin of diameter 30mm? | CO2 | |  |
|  | e) | State ‘Kennedy’s - three centres in a line’ theorem? | CO2 | |  |
|  | f) | Classify various types of instantaneous centers ? | CO2 | |  |
|  | g) | What are various stages in synthesis? | CO3 | |  |
|  | h) | Why the offset is provided to a cam follower mechanism? | CO3 | |  |
|  | i) | Which type of gear train is used to connect minute hand to hour hand in clock mechanism? | CO4 | |  |
|  | j) | What is ‘interference’ in meshed gears? | CO4 | |  |
| **Unit - I** | | | | | |
| 2. | a) | Define Kinematic pair. Differentiate between Higher pair and lower pair with examples. | CO1 | **5M** | |
|  | b) | Define Degree of Freedom. Explain any two inversions of four bar chain. | CO1 | **5M** | |
|  |  | **(OR)** |  |  | |
| 3. | a) | Draw the velocity diagram for a four bar mechanism with AB =40, BC=150, CD=80, AD=150.( All dimensions are in mm) | CO1 | **5M** | |
|  | b) | In a four link mechanism, the crank AB rotates at 36 rad/s. the lengths of the links are AB=200mm, BC=400mm, CD=450mm and AD=600mm. AD is fixed link. At the instant when AB at right angles to AD, determine the velocity of the mid-point of link BC. | CO1 | **5M** | |
| **Unit - II** | | | | | |
| 4. |  | Locate all the instantaneous centers for the mechanism as shown in Figure. The dimensions of various links are: CD = 65 mm, CA = 60 mm, DB = 80 mm and AB = 55 mm. Find the angular velocities of the links AB and DB, if the crank CA rotates at 100 r.p.m in the anticlockwise direction. | CO2 | **10M** | |
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| 5. |  | In the figure shown a slider crank mechanism. At the position shown, the slider C moves upward with velocities *v*C = 2 m/s and *a*C = 1 m/s2.  Determine a) the angular acceleration of link BC b) the angular acceleration of link AB. | CO2 | **10M** | |
| **Unit - III** | | | | | |
| 6. | a) | Explain the three phases of kinematic synthesis mechanisms. | CO3 | **5M** | |
|  | b) | Explain any one method of function generation with example. | CO3 | **5M** | |
|  |  | **(OR)** |  |  | |
| 7. |  | Construct the profile of a cam to suit the following specifications: Cam shaft diameter = 40 mm ; Least radius of cam = 25 mm ; Diameter of roller = 25 mm; Angle of lift = 120° ; Angle of fall = 150° ; Lift of the follower = 40 mm ; Number of pauses (dwell period) are two of equal interval between motions. During the lift, the motion is S.H.M. During the fall the motion is uniform acceleration and deceleration. The speed of the cam shaft is uniform. The line of stroke of the follower is off-set 12.5 mm from the centre of the cam. | CO3 | **10M** | |
| **Unit - IV** | | | | | |
| 8. | a) | State and prove ‘Law of Gearing’. | CO4 | **5M** | |
|  | b) | Derive a relation among Length of path of contact and radii of Gear and pinion which are in mesh. | CO4 | **5M** | |
|  |  | **(OR)** |  |  | |
| 9. |  | In a reverted epicyclic gear train, the arm A carries two gears B and C and a compound gear D-E. The gear B meshes with gear E and the gear C meshes with gear D. The number of teeth on gears B,C and D are 75, 30 and 90 respectively. Find the speed and direction of gear C when gear B is fixed and the arm A makes 100 r.p.m. clockwise. | CO4 | **10M** | |

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