

Code.No: RR312403

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SET-1

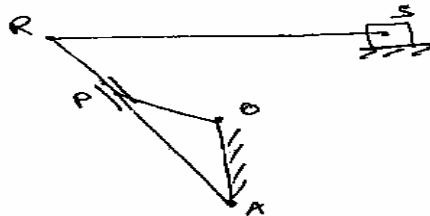
**III B.TECH – I SEM EXAMINATIONS, NOVEMBER - 2010**  
**KINEMATICS OF MACHINERY**  
**(AUTOMOBILE ENGINEERING)**

**Time: 3hours****Max.Marks:80**

**Answer any FIVE questions**  
**All questions carry equal marks**

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- 1.a) Classify the different kinds of constrained motion. Give examples of each.
- b) Is there a inversion in double sliders crank mechanism to describe a true ellipse. Discuss. Explain one more inversion of a double slider crank mechanism with neat sketch. [8+8]
- 2.a) Are there any conditions in Scott Russell mechanism to trace a straight line. Explain.
- b) Sketch any one type of exact straight line motion mechanism. Explain. [8+8]
3. How is the Kennedy's theorem useful in locations various instantaneous centre of a mechanism. Locate instantaneous centre for the following mechanism. Construct the diagram with approximate values. [16]



4. When the crank turns  $45^\circ$  from IDC of a sliders crank mechanism determine
  - a) The velocity of a point E located at a midpoint of the connecting rod.
  - b) Angular velocity of connectivity rod
  - c) The velocity of slider
 The crank is 400mm long and rotates at 24 rad/s in the clock wise direction. The length of the connecting rod is 175mm. [16]
5. The Ackerman steering gear does not satisfy the condition for correct steering in all position yes or no. If yes what is the steering gear mechanism available which satisfies the condition for correct steering in all position. Derive the expression for the angles of inclination which mechanism is preferred more and why? [16]
6. Plot the displacement, Velocity and acceleration of cam for one full cycle and also determine the maximum pressure angle when a translating roller follower of 10mm radius is driven by an eccentric circle cam of radius 40mm and eccentricity 1.25cm and rotating at 220rpm. [16]
7. Find the minimum number teeth on each wheel to avoid interference and the number of pairs of teeth is contact of two  $20^\circ$  involutes spur gears having a velocity is 3.6mm and addendum 1.13 module. The pinion coin rotates at 200rpm. [16]
8. What is meant by planetary gear train .Explain? [16]

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SET-3

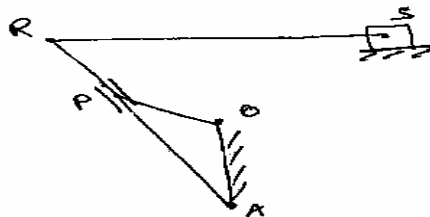
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**KINEMATICS OF MACHINERY**  
**(AUTOMOBILE ENGINEERING)**

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**Answer any FIVE questions**  
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1. The Ackerman steering gear does not satisfy the condition for correct steering in all position yes or no. If yes what is the steering gear mechanism available which satisfies the condition for correct steering in all position. Derive the expression for the angles of inclination which mechanism is preferred more and why? [16]
2. Plot the displacement, Velocity and acceleration of cam for one full cycle and also determine the maximum pressure angle when a translating roller follower of 10mm radius is driven by an eccentric circle cam of radius 40mm and eccentricity 1.25cm and rotating at 220rpm. [16]
3. Find the minimum number teeth on each wheel to avoid interference and the number of pairs of teeth in contact of two  $20^\circ$  involute spur gears having a velocity is 3.6mm and addendum 1.13 module. The pinion rotates at 200rpm. [16]
4. What is meant by planetary gear train .Explain? [16]
- 5.a) Classify the different kinds of constrained motion. Give examples of each.  
 b) Is there an inversion in double sliders crank mechanism to describe a true ellipse. Discuss. Explain one more inversion of a double slider crank mechanism with neat sketch. [8+8]
- 6.a) Are there any conditions in Scott Russell mechanism to trace a straight line. Explain.  
 b) Sketch any one type of exact straight line motion mechanism. Explain. [8+8]
7. How is the Kennedy's theorem useful in locating various instantaneous centres of a mechanism. Locate instantaneous centre for the following mechanism. Construct the diagram with approximate values. [16]



8. When the crank turns  $45^\circ$  from IDC of a slider crank mechanism determine
  - a) The velocity of a point E located at a midpoint of the connecting rod.
  - b) Angular velocity of connecting rod
  - c) The velocity of slider
 The crank is 400mm long and rotates at 24 rad/s in the clockwise direction. The length of the connecting rod is 175mm. [16]

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SET-4

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**(AUTOMOBILE ENGINEERING)**

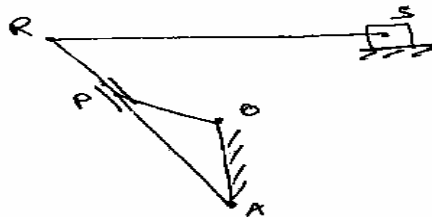
Time: 3hours

Max.Marks:80

**Answer any FIVE questions**  
**All questions carry equal marks**

- - -

1. Find the minimum number teeth on each wheel to avoid interference and the number of pairs of teeth in contact of two  $20^\circ$  involute spur gears having a velocity ratio 3.6 and addendum 1.13 module. The pinion rotates at 200rpm. [16]
2. What is meant by planetary gear train. Explain? [16]
- 3.a) Classify the different kinds of constrained motion. Give examples of each.  
b) Is there an inversion in double slider crank mechanism to describe a true ellipse. Discuss. Explain one more inversion of a double slider crank mechanism with neat sketch. [8+8]
- 4.a) Are there any conditions in Scott Russell mechanism to trace a straight line. Explain.  
b) Sketch any one type of exact straight line motion mechanism. Explain. [8+8]
5. How is Kennedy's theorem useful in locating various instantaneous centres of a mechanism. Locate instantaneous centre for the following mechanism. Construct the diagram with approximate values. [16]



6. When the crank turns  $45^\circ$  from IDC of a slider crank mechanism determine
  - a) The velocity of a point E located at a midpoint of the connecting rod.
  - b) Angular velocity of connecting rod
  - c) The velocity of slider
The crank is 400mm long and rotates at 24 rad/s in the clockwise direction. The length of the connecting rod is 175mm. [16]
7. The Ackerman steering gear does not satisfy the condition for correct steering in all positions yes or no. If yes, what is the steering gear mechanism available which satisfies the condition for correct steering in all positions. Derive the expression for the angles of inclination which mechanism is preferred more and why? [16]
8. Plot the displacement, Velocity and acceleration of cam for one full cycle and also determine the maximum pressure angle when a translating roller follower of 10mm radius is driven by an eccentric circle cam of radius 40mm and eccentricity 1.25cm and rotating at 220rpm. [16]

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