ME 222 (R-22)

Total No. of Questions : 10] [Total No.of Pages : 02

II/IV B. Tech. DEGREE EXAMINATIONS, AUGUST - 2024

Second Semester

MECHANICAL ENGINEERING

KINEMATICS OF MACHINES

Time : **Three Hours** Maximum : **70** Marks

Answer ONE question from each Unit.

All Questions carry equal marks. 5x14=70 M

UNIT - I

1. a) What is Grashoff's law ? Derive the equation.
   b) Explain different constrained motion of mechanisms.

(OR)

2. a) Explain types kinematic chains and kinematic pairs.
   b) Mention any two inversions of quadric cycle chain mechanism in detail.

UNIT - II

3. a) What is Pantograph ? Explain its working with neat sketch.
   b) The driving shaft of a Hooke's joint rotates at a uniform speed of 400 rpm. If the total maximum variation in speed of the driven shaft is 12% of the mean speed, determine the greatest permissible angle between the axes of the shaft. Also find the maximum and minimum speeds of the driven shaft ?

(OR)

4. Deduce the condition for the equal speeds of two shafts connected a Hooke's joint from the expression for the ratio of their angular velocities. Also deduce the expression for the angular acceleration of the driven shaft ?

UNIT - III

5. PQRS is a four-bar chain with link PS fixed. The lengths of the links are PQ = 62.5 mm; QR=175 mm; RS = 112.5 mm and PS = 200 mm. The crank PQ rotates at 10 rad/s clockwise. Draw the when angle QPS = 60^{o} and Q and R lie on the same side of PS. Find the angular velocity and angular acceleration of links QR and RS ?

P.T.O.

(OR)

6. Locate all instantaneous centers of the slider crank mechanism; the length of crank OB and Connecting rod AB are 125 mm and 500 mm respectively. The Crank speed is 600 rpm clockwise. When the crank has turned 45^o from the IDC. Determine (i) velocity of Slider 'A' (ii) Angular Velocity of connecting rod 'AB'.

UNIT - IV

7. Explain different types of cams and followers.

(OR)

8. Explain tangent cam with roller follower.

UNIT - V

9. The arm of an epicyclic gear train rotates at 100 rpm in the anticlockwise direction. The arm carries two wheels A and B having 36 and 45 teeth respectively. The wheel A is fixed and the arm rotates about the centre of wheel. Find the speed of wheel B. What will be the speed of B, if the wheel A instead of being fixed, makes 200 rpm (clockwise).

(OR)

10. Two spur gears of 32 teeth and 46 teeth of 10 mm module and 30^o pressure angle are in mesh. Addendum of each gear is 8mm. The teeth are of involute form and the pinion rotates at 400 rpm. Determine the velocity of sliding when the pinion is at a radius of 100 mm.