Roll No. ..... Total Pages : 2

BT-3/D-12 **8325**

KINEMATICS OF MACHINES

Paper—ME-207E

Time Allowed : 3 Hours] [Maximum Marks : 100

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. (a) Explain degree of freedom of planar mechanisms. 5
   (b) Discuss the quick return motion mechanism of crank and slotted lever. 15
2. (a) Discuss the classification of Kinematic Pairs. 10
   (b) Describe elliptical trammels. How does it enable you to describe a true ellipse ? 10

UNIT–II

3. (a) Discuss the tangential and centripetal acceleration component. 15
   (b) Discuss between path generation and function generation. 5
4. Design a four link mechanism when the motion of input and output links are governed by the function $y = x^2$, x varies from 0 to 2 with an interval of 1. Sketch the mechanism indicating various dimensions. 20

UNIT–III

5. (a) Under what conditions Scott-Russel mechanism tracy out a straight line and an ellipse ? 10

http://www.kuonline.in

   (b) Two shafts are connected by a universal joint. The driving shaft rotates at a uniform speed of 1,200 rpm. Determine the greatest permissible angle between the shaft axes such that total fluctuation of speed does not exceed 100 rpm. Also calculate the maximum and minimum speed of the driven shaft. 10
6. Derive an expression for the screw efficiency of square thread and prove that necessary condition for maximum efficiency of square threaded screw in terms of friction angle ϕ. 20

UNIT–IV

7. Draw the profile of a Cam operating a roller and following data minimum radius of cam = 25 mm, lift = 30 mm, Rollor diameter = 15 mm. The cam lifts the follower for 120° with SHM followed by a dwell of 30°. Then the follower lowers down during 150° of cam rotation with uniform acceleration and decleration followed by a dwell period. If the cam rotates at uniform speed of 150 rps., calculate the maximum velocity and acceleration of the follower during descent period. 20
8. (a) Explain the types of belts. 5
   (b) Derive an expression for the ratio of tensions on two sides of flat belt i.e. $\frac{T_1}{T_2} = e^{\mu\theta}$, θ is called angle of contact over the pulley, μ is coefficient of friction belt and pulley. 15

http://www.kuonline.in

http://www.kuonline.in