PVP 14

Code: ME4T4, AE4T4

II B.Tech - II Semester – Regular/Supplementary Examinations – April 2017

KINEMATICS OF MACHINERY

(Common for ME, AE)

Duration: 3 hours Max. Marks: 70

PART – A

Answer ***all*** the questions. All questions carry equal marks

11 x 2 = 22

1.

a) Define Kinematic Pair and list different types of Kinematic pairs.
b) Differentiate between Lower Pair and Higher Pair.
c) What do you mean by constrained and successfully constrained motions? Give examples.
d) What is Coriolis component of acceleration?
e) State and prove Kennedy's theorem.
f) What is pantograph?
g) Give two examples for approximate straight line motion mechanisms.
h) Classify the cams.
i) List different types of follower motions in cams.
j) What is interference in Involute gears? How it can be avoided?
k) State and prove law of gearing.

PART – B

Answer any ***THREE*** questions. All questions carry equal marks.

3 x 16 = 48 M

2. What is a kinematic inversion? With the help of neat diagrams, explain the inversions of quadric cycle chain. 16 M

3. Locate all the instantaneous centers for the crossed four bar mechanism as shown in Figure-1 below. 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. 16 M

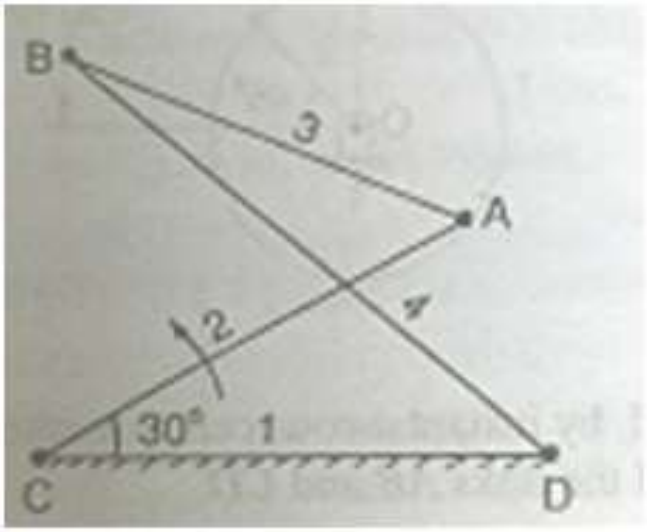

Figure-1

4. a) Explain Peaucellier mechanism with the help of a neat diagram and prove that it generates an exact straight line. 8 M

b) What is the condition for correct steering? Sketch and explain the Ackerman steering gear mechanism. 8 M

5. A cam, with a minimum radius of 50 mm, rotating clockwise at a uniform speed, is required to give a knife edge follower the motion as described.

a) To move outwards through 40 mm during 100^{o} of rotation of the cam.

b) To dwell for the next 80^{0}.

c) To return to its starting position during the next 90^{0}.

d) To dwell for the rest period of a revolution.

Draw the profile of the cam when the line of the stroke of the follower passes through the center of the cam shaft when the displacement of the follower is to take place with uniform acceleration and uniform deceleration. Determine the maximum velocity and acceleration when the cam shaft rotates at 900 r.p.m. 16 M

6. a) A pinion having 30 teeth drives a gear having 80 teeth. The profile of the gears is involute with 20^{0} pressure angle, 12mm module and 10 mm addendum. Find the length of the path of contact, arc of contact and the contact ratio. 8 M

b) 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. 8 M