H.T.No. | | | | | | | | | | |

Code No: ME1508 **GEC-R14**

II B. Tech I Semester Regular / Suppl. Examinations, November 2017

KINEMATICS OF MACHINES

(Mechanical Engineering)

Time: 3 Hours **Max. Marks: 60**

Note: All Questions from **PART-A** are to be answered at one place.
Answer any **FOUR** questions from **PART-B.** All Questions carry equal Marks.

PART-A

6 × 2 = 12M

1. What is the purpose of using pantograph?
2. State the Kennedy's theorem used to locate the instantaneous centres?
3. What is a Hooke's joint? Where is it used?
4. List different types of followers?
5. Write the equation to find the number of teeth in contact of two mating gears?
6. What do you mean by compound gear trains?

PART-B

4 × 12 = 48M

1. a) Explain with neat sketch about crank and slotted lever mechanism. (6M)

   b) Explain the types of constrained motion. (6M)

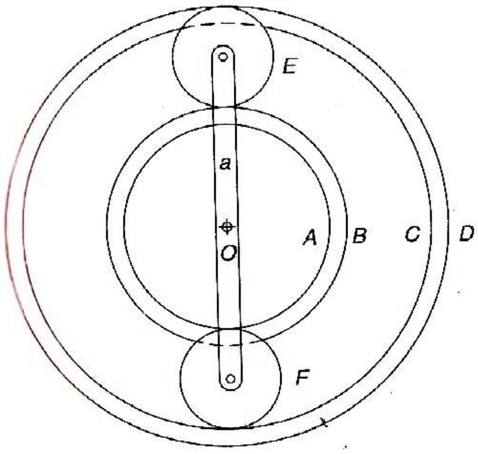
2. In a four-link mechanism, the crank AB rotates at 36 rad/s. The lengths of the links are: AB= 200 mm, BC= 400 mm, CD= 450 mm and AD= 600 mm. AD is the fixed link. At the instant when AB is at right angle to AD, determine the angular velocity of
   i) The mid-point of link BC
   ii) A point on link CD, 100 mm from the pin connecting the links CD and AD. (12M)

3. a) Show that Peaucellier mechanism generates straight line motion. (6M)
   b) Explain Ackermann steering gear mechanism. (6M)

4. The following data related to a cam profile in which the follower moves with uniform acceleration and deceleration during ascent and descent. Minimum radius of the cam =25 mm, Roller diameter =7.5mm, Lift =28 mm, Offset of the follower axis =12 mm towards right, Angle of ascent =60^0 Angle of descent =90^0 Angle of dwell between ascent and descent =45^0, the speed of the cam =200 rpm. Draw the profile of the cam. (12M)

5. Two gears in mesh have a module of 8 mm and pressure angle of 20^0. The larger gear has 57 teeth while pinion has 23 teeth. If the addenda on pinion and gear wheel are equal to one module. Determine (12M)
   i) Contact ratio
   ii) The angles of action of the pinion and the gear wheel
   iii) the ratio of the sliding velocity to the rolling velocity at the beginning of engagement, at the pitch point and at the end of engagement

6. In the epi-cyclic gear train shown in fig, the compound wheels A and B as well as internal wheels C and D rotate independently about the axis O. The wheels E and F rotate on the pins fixed to arm a. all the wheels are of the same module. The number of the teeth on the wheels are T_A =52, T_B =56, T_E =T_F =36. Determine the speed of C if i) the wheel D fixed and arm a rotates at 200 rpm clockwise. ii) the wheel D rotates at 20 rpm counter-clockwise and the arm a rotates at 200 rpm clockwise. (12M)



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