Code No: ME1508   **GEC-R14**

II B. Tech I Semester Regular Examinations, November 2015
## 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 x 2 = 12M

1. What is meant by equivalent mechanism?

2. What is Watt's mechanism?

3. What is configuration diagram? In which cases does it occur?

4. What is Coriolis acceleration component? In which case does it occur

5. What is reverted gear train?

6. What do you mean by differential?

PART-B

4 ×12 = 48M

1. a) Sketch and explain the inversions of four bar mechanism?   (8M)

   b) A linkage has 14 links and the number of loops is 5. Calculate its
      i) Degrees of freedom; (ii) number of joints; Assume that all the pairs are
      turning pairs.   (4M)

2. a) What is instantaneous centre of rotation? How do you know the number
      of instantaneous centers in a mechanism?   (6M)

   b) For the mechanism shown in fig, determine the velocities of the points
      C,E, and F and the angular velocities of the links BC, CDE, and EF   (6M)
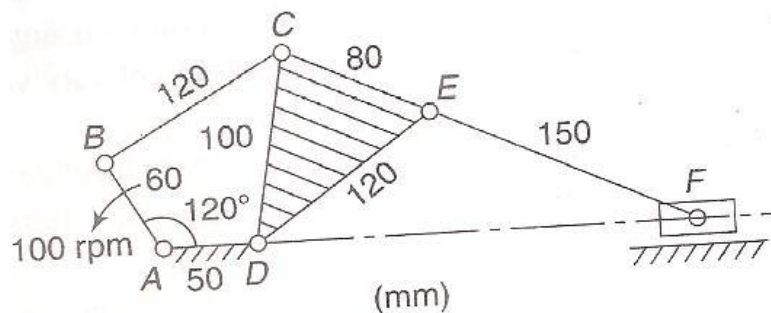
3. a) What is fundamental equation of correct condition for steering gears? Which steering gear fulfils this condition? (6M)

   b) Describe and derive the equation for angular velocity ratio in Hookes joint. (6M)

4. Draw the profile of the Cam which is to give oscillatory motion to the follower with uniform angular velocity about its pivot. The base circle diameter is 50 mm, angle of oscillation of the follower 30°and the distance between the cam centre and pivot of the follower 60 mm, the oscillating lever is 60 mm long with a roller of 8 mm diameter at the end. Ascent motion takes place with Simple Harmonic motion for 120^0 followed by dwell period of 60^0 .Then the follower descends with uniform velocity for 100^0. (12M)

5. a) Derive a relation for minimum number of teeth on the gearwheel and the pinion to avoid interference? (6M)

   b) State and prove law of gearing? (6M)

6. The epicyclic gear train is shown in Figure. The wheel D is held stationary by the shaft A and the arm B is rotated at 300 r.p.m . The wheels E (20 teeth) and F (40 teeth) are fixed together and rotate freely on the pin carried by the arm. The wheel G (30 teeth) is rigidly attached to the shaft C. Find the speed of shaft C stating the direction of rotation to that of B. (12M)

*****