Code: 9A03401

B.Tech II Year II Semester (R09) Supplementary Examinations December/January 2014/2015
KINEMATICS OF MACHINERY
(Mechanical Engineering)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1   (a)   Explain the classification of the kinematic pairs with the help of examples.
    (b)   Explain the inversion of single slider crank mechanism which is used in whitworth quick return motion mechanism.

2   (a)   Name and explain any copied straight line motion mechanism.
    (b)   What is the mechanism used to copy the existing diagram to a enlarged scale. Explain with the help of its line diagram.

3   (a)   What do you mean by Coriolis component of acceleration? When it will exist.
    (b)   Draw and explain Klein's construction for determining velocity and acceleration of the piston in a slider crank mechanism.

4   (a)   Explain why two Hooke's joints are used to transmit motion from the engine to the differential of an automobile.
    (b)   Determine the maximum permissible angle between the shaft axes of a universal joint if the driving shaft rotates at 800 rpm and the total fluctuation of speed does not exceed 60 rpm. Also find the maximum and the minimum speeds of the driven shaft.

5   Determine the profile of cam to give oscillatory motion to the follower, with uniform angular velocity about its pivot. One oscillation is completed in one revolution of the cam. The distance between the cam centre and the pivot of the flower is 50 mm. The base circle diameter is 40 mm. Angle of oscillation is 30º. The length of the oscillating lever is 50 mm with roller of 5 mm diameter at the end.

6   (a)   Explain what interference is and how it is prevented.
    (b)   A spur gear has a module of 3 mm and its pitch line velocity is 942.45 mm/s. if the number of teeth of this spur gear is 20, find the speed of the gear. Also determine its circular pitch.

7   (a)   Derive an expression for the length of a crossed belt.
    (b)   The maximum permissible stress in a belt is 1.4 N/mm^2 and ratio of tensions is 2.0, find the maximum power transmitted by a belt 150 mm x 10 mm if the density of leather is 1 Mg/m^3.

8   Two parallel shafts are to be connected by spur gears. The shafts are 600 mm apart approximately. Speed of one shaft is 360 r.p.m and of the other is 120 r.p.m. the circular pitch is 25 mm, find :
    (a)   No. of teeth on each gear.
    (b)   Pitch circle diameters of the gears.
    (c)   Exact centre distance between two shafts.

*****