

II B. Tech II Semester Supplementary Examinations, Dec - 2015
KINEMATICS OF MACHINERY
 (Com. to ME, AME, MM)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answer **ALL** the question in **Part-A**
 3. Answer any **THREE** Questions from **Part-B**

PART -A

1. a) Explain the terms : i) Mechanism, ii) Higher pair (4M)
- b) Explain about pantograph. (3M)
- c) Explain about the space centrode and body centrode. (4M)
- d) Why a roller follower is preferred to that of a knife-edged follower? (3M)
- e) What do you understand by the term 'interference' as applied to gears? (4M)
- f) Explain the phenomena of 'slip' and 'creep' in a belt drive. (4M)

PART -B

2. a) Sketch and explain any Oldham's coupling and oscillating cylinder engine. (10M)
- b) Sketch and explain whit worth quick return motion mechanism (6M)
3. a) Give a neat sketch of the straight line motion 'Hart mechanism.' Prove that it produces an exact straight line motion. (8M)
- b) Sketch an intermittent motion mechanism and explain its practical applications (8M)



4. In a mechanism shown in Fig.1, the crank OA is 100 mm long and rotates clockwise about O at 120 r.p.m. The connecting rod AB is 400 mm long. (16M)

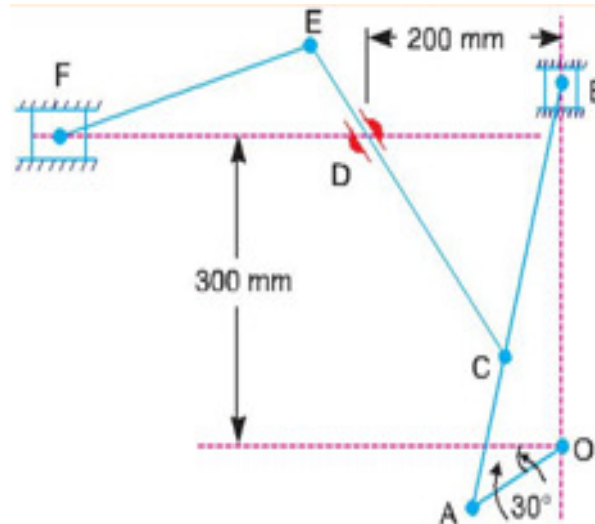


Fig.1

At a point C on AB, 150 mm from A, the rod CE 350 mm long is attached. This rod CE slides in a slot in a trunnion at D. The end E is connected by a link EF, 300 mm long to the horizontally moving slider. For the mechanism in the position shown, find i) velocity of F, ii) velocity of sliding of CE in the trunnion, and iii) angular velocity of CE.

5. Draw the displacement, velocity and acceleration diagrams for a follower when it moves with simple harmonic motion. Derive the expression for velocity and acceleration during outstroke and return stroke of the follower. (16M)
6. a) Derive an expression for the minimum number of teeth required on the pinion in order to avoid interference in involute gear teeth when it meshes with wheel. (8M)
- b) A pair of involute spur gears with 16° pressure angle and pitch of module 6 mm is in mesh. The number of teeth on pinion is 16 and its rotational speed is 240 r.p.m. When the gear ratio is 1.75, find in order that the interference is just avoided; i) the addenda on pinion and gear wheel ; ii) the length of path of contact ; and iii) the maximum velocity of sliding of teeth on either side of the pitch point. (8M)
7. a) Discuss briefly the various types of belts used for the transmission of power (8M)
- b) Two parallel shafts, whose centre lines are 4.8 m apart, are connected by open belt drive. The diameter of the larger pulley is 1.5 m and that of smaller pulley 1 m. The initial tension in the belt when stationary is 3 kN. The mass of the belt is 1.5 kg / m length. The coefficient of friction between the belt and the pulley is 0.3. Taking centrifugal tension into account, calculate the power transmitted, when the smaller pulley rotates at 400 r.p.m. (8M)

