

Question Bank(I Scheme)

Name of subject- **THEORY OF MACHINE**
Subject Code- **22438**

Unit Test- **I**
Course- **ME4I**

Chapter 1- Fundamentals and Types of machines

Questions for 2 marks

- 1) Define the following terms with one example
a) Higher pair b) Lower pair
- 2) Define the following terms with one example
a) Kinematic link (b) Kinematic pair
- 3) State the types of constrained motion. Draw the sketch of any one
- 4) Define inversion with example
- 5) Define sliding pair and turning pair with example

Questions for 4 marks

- 1) Explain crank and slotted lever mechanism with neat sketch
- 2) State the inversions of four bar chain mechanism and explain any one with neat sketch
- 3) Give the classification of kinematic pairs. Explain any one

Chapter 2- Velocity and acceleration in mechanisms

- (1) Define the following terms- (i) Linear velocity (ii) Angular velocity
- (2) Define the following terms- (i) Absolute velocity (ii) Relative velocity

Questions for 4 marks

(1) In reciprocating engine the crank is 250mm long and connecting rod is 1000mm long. The crank rotates at 150rpm. Find velocity and acceleration of piston and angular velocity and angular acceleration of connecting rod when the crank makes an angle of 30° to IDC. Use Relative velocity and acceleration method.

(2) The crank and connecting rod of a steam engine are 0.5m and 2m long respectively. The crank makes 180rpm in clockwise direction. When it has turned through 45° from IDC, Find the velocity of piston and angular velocity of connecting rod by relative velocity method

(3) In a four bar chain ABCD link AD is fixed and is 200mm long. The crank AB is 60mm long and rotates at 120 rpm clockwise while the CD 100mm long oscillates about D. BC and AD are of equal length. Find the angular velocity of link CD, when angle BAD = 60 degrees.

Chapter 3- Cams and Followers

Questions for 2 marks

- 1) Define the following terms with one example
 - i) Pitch Circle
 - ii) Pressure Angle
 - iii) Lift of follower
- 2) State the advantages of roller follower over knife edge follower
- 3) Give classification of followers and explain any one

Questions for 4 marks

- (1) Draw the profile of cam to give uniform velocity motion during outstroke of 40mm to a roller follower of diameter 20mm during the first half of cam rotation. The return of the cam takes place with SHM during remaining half of cam rotation. Draw the displacement diagram
- (2) Draw the profile of cam to raise a valve with SHM through 45mm in 1/4th of revolution, keep it fully raised through 1/10th revolution and to lower it with uniform acceleration and retardation in 1/6th revolution. The minimum radius of cam is 40mm. The axis of valve passes through axis of the cam shaft. Consider knife edge follower.
- (3) Draw the profile of a cam operating a roller reciprocating follower having a lift of 40mm. The roller diameter is 20mm. The minimum radius of cam is 30mm. The cam raises the follower with SHM for 110 degree of its rotation followed by a period of dwell for 80 degree. The follower descend for next 120 degree rotations of cam follower with uniform velocity followed by dwell period.

