

**D 90176**

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Name

Reg. No.



**FIFTH SEMESTER B.TECH. (ENGINEERING) [09 SCHEME] DEGREE  
EXAMINATION, NOVEMBER 2015**

**ME/PTME/AM/MT 09 505—MECHANICS OF MACHINERY**

Time : Three Hours

Maximum : 70 Marks

**Part A**

*Answer all the questions.*

1. Define Degree of Freedom and give the DOF for a shaft in a circular hole.
2. What is Corioli's component of acceleration ?
3. Define the term pressure angle of a cam mechanism.
4. What is worm gear drive ? Explain with a sketch.
5. What is path generation ?

(5 × 2 = 10 marks)

**Part B**

*Answer any four questions.*

1. Explain about straight line mechanism.
2. Explain the different types of joints in a chain.
3. Explain about cylindrical cams and spherical cams with neat sketch.
4. Write a note on polynomial cams.
5. What are the advantages of epicyclic gearing ?
6. Explain overlay method.

(4 × 5 = 20 marks)

**Part C**

*Answer all the questions.*

1. (a) Give step-by-step method of design of a crank-rocker mechanism. The inputs parameters, the graphical or analytical and also the verification of design are to be included.

*Or*

- (b) Two shafts are connected by means of a Hooke's joint. The angle between the shafts is 20°. What will be the angle turned by the driving shaft when ?
  - (i) Velocity ratio is maximum, minimum and unity.
  - (ii) Acceleration of the driven shaft is maximum and zero.

**Turn over**

2. (a) A cam drives a flat reciprocating follower in the following manner. During first  $120^\circ$  rotation of the cam, follower moves outwards through a distance of 20 mm with SHM. The follower dwells during next  $30^\circ$  of the cam rotation. During next  $120^\circ$  of cam rotation, the follower moves inwards with SHM. The follower dwells for next  $90^\circ$  of cam rotation. The minimum radius of the cam is 25 mm. Draw the profile of the cam.

*Or*

- (b) Construct a tangent cam and mention the important terminologies on it. Also derive the expressions for displacement, velocity acceleration of a reciprocating roller follower when the roller has contact with the nose.
3. (a) In an epicyclic gear train, the internal wheels A and B and compound wheels C and D rotate independently about axis O. The wheels E and F rotates on pins fixed to the arm G. E gears with A and C and F gears with B and D. All the wheels have same module and the number of teeth are :
- (i) Sketch the arrangement ; (ii) Find the number of teeth on A and B ; (iii) If the arm G makes 100 r.p.m. clockwise and A is fixed, find the speed of B and (iv) If the arm G makes 100 r.p.m. clockwise and wheel A makes 10 r.p.m. counter clockwise ; find the speed of wheel B.

*Or*

- (b) The number of teeth on each of the two equal spur gears in mesh are 40. The teeth have  $20^\circ$  involute profile and the module is 6 mm. If the arc of contact is 1.75 times the circular pitch find the addendum.
4. (a) Explain in brief about graphical synthesis of four bar mechanism.

*Or*

- (b) Describe in brief about the method of designing a four bar mechanism as a function generation.

(4 × 10 = 40 marks)