

MVR COLLEGE OF ENGINEERING AND TECHNOLOGY :AUTONOMOUS

II B.Tech I Semester Regular Examinations : February 2023

KINEMATICS OF MACHINERY

(Mechanical Engineering)

Time :3 hours

Max.Marks:70

Answer any five Questions one Question from Each Unit**All Questions Carry Equal Marks****UNIT -I**

- 1 A) What is Kinematic Pair? Classify Kinematic Pairs On the basis of the nature of relative motion? 7M
- B) Define Grashof's Law? State how is it helpful in classifying the four-link mechanisms into different types?. 7M

OR

- 2 A) Explain the applications of Kutzbach criterion to plane mechanisms. 7M
- B) Identify the degrees of freedom for four bar mechanism, slider crank mechanism and five bar mechanism. 7M

UNIT -II

- 3 A) What is Hooke's universal coupling? 4M
- B) What is an automobile steering gear? What are its types? Which steering gear is preferred and why? Derive the condition for correct steering of an automobile? 10M

OR

- 4 A) How many types of straight line mechanisms are there? What type of straight line does grasshopper mechanism generate? 7M
- B) Explain Scott Russell mechanism through a neat sketch. Show that it generates a straight-line motion. What are the limitations of Scott Russell mechanism? 7M

UNIT -III

- 5 A) Derive the expression to determine the magnitude of the coriolis component of acceleration.? 7M
- B) Draw and explain the KLEIN's construction for the velocity diagram of a reciprocating engine mechanism? With this construction, how do you find the velocities of the piston and connecting rod in terms of the uniform angular velocity of the crank? 7M

OR

- 6 A) Discuss various types of kinematic links with examples? 7M
- B) What are the various types of motions of follower motion? Among all which motion of follower is best, justify it? 7M

UNIT -IV

- 7 A) Explain various types of follower motions used in cam mechanisms? 7M
- B) Explain in Detail about 7M
1. Creep in a belt
 2. Centrifugal tension,
 3. Slip in the belt.

OR

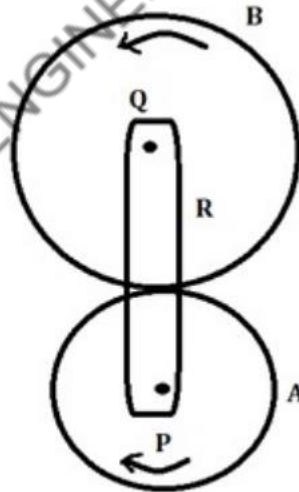
- 8 A) A Cam operating a knife edged follower has the following data: 7M
- Follower moves outwards through 40 mm during 60° of Cam rotation.
 - Follower dwells for the next 45° .
 - Follower returns of its original position during next 90° .
 - Follower dwells for the rest of the rotation.

The displacement of the follower is to take place with SHM during both the outward and return strokes. The least radius of the Cam is 50 mm. Draw the profile of the Cam when the axis of the follower is offset 20 mm towards right from the Cam axis. If the Cam rotates at 300 rpm, determine maximum velocity and acceleration of the follower during the outward stroke and the return stroke.

- B) What material is used for V belt drive? Explain the different types of V belt drives? 7M

UNIT -V

- 9 A) State law of gearing, define and explain the term (with the help of a neat sketch) path of approach, path of recess and path of contact between two mating gears. 7M
- B) A simple epicyclic gear train is shown in the figure. Deduce from fundamentals, the expression for velocity ratio of the gear train. 7M



OR

- 10 A) Two spur gear wheels with 18 and 26 teeth gear together. The addendum of each wheel is equal to one module, and pressure angle is 20° . Find the length of the arc of contact. 7M
- B) Classify gear trains and Explain about automotive deferential? 7M