



R17 Regulation

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous, Accredited by NAAC with 'A' Grade)

Subject code: 1P3CC

B.Tech II Year I Semester Supplementary Examinations, February 2021
Kinematics of Machinery
(Mechanical Engineering)

Maximum Marks: 70

Date: 24.02.2021 Duration: 3 hours

- Note:
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

- 1 What is the difference between Mechanism, Machine, and Structure?
- 2 When does a kinematic chain become a: i) Structure, ii) Incompletely constrained
- 3 What is relative velocity in mechanisms.
- 4 Define Instantaneous center of rotation.
- 5 Write the main advantage and the main limitation of the Hart mechanism over the Peaucellier mechanism.
- 6 List the advantages and disadvantages of Davis steering gear.
- 7 Define Cam, and explain its use.
- 8 Compare Roller and mushroom follower of a cam.
- 9 What do you understand by the term 'interference' as applied to gears?
- 10 What is a differential gear? Where is it used?

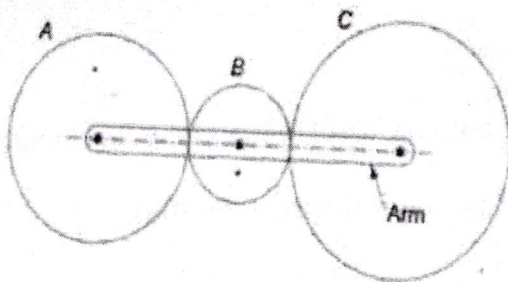
Part-B

Answer All the following questions.

(10M X 5=50Marks)

- 11 a) Explain different types of Links. (5M)
b) Classify and explain the Kinematic pairs. (5M)
OR
- 12 What are quick return mechanisms? Where are they used? Discuss the functioning of any one of them. (10M)
- 13 What is coriolis component of acceleration? How is it determined? (10M)
OR
- 14 Consider a reciprocating engine mechanism in which the crank OA rotates at 100 rpm clockwise, and OA has turned through 40° from its IDC position. The crank length is 40 mm, and the connecting rod is 100 mm long. Find analytically the linear velocity and acceleration of the piston, and the angular velocity and angular acceleration of the connecting rod. (10M)
- 15 Draw a neat sketch of the Peaucellier straight line motion mechanism, and prove that it produces an exact straight line motion. (10M)
OR

- 16 Draw a neat sketch of the Robert's mechanism, and explain its working. How do you find the location of the (tracing) point P which produces the approximate straight line motion? (10M)
- 17 cam operating a knife - edged follower has the following data:
 (i) Follower moves outwards through 40mm during 60° of cam rotation.
 (ii) Follower dwells for the next 45° .
 (iii) Follower returns of its original position during next 90° .
 (iv) Follower dwells for the rest of the rotation.
 The displacement of the follower is to take place with simple harmonic motion during both the outward and return strokes. The least radius of the cam is 50mm. Draw the profile of the cam when the axis of the follower is offset 20mm towards right from the cam axis. If the cam rotates at 300 r.p.m., determine maximum velocity and acceleration of the follower during the outward stroke and the return stroke. (10M)
- OR
- 18 Explain various types of follower motions used in cam mechanisms. (10M)
- 19 a) Define the 'Law of Gearing'. Derive the expression for the same. (5M)
 b) 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. (5M)
- OR
- 20 In an epicyclic gear train, as shown in figure , the number of teeth on wheels A, B, and C are 50, 25, and 52 respectively. If the arm rotates at 420rpm cw, find
 (a) speed of wheel C when A is fixed, and
 (b) speed of wheel A when C is fixed. (10M)



Figure