



R20 Regulation

Subject code: 3P4CC

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech IV Semester Supplementary Examinations, February 2024

Kinematics of Machinery
(Mechanical Engineering)

Maximum Marks: 70

Date: 21.02.2024

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 which carries 10M.
 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)		CO	Bloom Tx
1	Define Kinematic Pair.	CO1	L1
2	What are the applications of inversion of double slider crank chain mechanism?	CO1	L1
3	What are the methods for determining the velocity of a body?	CO2	L1
4	Define displacement.	CO2	L1
5	Distinguish radial and cylindrical cams?	CO3	L2
6	What is meant by Simple Harmonic Motion?	CO3	L1
7	What is the advantage of a compound gear train over a simple gear train?	CO4	L1
8	Define Backlash.	CO4	L1
9	What are the functions of clutches?	CO5	L1
10	What is meant by initial tension in belts?	CO5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)			
11	A. Distinguish between incompletely constrained motion and successfully constrained motion with examples. (5M) B. Write the inversions of double slider crank mechanism and explain any two of them with neat sketches. (5M)	CO1	L2 L2
OR			
12	A. Explain Ackers Mechanism with neat sketch. (5M) B. Classify the pairs depending upon relative motion with neat sketches. (5M)	CO1	L2 L2
13	Determine the velocity of a point on a link by instantaneous centre method with sketch and how to find the number of instantaneous centre in a mechanism? (10M)	CO2	L3
OR			
14	In a four bar chain ABCD, AD is fixed and is 120 mm long. The crank AB is 30 mm long and rotates at 100 r.p.m. clockwise, while the link CD = 60 mm oscillates about D. BC and AD are of equal length. Find the angular velocity of	CO2	L4

	link CD when angle BAD = 60°. (10M)		
15	A. Explain Peaucellier exact straight line motion mechanism with neat sketch. (5M) B. Explain universal joint with sketch. (5M)	CO3	L2 L2
	OR		
16	What are the conditions for correct steering and explain with a neat sketch the working of Ackerman's steering gear. (10M)	CO3	L2
17	A cam operating a knife-edged follower has the following data: a) Follower moves outwards through 40 mm during 60° of cam rotation. b) Follower dwells for the next 45°. c) Follower returns to its original position during next 90°. (d) Follower dwells for the rest of the rotation. The displacement of the follower is to take place with uniform velocity during both the outward and return strokes. The least radius of the cam is 50 mm. Draw the profile of the cam when (i) the axis of the follower passes through the cam axis (ii) the axis of the follower is offset by 18mm towards right from the cam axis. (10M)	CO4	L4
	OR		
18	A. Explain with sketches the different types of followers. (5M) B. Write short notes on cams and explain any one type with sketch. (5M)	CO4	L2 L2
19	Write about spur gear terminology with sketch. (10M)	CO5	L2
	OR		
20	In an epicyclic gear train, an arm carries two gears A & B having 24 & 30 teeth respectively. The arm rotates at 100 rpm in the clockwise direction. Find the speed of the gear B on its own axis, when the gear A is fixed. If instead of being fixed, the wheel A rotates at 200 rpm in the counter clockwise direction, what will the speed of B? (10M)	CO5	L4