



R18 Regulation

Subject code:2P3CC

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY
Innovative in Character, International in Excellence

B.Tech III Semester Supplementary Examinations, December 2024

KINEMATICS OF MACHINERY

(Mechanical Engineering)

Maximum Marks: 70

Date:06.12.2024

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	Distinguish between a machine and mechanism.	1	L1
2	Define kinematic link and kinematic chain.	1	L1
3	State and explain Kennedy's theorem.	2	L1
4	Define coriolis component of acceleration.	2	L1
5	What is pantograph?	3	L1
6	What is the use of steering gear mechanism in automobiles?	3	L1
7	Define angle of ascent and angle of dwell.	4	L1
8	What are the different types of follower motions used in cam-follower mechanism?	4	L1
9	Write the types of follower motions?	5	L1
10	Define gear velocity ratio.	5	L1

Part-B

Answer All the following questions: (5X10M=50Marks)		CO	Bloom Tx
11	Define Inversion. Sketch and explain the inversions of a four bar mechanism [10M]	1	L2
OR			
12	Describe with a neat sketch the working of an Elliptical trammel is an inversion of double slider crank chain. Prove that the path traced by a link of the mechanism is an ellipse. [10M]	1	L2
13	In a pin pointed four bar mechanism, AB=300mm, BC=CD=360mm and AD=600mm long and AD is fixed. The angle BAD=60°. The crank AB rotates uniformly at 100rpm. locate all the Instantaneous centers and find the angular velocity of the link BC. [10M]	2	L2
OR			
14	In a four bar mechanism ABCD.AD is fixed and 120mm long. The crank AB is 30mm long and rotates at 100 rpm Clockwise, while the link CD=60mm oscillates about D. Find the angular velocity and angular acceleration of link CD. When angle BAD=60°. [10M]	2	L2

15	(a) Derive the condition for correct steering. If the correct steering condition is not satisfied, then what happens? [5M] (b) Write the differences between Davis steering gear mechanism and Ackermann's steering gear mechanism. [5M]	3	L2
OR			
16	Define straight line motion mechanism. And explain Hart's mechanism with a neat sketch. [10M]	3	L2
17	A cam rotation with uniform speed is required to give the following motion to a knife edged follower The outstroke of the follower is 40 mm for 60° of cam rotation Dwell period for next 30° of cam rotation The return stroke during next 60° of cam rotation Dwell period for the remaining 210° of cam rotation. The minimum radius of cam is 50 mm. The follower moves with uniform velocity for both outstroke and return stroke. Draw the cam profile when the follower passes through the axis of cam shaft. [10M]	4	L2
OR			
18	The following data relate to a cam operating an oscillating roller follower: Minimum radius of cam = 44mm. Diameter of roller = 14mm, Length of the follower arm = 40mm. Distance of fulcrum centre from cam centre = 50mm, Angle of ascent = 75°, Angle of descent = 105°, Angle of dwell for follower in the highest position = 60°, Angle of oscillation of follower = 28°. Draw the profile of the cam if the ascent and descent both take place with SHM [10M]	4	L2
19	Explain Terminology used in Gears (minimum 15 terms). [10M]	5	L2
OR			
20	In an epicyclic gear train, the internal gears A and B and compound gears C and D rotate independently about point O. All the gears have same module and the number of teeth for gears C=28, D=26, E=F=18. The gears E and F rotate on pins fixed to the arm G. Gear E meshes with gear A and C whereas gear F meshes with B and D. Sketch the arrangement and find [10M] i) Number of teeth on gears A and B ii) Speed of gear B if arm G makes 200 rpm clockwise and gear A is fixed. iii) Speed of gear B if arm G makes 200 rpm clockwise and gear A makes 20 rpm in anticlockwise direction.	5	L2