



R18 Regulation

Subject code:2P3CC

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech III Semester Supplementary Examinations, December 2025

KINEMATICS OF MACHINERY

(ME)

Maximum Marks: 70

Date:19.12.2025

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)		Marks	CO	BTL
1	Distinguish between a machine and mechanism. How do they differ?	2M	1	L1
2	Define kinematic link, kinematic pair and kinematic chain.	2M	1	L1
3	State and explain Kennedy's theorem.	2M	2	L1
4	Define coriolis component of acceleration and explain	2M	2	L1
5	What is pantograph? Give any two applications of pantograph.	2M	3	L1
6	What is the use of steering gear mechanism in automobiles? And what is the condition for correct steering?	2M	3	L1
7	Define angle of ascent, angle of descent and angle of dwell.	2M	4	L1
8	What are the different types of follower motions used in cam-follower mechanism?	2M	4	L1
9	Define Helix angle, lead angle, Axial pitch and transverse pitch.	2M	5	L1
10	Explain the principle of working of an epicyclic gear train.	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
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? b) Write the differences between Davis steering gear mechanism and Ackermann's steering gear mechanism.	5M 5M	3	L2
OR				
16	Explain in detail single and double Hook's joint.	10M	3	L2
17	a) Define Cam& Explain classification of Cams. b) Draw Displacement, Velocity & Acceleration diagrams when the follower moves with uniform Acceleration & Retardation	5M 5M	4	L2
OR				
18	A knife edge follower with its axis 10 mm offset to the right of the axis of a cam. The follower rises with uniform acceleration and retardation during 120° of cam rotation. The dwell period for next 30° of cam rotation. First half of fall takes place with SHM and second half with uniform velocity during 120° of cam rotation. The remaining is dwell period for 90°. The minimum radius of the cam is 30 mm. Lift of the follower is 40 mm. Draw the profile of cam for the given motion.	10M	4	L2
19	Derive a relation for minimum number of teeth on the gear wheel and pinion to avoid interference.	10M	5	L2
OR				
20	a) Give a condition for constant velocity Ratio of Toothed wheel-Law of Gearing. b) A pinion having 20 teeth of involutes form, 20° pressure angle, and 6mm module drive a gear having 40 teeth , If addendum = module. Find (a) addendum radius and pitch circle radius of two gears (b) length of path of contact (c) arc of contact.	5M 5M	5	L2