

R18 Regulation



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

Subject code: 2P3CC

B.Tech III Semester Supplementary Examinations, February 2024
KINEMATICS OF MACHINERY
(ME)

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	BTL
1	Define Grashof's law.	CO1	L1
2	Distinguish between synthesis and analysis of mechanisms.	CO1	L2
3	What is the use of configuration diagram?	CO2	L1
4	What are the expressions for centripetal and tangential component of acceleration?	CO2	L1
5	Differentiate between Davis and Ackerman steering gears.	CO3	L2
6	What is an approximate straight-line motion mechanism?	CO3	L1
7	Define pressure angle with respect to cams.	CO4	L1
8	What is meant by Simple Harmonic Motion?	CO4	L1
9	State law of gearing.	CO5	L2
10	Applications of epicyclic gear trains.	CO5	L2

Part-B

Answer All the following questions. (5X10M=50Marks)		CO	BTL
11	Explain any two inversions of single slider crank mechanism with neat sketch.	10M	CO1 L2
OR			
12	Explain the Classification of Kinematic Pairs with Suitable examples.	10M	CO1 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	CO2 L3
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	CO2 L3
15	Explain Davis Steering Gear Mechanism with a neat sketch	10M	CO3 L3
OR			

16	Explain Hart's mechanism with neat sketch?	10M	CO3	L3
17	A cam with a minimum radius of 25 mm and roller diameter 15mm rotating in clockwise direction with a uniform speed of 100 rpm is to be designed to give the motion for a roller follower as follows. (i) To raise through 50 mm during 120° rotation of cam with SHM. (ii) Fully raised through next 30°. (iii) To lower during next 60° with uniform acceleration and uniform retardation . (iv) Dwell for the remaining period. Draw the profile of the cam when the line of stroke of the follower is offset by 10 mm from the axis of the camshaft.	10M	CO4	L4
	OR			
18	Derive an expression for velocity and acceleration of the follower when it moves with the simple harmonic motion with neat sketch.	10M	CO4	L3
19	A pinion of 20 degree involute teeth rotating at 275 rpm meshes with a gear and provides a gear ratio of 1.8. The number of teeth on the pinion is 20 and the module is 8mm. If the interference is just avoided, determine (i) addendum on the wheel and the pinion (ii) the path of contact, and (iii) the maximum velocity of sliding on both sides of the pitch point.	10M	CO5	L3
	OR			
20	The arm of an epicyclic gear train rotates at 100 rpm in anticlockwise direction. The arm carries two wheels A and B having 36 and 45 teeth respectively. When wheel A is fixed and the arm rotates about the centre of wheel A, determine the speed of wheel B. Also determine the speed of wheel B, if the wheel A makes 200 rpm clockwise.	10M	CO5	L3