Q.P.Code: 23ME0310 | R23 | H.T.No. | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech.II Year II Semester Regular Examinations July/August-2025

THEORY OF MACHINES

(Mechanical Engineering)

Time: 3 Hours **Max. Marks: 70**

PART-A

(Answer all the Questions **10 x 2 = 20** Marks)

1	a	Explain about Universal joint.	CO1	L2	2M
	b	Write short notes on Transmission angle	CO1	L1	2M
	c	What is Coincident point in motion analysis?	CO2	L1	2M
	d	Explain Coriolis component of acceleration.	CO2	L2	2M
	e	Explain principle behind the gyroscope.	CO3	L2	2M
	f	Name two common applications of gyroscopes in modern technology.	CO3	L1	2M
	g	What is the "pitch curve" in a cam profile?	CO5	L1	2M
	h	What is a cam profile?	CO5	L1	2M
	i	Define amplitude in the context of vibration.	CO6	L1	2M
	j	Explain Co-efficient of fluctuation of energy.	CO6	L2	2M

PART-B

(Answer all Five Units **5 x 10 = 50** Marks)

UNIT-I

2		Explain the classification of the kinematics pairs in detail with neat sketch.	CO1	L2	10M

OR

3		What are the practical applications of inversions of the single slider crank chain? Explain all with neat sketch.	CO1	L1	10M

UNIT-II

4		In a four bar chain ABCD, AD is fixed and is 150 mm long. The crank AB is 40mm long and rotates at 120 r.p.m. clockwise, while the link CD = 80 mm oscillates about D. BC and AD are of equal length. Find the angular velocity of link CD when angle BAD = 60°.	CO2	L3	10M

OR

5		Explain with sketch the instantaneous centre method for determination of velocities of links and mechanisms.	CO2	L2	10M

UNIT-III

6		State and prove the law of gearing. Show that involute profile satisfies the conditions for correct gearing.	CO4	L5	10M

OR

7	a	Explain the effect of Gyroscopic couple on a Naval ship during pitching.	CO3	L2	5M
	b	An aircraft makes a half circle of 50 m radius towards left, when flying at 200 km/hr. The engine and the propeller of the plane has a mass of 400 kg and a radius of gyration of 0.3 m. The engine rotates at 2400 rpm clockwise when viewed from the rear. Find the gyroscopic couple and its effect on the aircraft.	CO3	L3	5M

UNIT-IV

8	Four masses m1, m2, m3, and m4 are 200 kg, 300 kg, 240 kg and 260 kg respectively. The corresponding radii of rotation are 0.2 m, 0.15 m, 0.25 m and 0.3 m respectively and the angles between successive masses are 45°, 75° and 135°. Find the position and magnitude of the balance mass required, if its radius of rotation is 0.2 m.	CO5	L3	10M
	OR			
9	A, B, C and D are four masses carried by a rotating shaft at radii 100, 125, 200 and 150 mm respectively. The planes in which the masses revolve are spaced 600 mm apart and the mass of B, C and D are 10 kg, 5 kg, and 4 kg respectively. Find the required mass A and the relative angular settings of the four masses so that the shaft shall be in complete balance	CO5	L3	10M

UNIT-V

10	The measurements on a mechanical vibrating system show that it has a mass of 8 kg and that the springs can be combined to give an equivalent spring of stiffness 5.4 N/mm. If the vibrating system have a dashpot attached which exerts a force of 40 N when the mass has a velocity of 1 m/s, find : 1. critical damping coefficient, 2. damping factor, 3. Logarithmic decrement, and 4. ratio of two consecutive amplitudes.	CO6	L3	10M
	OR			
11	A shaft of length 0.75 m, supported freely at the ends, is carrying a body of mass 90 kg at 0.25 m from one end. Find the natural frequency of transverse vibration. Assume E = 200 GN/m2 and shaft diameter = 50 mm.	CO6	L3	10M

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