PVP 23

Code: 23ME3403

II B.Tech - II Semester – Regular Examinations - MAY 2025

THEORY OF MACHINES
(MECHANICAL ENGINEERING)

Duration: 3 hours Max. Marks: 70

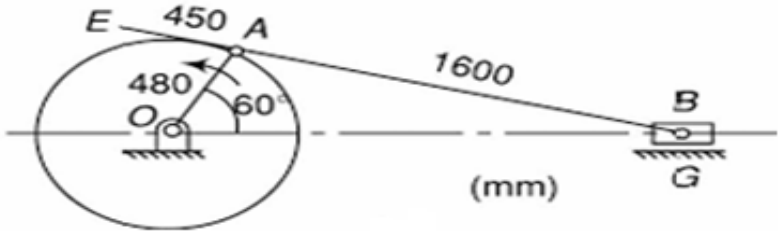
Note: 1. This question paper contains two Parts A and B.
2. Part-A contains 10 short answer questions. Each Question carries 2 Marks.
3. Part-B contains 5 essay questions with an internal choice from each unit. Each Question carries 10 marks.
4. All parts of Question paper must be answered in one place.

BL – Blooms Level CO – Course Outcome

PART – A

		BL	CO
1.a)	What is the degree of freedom of a mechanism?	L2	CO1
1.b)	Classify different types of constrained motion?	L2	CO1
1.c)	What is the Coriolis component of acceleration?	L2	CO1 CO2
1.d)	State kennedy's theorem.	L1	CO1 CO2
1.e)	Explain about interference.	L2	CO1 CO3
1.f)	Explain about a Gear train.	L2	CO1 CO3
1.g)	Explain about Dynamic balancing.	L2	CO1 CO4
1.h)	What is pressure angle in Cam?	L2	CO1 CO4
1.i)	Explain about coefficient of fluctuation of energy.	L2	CO1 CO5
1.j)	What is damping coefficient?	L2	CO1 CO5

PART – B

			BL	CO	Max. Marks
UNIT-I					
2	a)	Classify kinematic pairs with a neat sketch.	L2	CO1	6 M
	b)	Sketch any two inversions of single slider crank chain.	L2	CO1	4 M
OR					
3	a)	Explain any one of the approximate straight line mechanisms.	L2	CO1	5 M
	b)	What is a Hook's joint and where is it used?	L2	CO1	5 M
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. Calculate the angular velocity of link CD when angle BAD = 60° by instantaneous center method.	L3	CO1 CO2	10 M
OR					
5		For configuration of slider-crank mechanism shown, calculate acceleration of Slider B. 	L3	CO1 CO2	10 M

UNIT-III					
6	a)	Classify different types of gear trains.	L2	CO1 CO3	6 M
	b)	State law of gearing.	L2	CO1 CO3	4 M
OR					
7		An aeroplane flying at 240 km/hr turns towards the left and completes a quarter circle of 60 m radius. The mass of the rotary engine and the propeller of the plane is 450 kg with a radius of gyration of 320 mm. The engine speed is 2000 rpm clockwise when viewed from the rear. Determine the gyroscopic couple on the aircraft and state its effect.	L3	CO1 CO4	10 M
UNIT-IV					
8		A shaft carries four masses A, B, C and D of magnitude 200 kg, 300 kg, 400 kg and 200 kg respectively and revolving at radii 80 mm, 70 mm, 60 mm and 80 mm in planes measured from A at 300 mm, 400 mm and 700 mm. The angles between the cranks measured anticlockwise are A to B 45°, B to C 70° and C to D 120°. The balancing masses are to be placed in planes X and Y. The distance between the planes A and X is 100 mm, between X and Y is 400 mm and between Y and D is 200 mm. If the balancing masses revolve at a radius of 100 mm, find their magnitudes and angular positions.	L3	CO1 CO4	10 M

OR					
9	Explain with sketches the different types of cams and followers.		L2	CO1 CO3	10 M
UNIT-V					
10	a)	Derive natural frequency of free longitudinal vibrations.	L2	CO1 CO5	5 M
	b)	A vibrating system consists of a mass of 200 kg, a spring of stiffness 80 N/mm and a damper with damping coefficient of 800 N/m/s. Determine the frequency of vibration of the system.	L3	CO1 CO5	5 M
OR					
11	Explain and Draw Turning moment diagram of steam engine.		L2	CO1 CO4	10 M