

Fourth Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026 Theory of Machines

Time: 3 hrs.

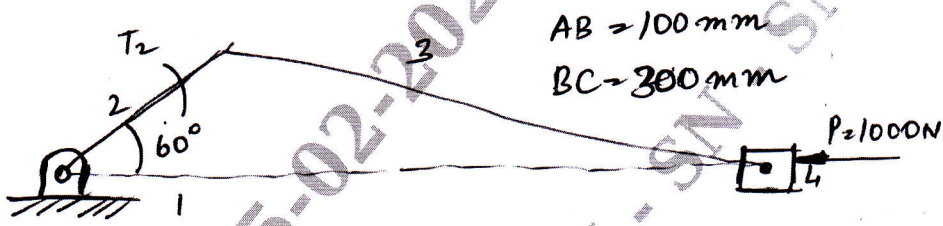
Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.

2. M : Marks, L: Bloom's level, C: Course outcomes.

Module - 1			M	L	C
Q.1	a.	Explain the following : i) Single Slider Crank Mechanism ii) Double Slider Crank Mechanism	10	L2	CO1
	b.	Explain the following : i) Kinematic Link ii) Rigid Link iii) Flexible Link iv) Kinematic Pair v) Inversion of Mechanism	10	L2	CO1
OR					
Q.2	a.	Explain the following with respect to mechanism: i) Linear Velocity ii) Linear Acceleration iii) Angular Velocity iv) Angular Acceleration v) Relative Velocity	10	L2	CO2
	b.	A 4-bar mechanism ABCD is made up of 4 links pin jointed at ends. AD is fixed with 180 mm long. Links AB, BC and CD are 90 mm, 120 mm and 120 mm. At certain instant AB makes 60° with AD. If AB rotates at a uniform speed of 100 rpm clockwise, determine angular velocity of BC and CD. Also calculate angular acceleration.	10	L3	CO2
Module - 2					
Q.3	a.	Explain the following with neat sketch: i) Circular Pitch ii) Diametral Pitch iii) Module iv) Clearance v) Backlash	10	L2	CO3
	b.	Two spur gears A and B of an epicyclic gear train is as shown below Fig.Q3(b). They have 24 and 30 teeth respectively. The arm rotates at 100 rpm clockwise. Find the speed of gear B on its own axis when gear A is fixed. If instead of A being fixed, it rotates at 200 rpm, counter clockwise, what will be speed of B. Fig.Q3(b)	10	L3	CO3
OR					
Q.4	a.	Write a brief explanation regarding classifications of followers with figures.	10	L2	CO2
	b.	Classify Cams with figures.	10	L2	CO2

Module – 3

Q.5	a.	Explain the following : i) Equilibrium ii) Equilibrium of 2 force members iii) Equilibrium of three force members iv) Equilibrium of 2 forces and a torque v) Equilibrium of 4 force members	10	L2	CO4
	b.	A slider crank mechanism is as shown in below Fig.Q5(b). Force applied to piston is 1000 N when the crank is at 60° from IDC. Calculate driving torque.  Fig.Q5(b)	10	L3	CO4

OR

Q.6	a.	When the crank is 45° from the IDC on the downward stroke, the effective steam pressure on the piston of a vertical steam engine is 2.5 bar. Diameter of the cylinder = 0.75 m, Stroke of the piston = 0.50 m and length of connecting rod = 1 m. Determine the torque on the crank shaft, if engine runs at 350 rpm. Mass of the reciprocating part is 200 kg.	10	L3	CO4
	b.	Explain with figure the inertial forces on an engine mechanism (slider crank).	10	L2	CO4

Module – 4

Q.7	a.	Derive the equations for energy stored in a flywheel.	10	L3	CO4
	b.	Explain the turning moment diagrams for a four stroke IC engine.	10	L2	CO4

OR

Q.8	a.	Explain the classification of Governors.	10	L2	CO4
	b.	Each arm of a porter governor is 300 mm long and is pivoted on the axis of the governor. Each ball has a mass of 6 kg and sleeve mass is 18 kg. Radius of rotation of ball is 200 mm when the governor begins to lift and 250 mm when the speed is max. Determine the max and min speed and range of the speed.	10	L3	CO4

Module – 5

Q.9	a.	Explain the types of friction and the laws of friction.	10	L2	CO4
	b.	Derive equations for frictional force and torque for flat pivot bearings.	10	L3	CO4
OR					
Q.10	a.	Derive equation for length of open belt drive.	10	L3	CO4
	b.	Explain the materials used for belts and slip in belts.	10	L2	CO4
