CBCS SCHEME - Make-Up Exam

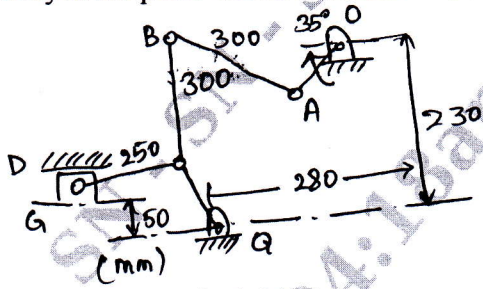
USN | | | | | | | | | | |

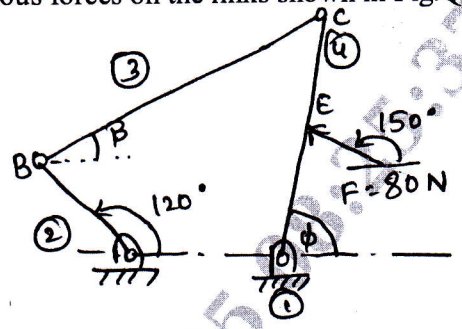
BAU401

Fourth Semester B.E./B.Tech. Degree Examination, June/July 2025
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.	Define kinematic pair and explain its types with examples.	10	L2	CO1
	b.	Write a note on single slider crank chain and double slider crank chain.	10	L1	CO1
		OR			
Q.2	a.	Fig.Q.2(a) shows a mechanism in which OA = QC = 100 mm, AB = QB = 300 mm and CD = 250 mm. The crank OA operates at 150 rpm in the clockwise direction. Determine: i) Velocity of the slider ii) Angular velocity of links QB and AB iii) Rubbing velocity at the pin B which is 40 mm in diameter.  Fig.Q.2(a)	10	L2	CO2
	b.	Explain velocity and acceleration graphical analysis of four bar mechanism.	10	L2	CO1
		Module – 2			
Q.3	a.	With suitable sketch, explain gear terminology.	10	L2	CO2
	b.	State and explain the law of gearing.	10	L2	CO2
		OR			
Q.4	a.	The following data relate to a cam profile in which the follower moves with uniform acceleration and deacceleration during ascent and descent. Minimum radius of cam = 25 mm, roller diameter = 7.5 mm, lift = 28 mm, offset of follower axis 12 mm towards right, Angle of Ascent = 60°, Angle of descent = 90°, Angle of dwell between ascent and descent = 45° speed of the cam = 200 rpm. Draw the profile of the cam and determine the maximum velocity and the uniform acceleration during the outstroke and the return stroke.	16	L3	CO2
	b.	List the types of cams.	4	L1	CO2

		Module – 3			
Q.5	**a.**	Determine the various forces on the links shown in Fig.Q.5(a).  Fig.Q.5(a)	**16**	**L3**	**CO3**
	b.	State the static equilibrium with equation.	**4**	**L2**	**CO3**
		OR			
Q.6	**a.**	Explain D'Alemberts principle.	**8**	**L1**	**CO3**
	b.	Derive an expression for inertia of the connecting rod.	**12**	**L2**	**CO3**
		Module – 4			
Q.7	**a.**	Derive an expression for stiffness of a Hartnell governors.	**10**	**L2**	**CO4**
	b.	The upper arms of a portar governor are pivoted to the axis of rotation. The length of the arm is 40 cm, the lower arm pivoted on the sleeve at a distance of 2 cm from the axis, there length is 30 cm of each ball is 5 kg the sleeve mass is 50 kg. Determine the equilibrium speed for the radius of rotation of 20 cm and also the effort and power for 1% speed change.	**10**	**L3**	**CO4**
		OR			
Q.8	**a.**	What are the differences between fly-wheel and governors?	**8**	**L3**	**CO4**
	b.	Derive the equation for size of fly wheel or Hoop stress developed in a flywheel.	**12**	**L3**	**CO4**
		Module – 5			
Q.9	**a.**	Derive the equation of total frictional torque flat color bearing by considering uniform pressure.	**10**	**L2**	**CO5**
	b.	Explain the types of friction and mention the laws of friction.	**10**	**L1**	**CO5**
		OR			
Q.10	**a.**	Derive an expression for length of open belt drive.	**12**	**L2**	**CO5**
	b.	Two parallel shafts connected by a cross belt, are provided with pulleys 480 mm and 640 mm in diameter, the distance between centre lines of the shaft is 3m. Find by how much the length of the belt should be changed if it is desired to alter the direction of rotation of the driven shaft.	**8**	**L4**	**CO5**

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