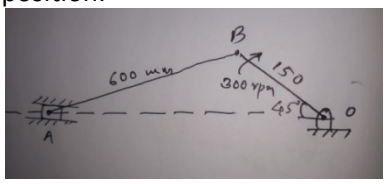
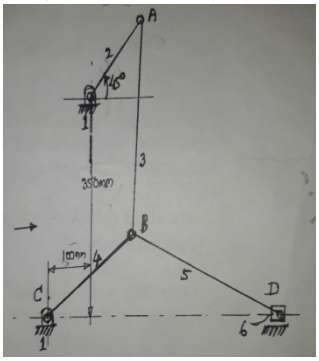
Model Question Paper with effect from 2019-20(CBCS Scheme)

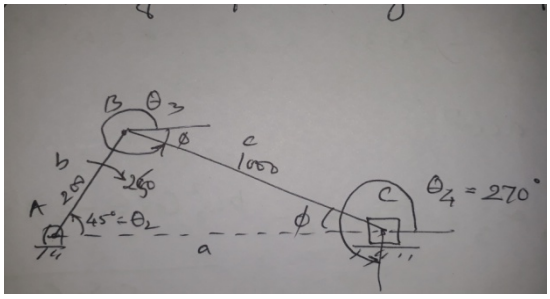
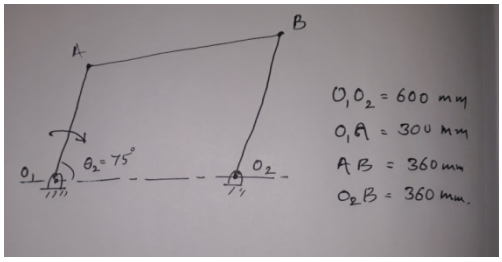
USN | | | | | | | | | | |

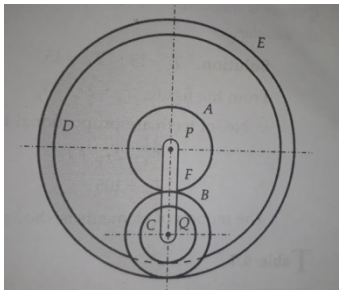
Fourth Semester B.E. Degree Examination
Kinematics of Machines

TIME : 03 Hours Max. Marks : 100

Note: 01. Answer any **FIVE** full questions, choosing **ONE** question from each **MODULE**

		Module-1	**Bloom's Texanomy Level**	**Marks**
Q.01	a	Distinguish between: i) Higher pair and lower pair ii) Kinematic pair and kinematic chain	L1	08
	b	Sketch and explain the single slider crank mechanism. Explain with neat sketches, any two of inversions.	L1	12
Q.02	a	Sketch and explain the working of elliptical trammel. Prove it traces an ellipse.	L1	08
	b	Sketch and explain two of intermittent motion mechanism like Ratchet and Pawl & Geneva.	L1	12
		Module-2		
Q.03		The crank of a slider crank mechanism rotates at a constant speed of 300 rpm. The crank is 150 mm and the connecting rod is 600 mm long. Determine: angular velocity and angular acceleration of connecting rod, at a crank angle of 45o from inner dead center position.  Fig. Q. 4 a)	L3	20
Q.04	a	What are the Instantaneous centers of rotation, explain with different types.	L1	06
	b	Locate all I-centers for the mechanism shown in fig.Take OA = 180 mm, AB =360 mm, BC = 250 mm and BD = 540 mm.  Fig. Q. 4 b)	L3	14
		Module-3		
Q.05	a	Using complex algebra derive the expression for velocity and acceleration of the piston for an in-line slider crank mechanism.	L2	08
	b	For the mechanism shown N = 250 rpm, find:	L4	12

		i) Velocity of the piston and angular velocity of the connecting rod. ii) Acceleration of the piston and angular acceleration of connecting rod. 		
Q.06		For the Four Bar mechanism shown find angular velocity and acceleration of the coupler link and the follower. The crank rotates at 320 rpm c. w. 	L4	20
Module-4				
Q.07		The following data relate to cam profile in which the roller follower moves with UARM during ascent and descent. Minimum radius of cam = 40 mm Roller radius = 20 mm Lift = 30 mm Angle of ascent = 120^o Angle of descent = 120^o Angle of dwell between ascent and descent = 60^o Draw the profile of the cam.	L3	20
Q.08		Draw the profile of a cam operating a flat faced follower having a lift	L3	20

		of 25 mm. The cam raises the follower with SHM for 150° of the rotation followed by a period of dwell for 60°. The follower descends for the next 120° of the cam rotation with uniform UARM, again followed a dwell period. The cam rotates in c.w. sense at 200 rpm and has least radius of 25 mm. Determine maximum velocity and acceleration of the follower during the lift and descent.		
		Module-5		
Q.09	a	State and prove Law of gearing.	L1	08
	b	Two 20° involute spur gears mesh externally and give a velocity ratio of 3. Module is 3 mm and the addendum is equal to 1.1 module. If the pinion rotates at 120 rpm, determine: i) The minimum number of teeth on each wheel to avoid interference ii) The number of pairs of teeth in contact.	L4	12
Q.10		A compound epicyclic gear is shown in Fig. The gears A, D and E are free to rotate on the axis P. The compound gear B and C rotate together on the axis Q at the end of arm F. 	L3	20