

## Model Question Paper-2 with effect from 2019-20 (CBCS Scheme)

USN

--	--	--	--	--	--	--	--	--	--

### Fourth Semester B.E. Degree Examination Kinematics of Machines

**TIME: 03 Hours****Max. Marks: 100**

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

		*Blooms' Taxonomy Level	Marks
<b>Module -1</b>			
Q.01	a. Differentiate between: i) Machine and Mechanism ii) Kinematic chain and structure iii) Lower pair and Higher pair iv) Mobility and degree of freedom	L IV	08 Marks
	b. What is meant by inversion kinematic chain? Sketch a four-bar chain.	L I	03 Marks
	c. Mention the inversions of double slider crank chain and explain elliptical trammel with a neat sketch.	L II	09 Marks
<b>OR</b>			
Q.02	a. Explain with a neat sketch the kinematic link	L II	05 Marks
	b. Mention the inversions of single slider crank chain and explain any two of them with neat sketches	L V	15 Marks
<b>Module-2</b>			
Q. 03	a. Explain the construction and working of Peaucellier's mechanism with a neat sketch. Prove that it generates an exact straight line.	L V	10 Marks
	b. Explain the following mechanisms with suitable sketches: i) Draglink mechanism ii) Crank and slotted link mechanism	L V	10Marks
<b>OR</b>			
Q.04	a. Explain working of the following mechanisms with neat sketches: i) Ratchet and pawl mechanism ii) Toggle mechanism	L II	10 Marks
	b. Explain the following mechanisms with suitable sketches: i) Withworth mechanism ii) Robert's mechanism	L II	10 Marks
<b>Module-3</b>			
Q. 05	The Fig.Q.5 fourbar mechanism Crank $O_2A$ rotates at 200rpm and an angular acceleration of $150\text{rad/sec}^2$ at the instant when the crank makes an angle of $45^\circ$ to the horizontal, find the acceleration of points B and C, and angular velocities and angular acceleration of link 3 and 4	L VI	20 Marks

**OR**

- Q. 06 Fig Q.6 shows a crank and slotted level type quick return mechanism. The crank rotates at a uniform speed of 60rpm clock wise. The line of stroke of the ram is perpendicular to OA. Determine the velocity and acceleration of D L VI 20 Marks

**Module-4**

- Q. 07 a Explain interference in gears. Discuss the methods of avoiding interference in gear drives L I 10 Marks
- b Two 20° involute spur gears mesh externally and gives a velocity ratio of 3. Module is 3mm and the addendum is equal to 1.1 module. If the pinion rotates at 120rpm, determine:
- i) Minimum number of teeth on each wheel to avoid interference
  - ii) Number of pairs of teeth in contact.
- L V 10 Marks

**OR**

- Q. 08 An epicyclic gear is constructed as follows. A fixed annular wheel A and a smaller concentric wheel B are connected by a compound wheel A<sub>1</sub>-B<sub>1</sub>. A<sub>1</sub> gearing with A, B<sub>1</sub> gearing with B. The compound wheel revolves on a stud which is carried around an arm which revolves about the axis A and B. 'A' has 130 teeth, B = 20 teeth, B<sub>1</sub> = 80 teeth, pitch of A and A<sub>1</sub> being twice that of pitch of B and B<sub>1</sub>. How many revolutions B will make for one revolution of arm? L VI 20 Marks

**Module-5**

- Q. 09 a How are followers classified? explain with neat sketches. L II 10 Marks
- b Derive an expression for displacement, velocity, and acceleration diagrams when the follower moves with uniform acceleration and retardation. L V 10 Marks

**OR**

- Q. 10 A Cam with 3 cm as minimum radius is rotating clockwise at a uniform speed of 1200rpm and has to give the motion to the knife edge follower as defined below.
- i) Follower to move outward through 3 cm during 120° of Cam rotation with SHM.
  - ii) Dwell for the next 60°
  - iii) Follower to return to its starting position during the next 90° with UARM
  - iv) Dwell for the remaining period
- Draw the Cam profile.
- a) Follower axis passes through cam axis
  - b) Follower axis is offset to the right by 1 cm
- L VI 20 Marks

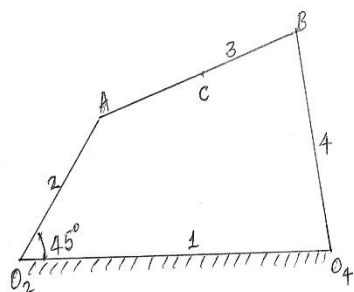


Fig. Q.5

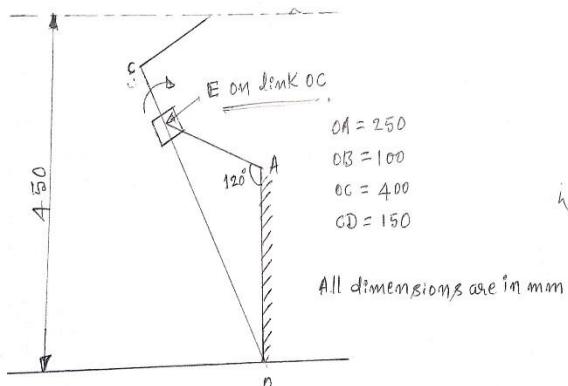


Fig. Q.6