

Enrolment Number: _____

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B.TECH MIDSEM EXAMINATION
3rd SEMESTER

Subject Name (Code): Kinematics and Theory of Machine (203109217)
Date: 08-08-2022

ACY-2022-23 (ODD SEM)

Time: 02:30 to 4:00 pm

Branch: Automobile/Mechanical

Total Marks: 40

Sr. No.	Marks
Q.1 (A)	05
1. If the degrees of freedom of a mechanism is zero, then it forms a a) structure b) statically indeterminate structure c) four bar mechanism d) none of the above	
2. A ball and socket joint is a a) sliding pair b) spherical pair c) lower pair d) Both b and c	
3. The motion of a square bar in a square hole is an example of a) completely constrained motion b) incompletely constrained motion c) partially (or successfully) constrained motion d) none of the above	
4. The linear velocity of a rotating body is given by the relation a) $v=rw$ b) $v=r/w$ c) $v=w/r$ d) none of the above	
5. The total number of instantaneous centers for a mechanism of n links is a) n b) n-1 c) $n(n-1)/2$ d) $n(n-1)/3$	
(B)	05
1. A double slider kinematic chain has _____ turning pairs and _____ sliding pairs.	
2. In a kinematic chain, a quaternary joint is equivalent to _____ binary joints.	
3. Define Lower Pair with example	
4. Define Higher pair with example	
3. Define Absolute Velocity.	
Q.2 Attempt any four(Short Questions)	12
(1) Define: Kinematics link, Kinematics pair, Kinematics Chain	
(2) Explain Kennedy's Theorem.	
(3) Explain Various types of constrained motion.	
(4) What is the degree of freedom in mechanism? How is it determined by Kutzbach's Criterion.	
(5) Explain types of instantaneous center of rotation.	
Q.3 Attempt any two	08
(1) Define "Inversion of Mechanism". Draw sketches of any two inversions of double slider crank mechanism.	

(2) A crank and slotted lever mechanism used in a shaper has a centre distance of 300 mm between the centre of oscillation of the slotted lever and the centre of Rotation of the crank. The radius of the cranks is 120 mm. Find the ratio of the Time of cutting to the time of return stroke.

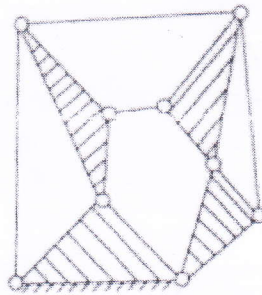
(3) In a pin jointed four bar mechanism, as shown in Fig. $AB = 300$ mm, $BC = CD = 360$ mm, and $AD = 600$ mm. The angle $BAD = 60^\circ$. The crank AB rotates uniformly at 100 r.p.m. Locate all the instantaneous centres and find the angular velocity of the link BC .

Q.4 (A) Explain porter governor with neat sketch.

05

(B) Find number of binary links, ternary links, quaternary link, number of loops, and degree of freedom of shown kinematic linkages.

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OR

(B) In a slider crank mechanism, the crank rotates in clockwise sense at a constant velocity of 300 rpm. The length of the crank is 150 mm and the connecting rod measures 600 mm long. Determine: linear velocity of the midpoint of the connecting rod when the crank angle is 45° from inner dead center.

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