

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-III (New) EXAMINATION – WINTER 2018

Subject Code: 2131906

Date: 12/12/2018

Subject Name: Kinematics of Machines

Time: 10:30 AM TO 01:00 PM

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		MARKS
Q.1	(a) Types of Constrained Motion.	03
	(b) Define:- Mechanism, higher Pair, Fluid Link, Kinematics	04
	(c) Explain Various Inversion of single Slider Kinematic Chain with Examples.	07
Q.2	(a) Derive freudenstein's equation.	03
	(b) Explain Velocity Analysis of a Slider Crank Mechanism.	04
	(c) Explain in brief Function, Path & Motion Generation.	07
	OR	
	(c) Explain synthesis of function generation.	07
Q.3	(a) Types of Instantaneous Centers.	03
	(b) What is Pantograph? Explain in Details of Pantograph.	04
	(c) What is straight line motion mechanism with neat sketch?	07
	OR	
Q.3	(a) Define: Circular pitch, Tooth thickness, Addendum.	03
	(b) Explain Law of Gearing with neat sketch.	04
	(c) Classification of Gears with Advantages & Disadvantages.	07
Q.4	(a) Explain with a neat sketch of the Differential Gear Box.	03
	(b) Explain Reverted gear Train with a neat sketch.	04
	(c) Two gear wheels of 10 cm and 15 cm pitch diameter have involute teeth of 1.6 DP and pressure angle 20° . The addenda are 3 mm. Determine (i) Length of path of contact (ii) Contact ratio (iii) angle turned by pinion, while any pair of teeth in contact.	07
	OR	
Q.4	(a) Types of Cams with Examples.	03
	(b) Explain in brief simple harmonic motion of follower.	04
	(c) A crank and rocker mechanism ABCD has the following dimensions. AB=0.75 m, BC=1.25 m, CD=1 m, AD=1.5 m. E is the mid point of the coupler link BC. AD is the fixed link. Crank AB has an angular velocity of 20 rad/s counter clockwise and deceleration of 280 rad/s ² at the instant angle DAB= 60° . Find 1. Instantaneous linear velocity and acceleration of midpoint E of link BC. 2. Instantaneous angular velocity and acceleration of link CD.	07
Q.5	(a) Explain Linear velocity & Velocity of rubbing.	03
	(b) Explain working & construction of hook's joint.	04
	(c) In a four bar chain ABCD, AO is fixed link. Crank AB rotates in clockwise direction at an angular velocity of 10 rad/sec. Link AB = 60 mm, BC = CD = 70 mm, DA = 120 mm. when angle DAB = 60° and the points B and D are on one side of the link AD, Find angular velocity of link CD and link BC.	07

OR

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|------------|------------|---|-----------|
| Q.5 | (a) | Define: - Dwell angle, Pressure angle and Pitch curve. | 03 |
| | (b) | Classification of followers. | 04 |
| | (c) | A flat face follower is moved with S.H.M by a disc cam. Follower rises for 30 mm during the cam rotation of 120° , remains in the same position during 30° of cam rotation, follower returns to original position during further 120° of rotation of cam and then for last 90° of rotation follower remains stationary. Minimum radius of cam is 25 mm and the diameter of the circular flat face of follower is 25 mm. Draw the cam profile. | 07 |
