Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER– II(New course) • EXAMINATION (Remedial) – WINTER- 2015

Subject Code: 2720910 **Date: 08/12/2015**

Subject Name: ADVANCED MECHANISM DESIGN

Time: 2:30 pm to 5:00 pm **Total Marks: 70**

Instructions:

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

Q.1 **(a)** Explain the position analysis of the geared fivebar linkage. **07**

(b) Explain the velocity analysis of the fourbar pin jointed linkage using analytical method. **07**

Q.2 **(a)** For the configuration of slider crank mechanism shown in Figure 1 below. Calculate graphically; **07**

i) Acceleration of slider B. ii) Acceleration of point E.

iii) Angular acceleration of link AB.

If crank OA rotates at 20 rad/sec CCW.

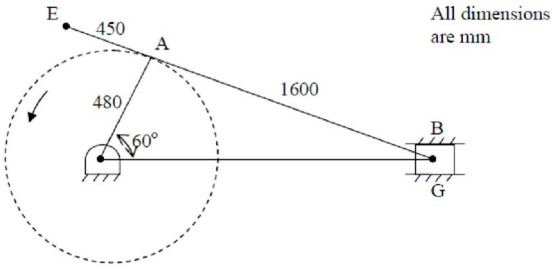

Figure 1

(b) 1) Explain Degree of freedom in planer mechanisms. **03**

2) How many degrees of freedom does the following mechanism (Figure 2) have? The circles represent gears in mesh. **04**

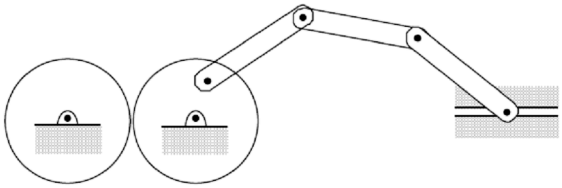

Figure 2

OR

(b) Discuss the Grashof condition to obtain motions from the four bar linkage. 07

Q.3 **(a)** Explain chebyshev spacing method for locating precision position in four bar mechanism. **07**

(b) Synthesize graphically, a slider crank mechanism with eccentricity 0.9cm for the two input positions of input link is 56 degree and output displacement of sliders is 1.6cm. **07**

OR

Q.3 **(a)** A four bar mechanism is to be synthesized by using three precision points, to generate the function $y = x^{1.5}$, for the range 1<x<4. Input link is to start from 30° and is to have a range of 90°. The output link is to start at 0° and is to have a range of 90°. Find out values of input and output angles corresponding to the three precision points. **08**

(b) Explain the two position synthesis of four bar chain mechanism by inversion method. **06**

Rabb

Q.4 **(a)** Explain the following term: **06**

(1) Types of synthesis
(2) Number of synthesis
(3) Dimensional synthesis

(b) A 4-bar mechanism is required such that the input and out angles are coordinated in the table. Synthesize the 4-bar mechanism using Frudensteinôs equation: **08**

Input crank angle	30°	50°	80°
Output follower angle	0°	30°	60°

OR

Q.4 **(a)** Explain the following term related to synthesis problem: **06**

(1) Function generation
(2) Path generation
(3) Motion generation

(b) Explain the analytical method for dimensional synthesis of four bar chain mechanism. **08**

Q.5 **(a)** Explain Euler Savary equation for location of the conjugate point. **07**

(b) Explain in detail ñD-H representation of forward kinematics. **07**

OR

Q.5 **(a)** Explain the geometric solution approach for deriving the inverse kinematics solution of planer robotic manipulator. **07**

(b) Define the term cubic of stationary curvature. Explain one graphical method to draw it. **07**

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