Reg. No. | | | | | | | | | |

M.E. / M.TECH. DEGREE EXAMINATIONS, MAY/JUNE 2017

SECOND SEMESTER

COMPUTER AIDED DESIGN

CD16202 – MECHANISMS DESIGN AND SIMULATION

(Regulation 2016)

Q. Code: 314208

Time: Three Hours **Maximum : 100 Marks**

Answer **ALL** questions

PART A - (10 X 2 = 20 Marks)

1. Differentiate between open loop and closed loop mechanisms. Give examples.
2. Define Grashof's criterion.
3. Write the vector loop equations for four bar mechanism.
4. List the Denavit - Hartenberg parameters.
5. Differentiate a cusp and crunode in the case of a 4 bar coupler curves.
6. What is number synthesis?
7. Define spatial mechanisms.
8. Write down Freudenstein's equation.
9. Define the term 'cognate'.
10. Name any four mechanism simulation packages.

PART B - (5 X16 = 80 Marks)

11. (a) (i) Classify and discuss kinematic mechanisms with neat sketches. **(10)**

(ii) What are compliant mechanisms? **(6)**

(OR)

(b) (i) Briefly describe about Kutzbach criterion for planar and spatial mechanisms. **(6)**

(ii) Draw the kinematic structures of serial and parallel robot manipulators. **(10)**

12. (a) Discuss briefly about the analytical solutions for velocity analysis of four bar pin jointed linkage. **(16)**

(OR)

(b) Write the vector loop equation for geared five bar linkage and solve it. **(16)**

13. (a) Write notes on Euler Savary equation and its graphical construction. **(16)**

(OR)

(b) (i) Write short notes on Fixed and moving centrodes with neat sketch. **(7)**

(ii) Briefly explain about any three straight line mechanisms with neat sketches. **(9)**

14. (a) Synthesize a function generator to solve the equation $Y=1/x$ over the range $1 \leq x \leq 2$ using three precision points. Choose for input level 30° starting position and 90° total swing angle. For output level, choose the starting position at 240° and a range of 90°. **(16)**

(OR)

(b) Synthesize a four bar linkage by Bloch's method of synthesis to give the following values for the angular velocities and accelerations. **(16)**

$\omega_2 = 200$ rad/s, $\alpha_2 = 0$ rad/s^2

$\omega_3 = 85$ rad/s, $\alpha_3 = -1000$ rad/s^2

$\omega_4 = 130$ rad /s, $\alpha_4 = -16000$ rad/s^2

15. (a) Discuss about the cognate linkages of 4 bar mechanism with the help of neat sketches. **(16)**

(OR)

(b) Briefly discuss about various practical issues to be considered in cam mechanism design. **(16)**