Q. Code:954669

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

M.E. / M.TECH. DEGREE EXAMINATIONS, MAY 2019

Second Semester

MS18202 - MECHATRONICS SYSTEM DESIGN

(Mechatronics)

(Regulation 2018)

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

Answer **ALL** questions

PART A - (10 X 2 = 20 Marks)

1. Mention few recent advancements in mechatronics system.
2. Draw the block diagram of simple mechatronic system.
3. Describe a system and how it can be represented.
4. Describe an analogue approach and give examples.
5. Name the different phases involved in simulation life cycle.
6. Show the zeroth order system, that can be interpreted using model equations.
7. State the need for optimization and how can it be done.
8. Define constraints and give examples
9. Describe the ABS in brief.
10. Write down the steps involved in building a mechatronics system.

PART B - (5 X16 = 80 Marks)

11. (a) (i) Explain in detail about key elements of mechatronics design. **(8)**

(ii) Explain briefly about the steps involved in mechatronics design process. **(8)**

(OR)

(b) Design a mechatronics system using different elements needed for controlling speed of a rotating shaft which is powered by a motor. Draw the relevant diagrams and justify the selection. **(16)**

12. (a) (i) Explain the role of least square method in modelling. **(4)**

(ii) Use signal graph method to derive transfer function for given below figure 1 **(12)**

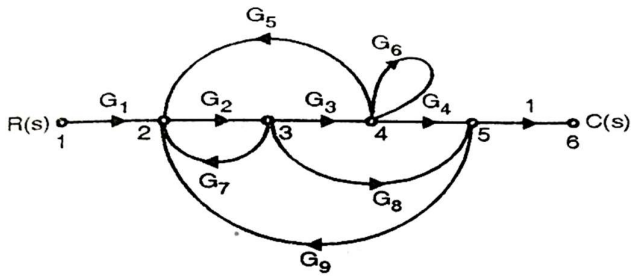

FIGURE 1

(OR)

(b) Explain how to represent using bond graph method for the given below system in figure 2. **(16)**

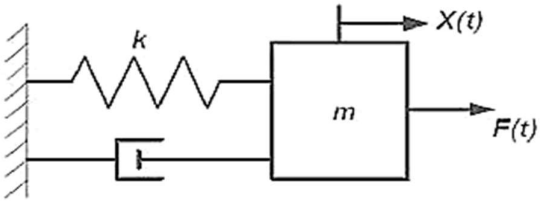

FIGURE 2

13. (a) Explain in detail about Monte Carlo Simulation. **(16)**

(OR)

(b) Discuss in detail about Hardware in loop simulation (HIL). **(16)**

14. (a) Explain any two linear optimization techniques. **(16)**

(OR)

(b) Write short notes on any two non-linear optimisation techniques. **(16)**

15. (a) Discuss in detail about automatic transmission controller. **(16)**

(OR)

(b) Explain briefly about modelling of stewart platform with actuators. **(16)**