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**B.E. / B.TECH. DEGREE EXAMINATIONS, DEC 2019**

Seventh Semester

**ME16702 – MECHATRONICS***(Mechanical Engineering)***(Regulation 2016)****Time: Three Hours****Maximum : 100 Marks**Answer **ALL** questions**PART A - (10 X 2 = 20 Marks)**

	<b>CO</b>	<b>RBT</b>
1. Illustrate how capacitive sensor works when area changes?	1	U
2. How is 'resolution' of a sensor defined?	1	U
3. Name the five types of instruction set in 8085 microprocessors.	2	R
4. What are the instructions of an 8085-instruction set for data transfer from memory to microprocessor?	2	U
5. State the function of an Analog to Digital Converter (ADC).	3	R
6. What is the function of Read/Write control logic in 8255PPI?	3	R
7. Draw a ladder diagram to represent a Latch circuit.	4	U
8. Draw a ladder logic diagram to represent two switches that are normally open and both have to be closed for a motor to operate.	4	AP
9. Mention the constraints in mechatronics system design.	5	U
10. List the sensors used in Engine Management System.	5	R

**PART B - (5 X16 = 80 Marks)**

11. (a) (i) Discuss how displacement is sensed by LVDT. With neat sketch show how it can be made phase sensitive. (10) 1 U
- (ii) What is the application of bimetallic strip? Discuss their types and principle of operation respectively. (6) 1 U
- (OR)**
- (b) Briefly explain the static and dynamic characteristics of sensor. (16) 1 R
12. (a) List and explain the various types of addressing modes in detail in 8085 microprocessors with example for each. (16) 2 R
- (OR)**
- (b) Draw and explain the architecture and functional units of 8085 microprocessor. (16) 2 R
13. (a) (i) The temperature in a furnace has to be controlled using a microprocessor. Explain the arrangements with an illustration. (8) 3 AP

- (ii) A stepper motor is controlled using microprocessor. Explain the arrangements with an illustration. **(8) 3 AP**
- (OR)**
- (b) (i) Demonstrate LED interface with 8255. **(8) 3 AP**  
(ii) Demonstrate 4x4 matrix Key board interface with 8255. **(8) 3 AP**
14. (a) Develop a PLC circuit for the following lighting control system. The system will be controlled by four switches S1, S2, S3 and S4. These switches will control the lighting in a room based on the following criteria: **(16) 4 AP**
- (i) Any one of three switches S1, S2 and S3, if turned ON can turn the lighting on, but all three switches must be OFF before the lighting will turn off.
- (ii) The fourth switch S4 is master control switch. If this switch is in ON position, the lights will be OFF and none of the other three switches have any control.
- (OR)**
- (b) (i) Discuss how AND, OR, NOR and NAND systems can be formed with ladder diagram. **(12) 4 AP**  
(ii) What are the criteria needs for the selection of a PLC? **(4) 4 U**
15. (a) (i) Explain the working principle of stepper motor and its classification. **(12) 5 U**  
(ii) A stepper motor has a step angle of 7.5 degree. How many pulses required for motor to rotate through 5 complete revolutions? **(4) 5 U**
- (OR)**
- (b) Illustrate with an example the traditional and mechatronics design approaches. **(16) 5 AP**