A **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 57703

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2019

Seventh Semester

Mechanical Engineering

15UME703- MECHATRONICS

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The working of stepper motor is considered to be a _____system. CO1- R

   (a) Open loop system (b) Closed loop system

   (c) Sequential system (d) None of these

2. Inductive pressure transducers are used to measure CO1- R

   (a) Temperature (b) Flow (c) Pressure (d) Level

3. Which element used to converts hydraulic power into mechanical power. CO2- U

   (a) compressor (b) Pump

   (c) Actuator (d) Convertors

4. Identify the belt drive that doesn't undergo slip while transmitting power CO3- U

   (a) Timing (b) Round (c) V- Belt (d) Cross

5. Which of the following is not an element of a mechanical building block? CO3- R

   (a) Capacitor (b) Dashpot (c) Mass (d) Spring

6. The corrective measures taken by a controller when it is operated in a proportional mode is CO3- U

   (a) $K_p e$ (b) $K_{p/} e$ (c) $1/K_p$ (d) e/K_p

7. PLC can be _____ in plant to change the sequence of operation CO4- R

(a) Only programmed (b) only reprogrammed

(c) Programmed and reprogrammed (d) able to give a set point

8. A counter that starts from a specified number and increments down to zero is known as the CO4- R

(a) Up counter (b) Down counter

(c) Reset counter (d) Synchronizing counter

9. In general, design process starts with _____ of the product CO5- R

(a) Analysis (b) Solution (c) Resale value (d) Need

10. Which sensor is used in engine management system to measure burne exhaust gas CO5- R

(a) Oxygen sensor (b) temperature sensor (c) speed sensor (d) Need

PART – B (5 x 2= 10Marks)

11. What is dynamic braking? CO1- R

12. Write the objectives of Directional Control Valves. CO2- R

13. Interpret thermal capacitance in thermal system building block CO3- U

14. Explain delay ON and delay OFF timer with ladder diagrams CO4- R

15. What is a windscreen wiper CO5- R

PART – C (5 x 16= 80Marks)

16. (a) Explain in detail about the elements of measurement systems used in mechatronics applications. CO1- U (16)

Or

(b) (i) Interpret how does LVDT measure displacement. CO1- U (4)

(ii) Explain the working of following sensors: CO1- U (12)

(a) Pressure sensor

(b) Temperature sensor

(c) Light sensor

17. (a) Discuss in detail about the working of a pneumatic actuation system with neat sketch. List the merits and demerits of using pneumatic actuation system. CO2- U (16)

Or

	(b)	Explain with neat sketches the working of any three hydraulic pumps	CO2- U	(16)
18.	(a)	Design building blocks for translational and rotational system. Also, derive the relationship between their input and output.	CO3- App	(16)
		Or		
	(b)	Explain with neat example of microprocessor based controller	CO3- App	(16)
19.	(a)	Discuss how AND, OR, NOR and NAND systems can be formed with ladder diagram	CO4- U	(16)
		Or		
	(b)	Summarize how data are handled in PLC with necessary illustrations.	CO4- U	(16)
20.	(a)	Design a autonomous mobile robot using mechatronics elements	CO5- App	(16)
		Or		
	(b)	Illustrate the application of mechatronics system in engine management of a modern car.	CO5- App	(16)