Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

I SEMESTER M.TECH. (MECHATRONICS ENGINEERING)

END SEMESTER EXAMINATIONS, NOV 2017

SUBJECT: SENSORS AND ACTUATORS FOR INDUSTRIAL AUTOMATION [MTE 5101]

REVISED CREDIT SYSTEM
(16/11/2017)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer any 5 questions out of 6.
- Data not provided may be suitably assumed

1A.	What is signal conditioning? Why it is needed in measurement system?	**2**
1B.	Mention some displacement measurement sensors used in industrial automation. Explain its Types, Selection criteria and applications.	**4**
1C.	What is RVDT How is it useful in industrial applications? Compare LVDT and RVDT in terms of performance.	**4**
2A.	What are the types of temperature measurement sensors? Mention selection criteria for industrial applications as per range of temperature.	**4**
2B.	With a neat diagram explain the working of electromagnetic flow meter.	**3**
2C.	State different possible sensors used in automobile. Explain any one in detail	**3**
3A.	Explain operating principle of synchronous motors with its construction, working and suitable applications.	**4**
3B.	Describe a suitable sensor that can be used for measurement of torque for DC motor.	**3**
3C.	A platinum thermometer has a resistance of 100 Ω at 25°C 1. Find its resistance at 65 °C if the platinum has a resistance temperature coefficient of 0.00392/ °C 2.If the thermometer has a resistance of 150 Ω, calculate the unknown temperature 3.Find sensitivity of device	**3**
4A.	Write down significance of gate terminal in terms of static characteristics of SCR. What is latching and holding current?	**3**
4B.	Why single phase induction motor is not self-starting? How to overcome the problem?	**3**

4C Explain the terms **4**

i) Hysteresis
ii) Eddy current losses
iii) Sensitivity
iv) Hunting in synchronous motor

5A. Write a short note on single phase full wave, controlled rectifier with RL load. **3**

5B. What is significance of back emf ? What will happen if DC series motor is run at no load condition? **3**

5C. What is principle of starting of synchronous motors? What are the methods of speed control ? **4**

6A. What is significance of gray codes in encoder calibration? Describe in brief types of encoders along with their working and applications. **4**

6B. Explain Ward Leonard Method of speed control for DC motor. **3**

6C. Explain electric types of braking system used for motor drives. **3**