USN ☐☐☐☐☐☐☐☐☐☐ **18IC54**

Fifth Semester B.E. Degree Examination, Jan./Feb. 2023
Sensors and Sensing Systems

Time: 3 hrs.   Max. Marks: 100

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1 a. What are sensors? Discuss the physical and chemical transduction principles. **(10 Marks)**
   b. What are sensor characterization methods? Explain the electrical characterization of a sensor. **(10 Marks)**

OR

2 a. Discuss precision wire wound resistive potentiometers with a neat diagram. Explain its equivalent circuit. **(10 Marks)**
   b. How does the gauge factor of a semiconductor strain gauge vary with doping levels? Explain. **(10 Marks)**

Module-2

3 a. Explain vapour pressure thermometer. List out the commonly used liquids for vapour pressure thermometer. **(10 Marks)**
   b. Discuss MI thermocouples with neat diagram. Explain its construction. **(10 Marks)**

OR

4 a. Explain briefly various types of magnetic sensors. **(10 Marks)**
   b. Describe Linear variable differential transformer (LVDT) sensor. **(10 Marks)**

Module-3

5 a. Describe the basic construction and operation of an electro chemical cell. **(10 Marks)**
   b. How is cell potential affected by polarization? Explain the different types of polarization. **(10 Marks)**

OR

6 a. Describe the functioning of instrumentation amplifiers in sensors. **(10 Marks)**
   b. Explain Rail – to – Rail operational simplifiers. **(10 Marks)**

Module-4

7 a. Explain with a neat diagram the basic MCU control unit. Discuss the various types of memory that can be integrated in to MCU. **(10 Marks)**
   b. Explain in detail DSP control and its 24 bit architecture. **(10 Marks)**

OR

8 a. Explain the communication protocol "CAN" developed by Robert Bosh GmbH. **(10 Marks)**
   b. Write a note on office/Building automation. **(10 Marks)**

Module-5

9 a. What is mechatronics? Discuss Smart Power IC's to provide direct interface between the MCU and system loads. **(10 Marks)**
   b. Briefly explain multiple sensing devices. With a neat diagram explain multichannel microprobe sensor. **(10 Marks)**

OR

10 a. Discuss various networks communication models. **(10 Marks)**
    b. Explain IEEEP1451.4 standards. **(10 Marks)**

* * * * *