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

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

FOURTH SEMESTER B.TECH. (INSTRUMENTATION AND CONTROL ENGG.)

END SEMESTER DEGREE EXAMINATION, APRIL/MAY - 2019

SUBJECT: SENSOR TECHNOLOGY [ICE 3284]

TIME: 3 HOURS MAX. MARKS: 50

Instructions to candidates :*Answer ALL questions and missing data may be suitably assumed.*

1A Differentiate the following
i. Sensor and transducer.
ii. Sensor and system characteristics.

1B How can we quantify the requirements of the measurements in the sensor technology?

1C List the parameters required to check for sensor selection and installation in the measuring environment.

(3+3+4)

2A Derive the expression for voltage sensitivity of a piezoelectric accelerometer.

2B Explain the working of an accelerometer which is used for shock testing.

2C Explain piezoelectric effect in a quartz crystal.

2D Differentiate piezoresistive, piezoelectric and capacitive accelerometers.

(2+3+2+3)

3A Write the target considerations required for the design of capacitive displacement sensor.

3B Define electrical runout and explain the selection of inductive displacement sensors.

3C Explain the measurement of paint thickness on metal substrate by using the combination of capacitive and inductive displacement sensors.

3D A Hall Effect sensor is used for the measurement of a magnetic field of 0.5 Wb/m^2. The 2mm thick slab is made of bismuth for which hall co-efficient is -10^{-6} $Vm/(A\text{-}Wb\ m^{-2})$ and the current is 3A. Calculate Hall Effect sensor output voltage.

(2+3+3+2)

4A Define faradic process and explain potentiometric chemical sensor.

4B What are the considerations required to take in the development of biosensors and explain clark enzyme electrode.

4C Write a short note on
i. Photo - voltaic cell.
ii. Hybrid star – Mesh network.

(3+3+4)

5A Illustrate the power consideration in wireless sensor networks.

5B Describe the Various components of a smart sensor.

5C Explain any two applications of Nanotechnology enabled Sensor.

(3+3+4)

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