

Code No: 158FG

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**B.Tech IV Year II Semester Examinations, June - 2024****SMART SENSOR TECHNOLOGIES****(Computer Science and Engineering - IoT)****Time: 3 Hours****Max. Marks: 75****Note:** i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.

iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A**(25 Marks)**

- 1.a) Define Ratiometricity. [2]
- b) What are the undesirable characteristics of semiconductor sensors? [3]
- c) What is Dark current in a photodiode? [2]
- d) What is the difference between RTD and thermistor? [3]
- e) Define Ferroelectric effect. [2]
- f) Sketch a simple, inexpensive circuitry used to create a duty cycle that is linear to the applied pressure. [3]
- g) What is meant by Remote Keyless Entry? [2]
- h) What is the purpose of a VNAW system? [3]
- i) How is a micro machined microphone used? [2]
- j) What is the significance of a micro angular rate sensor? [3]

PART – B**(50 Marks)**

- 2.a) Explain the functional blocks of a general transducer model with a neat diagram.
- b) Discuss the measurement of change in resistance using the Strain-gauge pressure sensors in Wheatstone bridge. [5+5]

OR

- 3.a) Describe the working of a Smart Sensor model with a neat sketch.
 - b) Discuss about the different Digital techniques used in sensing the outputs of a Sensor. [5+5]
- 4.a) Explain the operation of a Microwave Doppler motion detector with neat block diagram and Timing diagram.
 - b) Describe the working principle of a CCD sensor. [5+5]

OR

- 5.a) Briefly explain about the different types of thermos electric contact sensors and their applications.
- b) Discuss in detail the energy bands in a phototransistor along with its equivalent circuit. [5+5]

- 6.a) With a neat diagram, explain the working of Rail-to-Rail Operational Simplifiers.
b) Describe the technique of providing Autozero and Autorange in an MCU. [5+5]

OR

- 7.a) Explain why On board A/D conversion need to be integrated with the MCU.
b) Describe the methodology that has been developed to allows custom MCUs to be designed to specifically address the requirements of a particular application. [5+5]

- 8.a) Describe in detail about Wireless Zone Sensing based on Spread Spectrum technique.
b) Explain the working of Radar Proximity Sensor with a neat diagram. [5+5]

OR

- 9.a) Discuss in detail how the MEMs technology is being used to develop RF components that demonstrate superior high performance relative to conventional devices.
b) Explain how real time sensing using a PCMCIA card fax/modem installed in a computer is done. [5+5]

- 10.a) Discuss the characteristics of future semiconductor technologies in detail.
b) Explain the working of a Fabry-Perot interferometer with a neat diagram. [5+5]

OR

- 11.a) Discuss the working of MCU with Integrated Pressure Sensor.
b) Describe the usage of Sensors in Automobile Applications. [5+5]

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