

Printed Page:-

Subject Code:- BEC0203

Roll. No:

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: II - THEORY EXAMINATION (20..... - 20.....)

Subject: Sensor Technology

Time: 3 Hours

Max. Marks: 100

General Instructions:

IMP: Verify that you have received the question paper with the correct course, code, branch etc.

1. This Question paper comprises of **three Sections -A, B, & C**. It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.

2. Maximum marks for each question are indicated on right -hand side of each question.

3. Illustrate your answers with neat sketches wherever necessary.

4. Assume suitable data if necessary.

5. Preferably, write the answers in sequential order.

6. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION-A

20

1. Attempt all parts:-

1-a. Which of the following is a type of inductive sensor? (CO1, K2) 1

- (a) Thermocouple
- (b) Strain Gauge
- (c) LVDT
- (d) Hall Effect Sensor

1-b. Which of the following is a type of resistive sensor? (CO1, K2) 1

- (a) Thermocouple
- (b) Strain Gauge
- (c) Hall Effect Sensor
- (d) Optical Sensor

1-c. When using an RTD, what is the reference temperature (T₀) typically set at for resistance measurement? (CO2, K2) 1

- (a) 0°C
- (b) 20°C
- (c) 100°C
- (d) 273.15°C

1-d. What is the most commonly used material for RTDs due to its predictable and linear resistance-temperature CO2, K3) 1

- (a) Copper

- (b) Platinum
 - (c) Gold
 - (d) Silver
- 1-e. Which of the following is not a configuration of a smart sensor? (CO3,K2) 1
- (a) Transducer
 - (b) Network interface
 - (c) Processor
 - (d) None of the mentioned
- 1-f. Is the storage of data possible in smart sensors? (CO3,K3) 1
- (a) Yes, smart sensors can store data locally in their integrated memory.
 - (b) No, smart sensors only transmit data in real-time and do not store any data.
 - (c) Smart sensors store data on external servers through a cloud connection.
 - (d) Smart sensors can only store data for a few minutes before deleting it automatically.
- 1-g. Which of these is NOT a component of an IoT system? 1
- (a) Sensors
 - (b) Actuators
 - (c) Electric motor
 - (d) Microcontroller
- 1-h. Which component of an IoT system is responsible for interpreting and processing data from sensors? 1
- (a) Actuators
 - (b) Microcontroller
 - (c) Gateway
 - (d) Communication module
- 1-i. Which of the following libraries is used to control an LCD in Arduino? 1
- (a) LiquidCrystal
 - (b) LCDControl
 - (c) DisplayLib
 - (d) ScreenDriver
- 1-j. Which function is used to read analog input in Arduino? 1
- (a) analogInput()
 - (b) analogRead()
 - (c) digitalRead()
 - (d) readAnalog()

2. Attempt all parts:-

- 2.a. How do temperature and pressure Sensor differ from each other. (CO1, K2) 2
- 2.b. Write the formula of Hall voltage and explain it. (CO2, K2) 2
- 2.c. What does RFID stand for? (CO3,K1) 2

- 2.d. What is the difference between a consumer IoT and an industrial IoT? (CO4, K1) 2
- 2.e. Define LED. (CO5, K2) 2

SECTION-B

30

3. Answer any five of the following:-

- 3-a. What factors should be considered when choosing a sensor? (CO1, K2) 6
- 3-b. Provide an overview of gyroscopes and their applications in mobile phones and computers. Explain the technology behind them. (CO1, K2) 6
- 3-c. Differentiate the types of ultrasonic flow meter. (CO2, K2) 6
- 3-d. Write a short note on accelerometer sensor. (CO2, K1) 6
- 3.e. Describe the working mechanism of a self-testing smart sensor with a neat block diagram. (CO3,K2) 6
- 3.f. Illustrate the role of IoT in improving healthcare systems and its impact on patient care. 6
- 3.g. What are most common challenges faced in deploying IoT sensors in the field? 6

SECTION-C

50

4. Answer any one of the following:-

- 4-a. Discuss the classification of sensors based on their working principles. Explain each classification and provide real-world examples for each category. (CO1, K1) 10
- 4-b. Differentiate between sensor and transducers. And explain their applications in real world. (CO1, K3) 10

5. Answer any one of the following:-

- 5-a. What are the advantages, disadvantages and applications of thermistor? (CO2, K1) 10
- 5-b. briefly explain the laws of thermocouple and types of thermocouple. (CO2, K3) 10

6. Answer any one of the following:-

- 6-a. Compare and contrast Passive, Active, and Semi-passive RFID tags with examples. (CO3,K1) 10
- 6-b. Explain the concept of tag collision and anti-collision techniques in RFID systems. (CO3,K3) 10

7. Answer any one of the following:-

- 7-a. Outline the conceptual framework of IoT, focusing on the role of microcontrollers in bridging the physical and digital worlds. (CO5, K3) 10
- 7-b. Analyze the use of Node MCU in IoT projects and its advantages in wireless communication. (CO4, K1) 10

8. Answer any one of the following:-

- 8-a. Write a program to interface an LED with Arduino Uno. (CO5, K3) 10
- 8-b. Evaluate the use of IoT in smart cities for traffic management and waste management. (CO5, K2) 10