



# MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

Paper Code : OECAIDS701A/OECAIML701A Internet of Things

UPID : 007816

Time Allotted : 3 Hours

Full Marks :70

The Figures in the margin indicate full marks.

Candidate are required to give their answers in their own words as far as practicable

## Group-A (Very Short Answer Type Question)

1. Answer any ten of the following :

[ 1 x 10 = 10 ]

- (I) Why is monitoring air quality important for IoT applications?
- (II) What is the basic working principle of a resistive sensor?
- (III) Define constant phase impedance.
- (IV) What is the primary function of a sensing element in a smart sensor?
- (V) What is the purpose of interfacing electronic circuits with smart sensors?
- (VI) What does the sensitivity of a sensor refer to?
- (VII) What is the function of a pressure sensor?
- (VIII) What is one advantage of using integrated circuits (ICs) in smart sensor designs?
- (IX) How is the equivalent circuit of a sensor used in modeling?
- (X) Explain the purpose of a power management system in smart sensors.
- (XI) What is a common application of smart sensors in industrial automation?
- (XII) Give an example of a smart sensor application in agriculture.

## Group-B (Short Answer Type Question)

Answer any three of the following :

[ 5 x 3 = 15 ]

2. Explain the role of smart sensors in enhancing daily life through health monitoring. [5]
3. Discuss the effects of adverse environmental parameters on human health and how IoT can mitigate them. [5]
4. Describe the structure and function of a resistive humidity sensor. [5]
5. Explain the architecture of smart sensors, detailing the key components and their respective roles in sensor functionality. [5]
6. How can adverse environmental conditions affect the performance of IoT networks, and what are the solutions? [5]

## Group-C (Long Answer Type Question)

Answer any three of the following :

[ 15 x 3 = 45 ]

7. Evaluate the significance of real-time environmental monitoring in healthcare and urban planning using IoT technologies. [ 15 ]
8. Discuss in detail the working principles of capacitive, resistive, and SAW sensors. Provide a practical example for 3 each sensor type. [ 15 ]
9. (a) Describe the role of impedance spectroscopy in the characterization of sensors. [ 5 ]  
(b) Include a discussion of its methodology and applications in various sensing environments. [ 10 ]
10. (a) Evaluate the fabrication techniques of electrodes in smart sensors, focusing on screen printing, photolithography, and electroplating. [ 5 ]  
(b) Discuss their processes, advantages, limitations, and applications. [ 10 ]
11. Illustrate the future scope of research in smart sensors, focusing on emerging technologies and their potential applications across various sectors. [ 15 ]

\*\*\* END OF PAPER \*\*\*