



**MANIPAL INSTITUTE OF TECHNOLOGY**

**MANIPAL**

*(A constituent unit of MAHE, Manipal)*

**SEVENTH SEMESTER B. TECH (ELECTRONICS AND INSTRUMENTATION)**

**PROCTORED ONLINE MAKE-UP EXAMINATION - Feb/March. 2022**

**SUBJECT: Smart Sensors (ICE 4058)**

**TIME: 2.20-3:35 PM**

**DATE: 26/02/2022**

**MAX MARKS: 20**

**Note: Answer All questions.**

1	A	Describe the three types of smart sensor faults with necessary equations. With diagram, explain the smart-sensor fault detection schemes based on Shewart chart and EWMA chart.	5M
	B	Assume that you are working in an Intelligent Transportation System application where the data is continuously recorded from smart sensors for traveler information details. Since the data may come with rich noise, a robust filtering technique is needed for accurate extraction of features from time and frequency domain simultaneously. Which filtering technique can be used here? How is this filtering technique different from its predecessors? Describe the working principle of this filtering technique.	3M
	C	Discuss any two important applications of wireless sensor networks.	2M
2	A	What are biometric sensors and where are they applied in modern world? In brief, describe the iris recognition, speech recognition, signature verification, hand geometry, fingerprint recognition and face recognition techniques.	5M
	B	Describe in brief the remote keyless entry and remote emission sensing techniques.	3M
	C	With diagram, explain the working of a digital micro-mirror device.	2M