



**MANIPAL INSTITUTE OF TECHNOLOGY**  
**MANIPAL**  
(A constituent unit of MAHE, Manipal)

**SEVENTH SEMESTER B.TECH. (INSTRUMENTATION AND CONTROL ENGG.)**  
**END SEMESTER DEGREE EXAMINATIONS, DECEMBER - 2020**

**SUBJECT: SMART SENSORS [ICE 4012]**

01-01-2021

TIME: 3 HOURS

MAX. MARKS: 50

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

- 1A. What are the sensor interference needs? Explain.  
1B. Describe sensor noise model.  
1C. Why is nonlinear compensation required for sensor? (4+4+2)
- 2A. What are the challenges in design of smart sensor?  
2B. Explain the process of bus arbitration in CAN.  
2C. Represent the message frame of MODBUS with signal level. (2+4+4)
- 3A. With block diagram explain the functioning of fourth generation smart sensor.  
3B. How is the sensor trigger operation initiated in 1451.0? Illustrate with state diagram. (5+5)
- 4A. Explain the process of publish/subscribe communication model in IEEE 1451.1.  
4B. Write a note on the functions of IEEE 1451.3?  
4C. Why is XMPP important for a smart sensor system? (3+4+3)
- 5A. What is the framework of Intelligent transport system?  
5B. Considering any real life examples from a process industry, provide a framework for implementation of smart sensor system replacing the conventional sensor system. (5+5)

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