Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

SIXTH SEMESTER B.TECH. (INSTRUMENTATION AND CONTROL ENGG.)

END SEMESTER EXAMINATIONS, APRIL - 2018

SUBJECT: ADVANCED SENSOR TECHNOLOGY [ICE 4009]

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Use neat diagrams where ever needed.

1A. What is the need for standardization in sensing system? How is standardization carried out? **4**

1B. Given the input output characteristics of Sensor A and Sensor B, compute the standard instrument parameters like 'sensitivity', 'resolution', 'range', 'precision', 'accuracy', and 'linearity'. Also comment on the performance of both sensors. **4**

Sensor A			Sensor B	
Input 'in ^oC'	**Output 'in mV'**		**Input 'in ^oC'**	**Output 'in mV'**
36	0.20		54	0.63
40	0.46		55	0.66
42	0.49		56	0.68
48	0.55		56	0.68
54	0.63		57	0.71
60	0.70		58	0.75

1C. 'Loading effect is minimal in optical sensor' Justify the statement. **2**

2A. Discuss the functionality and importance of driving circuits in optical sensor design **3**

2B. Illustrate the technique for micro position measurement. **3**

2C. Describe the process of fluid level measurement using coaxial electrodes. Indicate the changes to be incorporated for measuring conductive liquid. **4**

3A. How can a proximity sensor be deployed to measure velocity? List the assumption to be satisfied before using the sensor **4**

3B. Fluxgate sensors are used in metallurgy. Prove with an application **2**

3C. With a neat diagram explain the working of resistive accelerometers, indicating its drawbacks. **4**

4A. Explain how a potentiometric chemical sensor be deployed for pH measurement **3**

4B. Can a SAW sensor be used to analyze air quality? Justify with an example **3**

4C. Differentiate between a 'CHEMFET' and 'Enzyme based Biosensor' for parametric analysis of uric acid. **4**

5A. What do you understand by the concept of 'lab on chip'? Discuss any one application of lab on chip. **4**

5B. Discuss the incorporation of advanced sensing technique for water management in smart cities **6**