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MANIPAL INSTITUTE OF TECHNOLOGY
Manipal University

**FOURTH SEMESTER B.Tech. DEGREE END SEMESTER EXAMINATION**
**May/June 2016**
**SUBJECT: SENSOR TECHNOLOGY (ICE 3284)**
**(Open Elective)**

**TIME: 3 HOURS** **MAX. MARKS: 50**

**Instructions to candidates**
- Answer **ALL** the questions.
- Missing data may be suitably assumed.

1A. Define and Differentiate between Sensitivity and Fidelity of a sensor.

1B. A precise instrument would definitely be accurate. State true or false with reason.

1C. Temperature in a furnace is varied from 70-1600 degree centigrade. The furnace temperature has to be ramped up from 70 to 1300 in three hours, then it has to be kept constant from 1300-1350 for about six hours. Which sensor would be used for temperature measurement here? Justify.

(4+3+3)

2A. State and explain Seeback effect. State the utility of law of homogeneous metal and law of intermediate metals for measurement of temperature.

2B. State and explain the working of Linear Variable differential transformer work with a neat diagram.

3C A bourdon tube may be used for measurement of temperature. Explain how (if you agree).

(3+4+3)

3A. A piezoelectric sensor is a dynamic sensor. Explain?

3B. How would you use an orifice for the measurement of mass flow?

3C. A sensor equipped with a very fidel signal conditioning circuit may be called a smart sensor. Write for/against.

(3+4+3)

4A. How speed can be measured using a stroboscope?

4B Identify the figure below (Fig. Q4B). How may this be used for measurement of angular displacement? What would be the resolution of this instrument? What are the different variations available? How can this instrument be made direction sensitive?

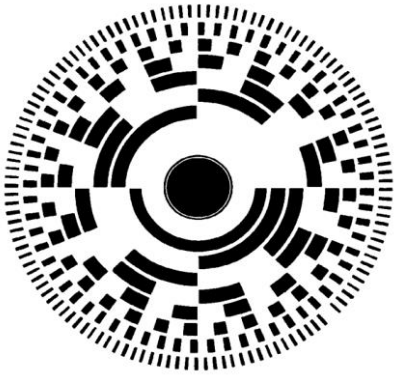

Fig. Q4B (3+7)

5A. Explain with a neat diagram the construction principle and working of a rotameter. What is the typical range it is generally used for? Can it measure gas flow? If yes; How?

5B. A pressure sensor that outputs 25 mV/$^{o}$ C is used for pressure variations from 0 to 25 kPa. It has to be used to measure the level of a liquid with density of 1.3 x 10 $^{3}$ kg/cubic meters. What voltage output will be expectedfor level variations from 0 to 2.4 m? What is the sensitivity of level measurement expressed in mV /cm?

(5+5)

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