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(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 0325 Roll No.

B. Tech.

(SEM. IV) THEORY EXAMINATION 2010-11

TRANSDUCER AND SENSORS

Time : 3 Hours *Total Marks : 100*

Note : (1) Attempt **all** questions.

(2) Assume the missing data if any

(3) Marks are indicated at the end of each question.

1. Attempt any **four** parts of the following : **(5×4=20)**

(a) Differentiate between sensors and transducer by giving suitable example.

(b) How the transducers are classified on the basis of principle of operation ?

(c) List the types of potentiometers used in instrumentation system. Discuss the advantages and disadvantages of potentiometers.

(d) What is inductive transducer ? Mention some advantages and disadvantages of LVDT.

(e) What is the basic principle of capacitive transducer ? Mention some advantages and disadvantages of capacitive transducer.

2. Attempt any **four** parts of the following : **(5×4=20)**

(a) Discuss the application area of ultrasonic transducer.

(b) Explain the working principle of Bolometer.

(c) Which method is suitable for the measurement of high power microwave signals ? Explain its working also.

(d) List all the secondary transducers. Of these which are used for temperature measurement.

(e) What is resistance thermometer ? Discuss the advantages and disadvantages of it in brief.

3. Attempt any **two** parts of the following : **(10×2=20)**

(a) What is piezoelectric effect ? List the materials used for piezoelectric transducer. Describe the different modes of operation of piezoelectric transducers.

(b) Discuss the working principle of thermistor and thermocouples. Explain in brief its application area.

(c) Discuss in detail about optical encoder, resistive encoder and shaft encoder.

4. Attempt any **two** of the following : **(10×2=20)**

(a) What for Tachometers are used ? Compare the performance of DC tachometer generator with that of AC tachometer generator.

(b) Explain the working principle of Radiation Pyrometers and discuss its application area in brief.

(c) Explain the working principle of Turbine flow meters. Discuss its limitation in brief.

5. Attempt any **two** of the following : **(10×2=20)**

(a) Explain the working principle of Electromagnetic flow meters. Compare its performance with respect to Hot Wire Anemometers.

(b) Explain the working of "Photo-emissive cells', "Photo-conductive cells" and "Photo-voltaic cells". Are they all an example of active transducers ? Give reason in support of your answer.

(c) An accelerometer has a seismic mass of 0.05 kg and a spring constant of 3×10^3 N/m. Maximum mass displacement is $\pm$ 0.02 m (before the mass hits the stop). Calculate (i) the maximum measurable acceleration and (ii) natural frequency.