Printed Pages : 3   **TEE801**

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

PAPER ID : 0287   Roll No.

B. Tech.

(SEM. VIII) THEORY EXAMINATION 2010-11

INSTRUMENTATION AND PROCESS CONTROL

Time : 3 Hours   *Total Marks : 100*

Note :—Attempt all questions.

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

    (a) What is an electrical transducer ? What are the advantages of electrical transducer ?

    (b) What is LVDT ? Draw the circuits of an LVDT. Also show the variation of output voltage with linear displacement for an LVDT.

    (c) Explain the help of diagram the theory of strain gauge. A resistance wire strain gauge uses a soft iron wire of small diameter. The gauge factor is +4·2. Neglecting the piezoresistive effect, calculate the Poisson's ratio.

    (d) Explain with the help of diagram measurement of temperature with thermocouple. Write its advantages and disadvantages.

    (e) Explain with diagram the different forms of thermistors. Explain any one of its applications.

    (f) Draw and explain the input, transfer and output characteristics of transducers.

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

   (a) Explain the resistive method for the liquid level measurement. Also discuss the advantages of this method.

   (b) Discuss the various types of angular velocity of measurement transducer.

   (c) With suitable diagram explain the moving coil type velocity transducer.

   (d) What is Hall Effect ? Describe the working principle, construction and applications of Hall Effect transducers.

   (e) What is pilot tube ? With the help of suitable diagram describe its use in flow measurement.

   (f) What is impulse telemetring system ? Explain the various impulse telemetring systems.

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

   (a) A P.M. transmitter operating at a carrier of 100 MHz with a carrier voltage of 8 V. The modulating signal has amplitude of 3 V and a frequency of 6 kHz, resulting in a deviation of 60 kHz. Write the voltage equation for the following conditions :

      (i) Original value

      (ii) Audio amplitude increased by 4 V

      (iii) Audio frequency increased to 8 kHz

   (b) (i) What is Data-Acquisition system ? Explain with the help of diagram Modern Digital Data Acquisition system.

      (ii) What are the different types of telemetry systems ? Explain land line telemetry.

(c) Find the carrier and modulating frequencies, the modulation index and the maximum deviation of the F.M. wave represented by e_{fm} = 12 sin (6 × 10⁸t + 5 sin 1200 t) V. What power will this F.M. wave in a 10 Ω resistance ?

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

    (a) What are the basic control actions in industrial analog process controllers ? Give their brief description.

    (b) With neat diagram explain the working principal of X-Y recorders. Also write its three applications.

    (c) What is a ON-OFF controllers ? Explain its working with a suitable example and also give it advantages, disadvantages and any two applications.

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

    (a) Explain the following :

        (i) Process

        (ii) Controlled variable

        (iii) Set point

        (iv) Self regulation

        (v) Sensor.

    (b) Describe the working principle and also the features of a self-balancing type servo strip char recorder.

    (c) With suitable example explain the pneumatic control of any process in an industry. Also draw the related block diagram.