Printed Pages : 4

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

PAPER ID : 132401

Roll No.

B. Tech.

(SEM. IV) THEORY EXAMINATION, 2014-15
TRANSDUCERS AND SENSORS

Time : **3** Hours]   [Total Marks : **100**

Note : Attempt all questions. All question carry equal marks

1   Attempt any four of the following :   5×4=20

    (a)   Define the term repeatability, accuracy, precision, static sensitivity, and linearity with examples?

    (b)   Explain hysteresis and explain its effects?

    (c)   A wheatstone bridge requires a change of $7\,\Omega$ in unknown arm of bridge to produce a change in deflection of 3mm of galvanometer. Determine sensitivity, also determine deflection factor?

    (d)   Explain static characteristics of the system?

    (e)   Describe the input-output configuration of measuring input and measurement system?

    (f)   What is defined by instrument .what are the basic elements of instrument?

132401]   **1**   **[Contd...**

2 Attemp any two of the following : **10×2=20**

(a) Describe with help of neat diagram the variable inductance pickup. Also describe its advantages and disadvantages?

(b) Show how piezoelectric transducer can be used to measure torque, pressure and acceleration?

(c) Describe the tachometer encoder methods. Explain the eddy current drag cup tachometer with the help of diagram?

3 Attemp any two of the following: **10×2=20**

(a) A strain gauge having a resistance $100\,\Omega$ and gauge factor 2 is connected in series with a ballast resistance of $100\,\Omega$ across a 12v supply. Calculate the difference between the output voltage with no stress applied and stress of 140 MN/m^2. the modulus of elasticity is 200MN/m^2.

(b) Describe the methods used for low pressure measurement using

(i) ionization gauzes

(ii) pirani gauge

(c) (i) Explain the working of a dynamometer with the help of diagram?

(ii) An energy meter revolves 10 revolutions of disc for unit of energy. Find the no. of revolutions made by it during an hour when connected across when connected 20 A at 210v and 0.8 POWER FACTOR LEADING. if energy meter revolves 350 revolutions find percentage error?

132401] 2 **[Contd...**

4   Attempt any two of the following: 10×2=20

   (a)   Describe the working and theory of ultrasonic flow meter. Enlist its advantages and disadvantages?

   (b)   Describe the principle of average pitot tube and explain the working of hot film anemometer?

   (c)   A rotameter is calibrated for metering a liquid of density $1000kg/m^3$ and has a scale ranging from 1 to 100 1/min.it is intended to use this meter for metering the flow of gas of density $1.25kg/m^3$ with flow range between 20 to 200 1/min.determine the density of new float if original one has density $2000kg/m^3$.assume that shape and volume of float will be same.

5   Attempt any four of the following :   4×5=20

   (a)   Give the working principle of radiation type temperature sensors. What are its disadvantages?

   (b)   Explain the working principle of cooled thermocouples?

   (c)   A resistance wire to be constructed of nickel wire.thermometer resistance at 200 degree celcius is 100 ohms.what length of 0.4mm diameter is used?

   (d)   Explain the help of diagram bimetallic thermometers and describe thermistors?

132401]   3   [Contd...

(e) Describe the optical pyrometers with the help of neat sketch. Also explain its principle, working applications?

(f) The emitted radiation energy from piece of metal is measured and temperature is found to be 1065 degree celcius assuming a surface emissivity of 0.82 it was later found that the true emissivity is 0.75.Calculate the error in temperature measurement.

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