

Printed Pages : 4



EIC401

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

PAPER ID : 132401

Roll No.

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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 7Ω 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?

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2 Attempt 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 Attempt 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 $140\ \text{MN/m}^2$. the modulus of elasticity is $200\ \text{MN/m}^2$.
- (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?

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 l/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 l/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?

- (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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