Exam.Code:0941
Sub. Code: 6724

2123

B.E. (Mechanical Engineering)
Fifth Semester
MEC-504: Mechanical Measurement

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Part.

x-x-x

Q-1)

1) What is meant by law of intermediate metals?
2) What is the significance of settling time in measuring instruments?
3) Differentiate between a quarter and full Wheatstone bridge circuit.
4) Plot output and input behavior with time for a first order instrument with ramp input.
5) Mention various types of errors encountered in a Bourdon pressure gauge.

(5x2=10)

PART A

Q-2)

1) Explain various types of photo electric transducers.
2) What is full scale deflection? What is the ratio of relative error and error due to full scale deflection?

(5,5)

Q-3)

1) Explain the construction and working of LVDT with diagrams
2) Differentiate between thermal conductivity and ionization gauge.

(5,5)

Q-4)

A capacitance based displacement transducer of area 200mm^2 and distance h between plates is 5mm and is filled with air. What is the maximum possible displacement of the plates so that non-linearity does not exceed 3%. What is the sensitivity of this transducer and what would be the sensitivity of a square moving plate sensor of 14mm side of the same air gap.

(10)

P.T.O.

PART B

Q-5)

1) How are laser based tachometers used to measure speed?
2) Explain Schlieren system and Interferometer flow visualization techniques.

(5,5)

Q-6)

A mild steel is shaft used to connect a motor drive to a constant load torque. To measure this torque, a resistance gauge of 120Ω and gauge factor 2 is mounted at 45^0 to the shaft axis. Shear modulus of steel is 80GPa, shaft diameter is 50mm and change in strain gauge resistance due to load is 0.1Ω. Find the load torque.

(10)

Q-7)

Write short notes on any 2 of the following:-

1) Calibration of thermal sensors
2) Vibrating reed tachometer
3) Micro scale sensors

(5,5)

x-x-x