Exam.Code:0941
Sub. Code: 33865

2125

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 Unit.

x-x-x

I. Attempt the following:-

a) Describe in brief the phenomenon of the 'Dip effect' in thermometers.

b) What do you mean by the deflection factor of an instrument? How does it differ from static sensitivity?

c) Distinguish between the absorption and transmission dynamometers. Write examples also.

d) Determine the pressure detected by a mercury manometer if the mercury is displaced by 20 inches, and the specific gravity of the mercury in the manometer is 13.54.

e) Differentiate between accuracy and precision. (5×2)

UNIT - I

II. a) Draw the block diagram representing various basic functional elements of a Generalized Measurement System. Briefly describe the functions of various elements.

b) Derive the equation for the time response of a first-order system when subjected to a Step Input. Additionally, plot the curve showing dynamic error for a first-order system when subjected to a ramp input. (2x5)

III. a) A flow meter working on the thermal principle has an accuracy of ±5% of the full-scale reading of 5×10^{-6} m^3/s. The flow measured by this meter is 2.5×10^{-6} m^3/s. Calculate the limiting error in percentage. Comment upon the results.

b) Define the term Signal Conditioning. Describe various types of signal conditioning.

c) What do you mean by linearity? Briefly describe various forms of linearity. (3,4,3)

P.T.O.

IV. a) On which principle the photoelectric transducers work? Describe the photo-emissive cell and photo-conductive cell with the help of neat sketches.

b) Define gauge factor in strain gauges. Write the formula to determine the gauge factor. Which value of gauge factor (lower or higher) is desirable? Give reasons. (7,3)

UNIT - II

V. a) Describe the working principle of the hot wire anemometer with the help of a neat sketch. What are two ways of its operation?

b) Describe the construction and working of the Bourdon Tube Pressure Gauge. What are the various errors produced in it while measuring the pressure? (2x5)

VI. a) How Total Radiation Pyrometer is used to measure the temperature? Write its various characteristics.

b) Describe the construction and working of the hydraulic load cell. Discuss their advantages and disadvantages. (2x5)

VII. a) Briefly describe the vibrating reed tachometer using a neat sketch.

b) What do you mean by Clean Room Technology? Briefly describe various clean room standards.

c) How to measure brake power using a light torsion dynamometer. (3,4,3)

x-x-x