R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year I Semester Examinations, November/December - 2016
INSTRUMENTATION AND CONTROL SYSTEMS
(Common to ME, AME)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A
(25 Marks)

1.a) Distinguish between Accuracy and Precision. [2]
  b) State and explain briefly desirable and undesirable dynamic characteristics. [3]
  c) List out active transducers. [2]
  d) State the characteristics of manometer fluid. [3]
  e) List out contactless electrical tachometers. [2]
  f) What is the relationship between the rotational speed and the flashing rate of stroboscope directed onto a single radial mark on the rotating wheel? [3]
  g) State the factors to be considered for the selection of material used in strain gauges. [2]
  h) Draw the neat diagram of Sling psychrometer and mention components. [3]
  i) State any two merits of closed loop control systems. [2]
  j) Distinguish between servomechanism and process control. [3]

PART-B
(50 Marks)

2.a) Draw the generalized scheme of a typical measurement system and explain about various components of it.
  b) State and explain various types of errors in measurements. [5+5]

OR

3.a) Draw the block diagram of first order system. Derive the equation of transfer operator for the first order system.
  b) Derive the steady-state responses of first order system with respect to:
   i) Step input and ii) Ramp input. [4+6]

4. Explain the construction and principle of LVDT with a neat diagram and compare it with capacity pickup transducer. [10]

OR

5.a) Explain the working principle of Bimetallic thermometer with a neat diagram.
  b) A platinum resistance thermometer has a resistance of 140.5 and 100.0 Ω at 100 and 0^0C respectively. If its resistance becomes 305.3 Ω when it is in contact with a hot gas, determine the temperature of the gas. Take the temperature coefficient of platinum as 0.0039^0C^{-1}. [5+5]