R16

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year I Semester Examinations, December - 2019
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 as sub questions.

PART – A

(25 Marks)

1.a)	Define hysteresis.	[2]
b)	What are the functions of a transducer?	[3]
c)	What materials are used for thermocouples?	[2]
d)	What are the limitations of bulk modulus pressure gauges?	[3]
e)	List the disadvantages of bubbler level indicator.	[2]
f)	Can a piezoelectric accelerometer be used to check constant acceleration? Justify your answer.	[3]
g)	List the parameters to be considered for the selection of metallic strain gauges.	[2]
h)	What are the limitations of elastic force meters.	[3]
i)	Give the classification of control systems.	[2]
j)	Define and explain transfer function.	[3]

PART – B

(50 Marks)

2.   Discuss in detail about the dynamic performance characteristics of measuring instruments.
                                                                                          [10]

OR

3.a) Compare and contrast various displacement measuring principles.
  b) What is calibration? Discuss the need for calibration.   [5+5]

4.a) Explain the principles of working of bimetallic strip.
  b) Describe a dead weight pressure gauge and explain its working.   [5+5]

OR

5.a) Discuss in detail about the use of changes in chemical phase for assessing the temperature of a material.
  b) Explain the working of thermal conductivity gauges.   [5+5]

6.a) Suggest and explain a method for the measurement of level if the liquid is corrosive or explosive.
  b) Describe the basic concept of seismic instrument.   [5+5]

OR

7.a) Explain the principle of operation of electromagnetic flow meter. Discuss its merits.
  b) Listout the advantages and applications of non-contact type stroboscope.   [5+5]

8.a) Explain the working of hydraulic load cells.
  b) Describe a sling psychrometer and explain the working.   [5+5]

<div align="center">OR</div>

9. Define gauge factor of a resistance strain gauge. Derive an equation for the same. Give the assumptions made and limitations.   [10]

10. With the help of suitable line diagrams explain the working of position control system.
                    [10]

<div align="center">OR</div>

11.a) Establish an expression for the value of transfer function for a spring-mass damper system and a rotational mechanical system.
  b) Explain the applications of servomechanism.   [4+6]

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