

R16

Code No: 137DN

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. [5+5]
- b) What is calibration? Discuss the need for calibration. [5+5]

- 4.a) Explain the principles of working of bimetallic strip. [5+5]
- 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. [5+5]
- 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. [5+5]
- 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. [5+5]
- b) List out the advantages and applications of non-contact type stroboscope. [5+5]

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

OR

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]

OR

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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