

16AG5A0302

Code No: 127EA

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year I Semester Examinations, November/December - 2018

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) ✓ State the two differences between the basic and auxiliary functional elements of measurement system. [2]
- b) ✓ State the different sources of errors in measurements and measuring instruments. [3]
- c) ✓ State the advantages of electric transducers over mechanical transducers. [2]
- d) ✓ Explain why it is desirable to use that piezo-electric transducers should be used for measuring of dynamic quantities only. [3]
- e) ✓ State the two advantages and two limitations of rotameter. [2]
- f) ✓ State the principles of seismic accelerometer. [3]
- g) ✓ Define gauge factor. [2]
- h) ✓ Define Humidity ratio, Dew point temperature and wet bulb temperature. [3]
- i) ✓ Define control system. [2]
- j) ✓ Draw the block diagram representation of a generalized feedback control system. Identify the various system components. [3]

## PART-B

(50 Marks)

- 2.a) ✓ State and explain the basic principles of measurements.
- b) ✓ Explain about the various stages of general measurement system using a bourdon pressure gauge as an example with a neat sketch. [5+5]

OR

- 3.a) ✓ State and explain the dynamic characteristics of a measurement system.
- b) ✓ What is meant by Zero order system? Write the relevant governing equations. [5+5]

- 4.a) ✓ Explain the construction and working principle and advantages of capacitive transducers.
- b) ✓ Explain the working principle of filament type of optical pyrometer with a neat diagram. [5+5]

OR

- 5.a) ✓ Derive the equations for U-tube manometer for measuring the pressure.
- b) ✓ Explain the working principle of ionization gauges for measuring the low pressures using a neat diagram. [5+5]

- 6.a) ✓ Explain the working principle of ultrasonic of flow level meter.
- b) ✓ Explain the construction and working principle of turbine flow meter with a neat diagram. State its limitations also. [5+5]

OR

7. Explain the construction and working principle of stroboscope. State its advantages and limitations. [10]

8.a) What is meant by strain gauge rosette? Explain about the various types of rosettes.  
b) List out various types of electrical hygrometers for measuring the relative humidity. Explain atleast one in detail with a neat diagram. [5+5]

OR

9. Explain the construction and working principle of rope brake type absorption dynamometer with a neat diagram. [10]

10.a) Distinguish between open-loop control system and closed-loop control system.  
b) Draw and explain block diagram for temperature control system. [5+5]

OR

11.a) What is meant by servomechanism? Explain its importance.  
b) Draw and explain block diagram for position control system. [5+5]

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