

Code No: 117EA

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B. Tech IV Year I Semester Examinations, November/December - 2017****INSTRUMENTATION AND CONTROL SYSTEMS****(Common to AME, ME)****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) Define Resolution and Threshold. [2]
- b) How errors are classified? Enumerate the various sources of errors. [3]
- c) State the difference between thermometer and thermistor. [2]
- d) Describe the constructional details and application of different types of Diaphragm pressure gauges. [3]
- e) State the principle of capacitive level indicator. [2]
- f) What is a turbine flow meter? [3]
- g) Define absolute humidity. [2]
- h) Explain strain gauge rosettes. [3]
- i) What is a servo mechanism? [2]
- j) Differentiate Open and closed loop control systems with a suitable examples. [3]

**PART-B****(50 Marks)**

2. Explain the following terms:
  - a) Range and span
  - b) Resolution
  - c) Calibration
  - d) Sensitivity.[10]
- OR
3. Sketch and explain with a block diagram generalized measurement system and its elements with an example. [10]
4. State law of thermocouples. How are the laws useful in construction of thermocouple thermometers? [10]
- OR
5. Discuss the application areas in which low pressures are maintained. List out various indirect methods for measurement of low pressure and explain any two methods. [10]
6. A Stroboscope projects 6000 flashes per minute on a disk mounted on the shaft of a machine. Find the speed of the machine if the disk appears stationary and has a single image of 10 points. [10]



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**OR**

- 7.a) Explain the working of mechanical tachometer with a neat sketch.
- b) State the difference between vibrometer and accelerometer.

[8+2]

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- 8. Describe the functioning of a stroboscope and explain how speed of a rotating shaft can be measured using a single pattern and multi-pattern disc.

[10]

**OR**

- 9. How does a mechanical load cell work? Explain the principle of measuring shaft torque using strain gauge torsion meter.

[10]

- 10. Draw a block diagram of closed loop control system. Describe its working for motor speed control.

[10]

**OR**

- 11. What is a block diagram? Explain the steps involved in the preparation of block diagrams.

[10]

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