

Code No: 117EA

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B. Tech IV Year I Semester Examinations, March - 2017****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) What is the role of manipulation elements of measuring elements. [2]
- b) Give the classification of errors found in measures instruments. [3]
- c) Give the classification of measurement of pressure. [2]
- d) Explain the working principle of manometers [3]
- e) Explain the Working principle of Seismic instruments. [2]
- f) Explain the principle of operation of hot wire anemometer. [3]
- g) Explain the functions of strain gauge rosettes. [2]
- h) Explain the measurement of power using elastic force meters. [3]
- i) What are the requirements of a control system? [2]
- j) What are the basic elements of a control system? Explain [3]

**Part-B (50 Marks)**

2. a) Classify measuring instruments.
- b) What are desired, modifying and interfering inputs for a measurement system? Give examples each of these quantities. [5+5]

**OR**

3. a) What are the different sources of errors in measurements and measuring instruments? Explain them in brief.
- b) Describe the terms Linearity, Repeatability and calibration. [5+5]

4. Write a short note measurement of pressure by the following gauges

a) Thermal conductivity gauges

b) Mcleod pressure gauge. [5+5]

**OR**

5. a) Compare and contrast the advantages and limitations of resistance thermometers and thermistors.
- b) Describe the construction and working of Ionization pressure gauges for measurement of pressure. [5+5]

6. a) Describe the construction of bubbler level indicator.
- b) Explain the working principle of ultrasonic flow meter. [5+5]

**OR**

7.a) Discuss in detail about electrical tachometers.

b) What are the mechanical methods to measure the vibrations explain with neat sketches. [5+5]

8.a) What is the temperature compensation with respect to strain gauges?

b) List the essential characteristics required for the backing material of a bonded strain gauge. [5+5]

9.a) Explain with neat sketch the principle of sling psychrometer.

b) Discuss in detail with neat sketch the working principle of torsion meters. [5+5]

10.a) Explain the advantages of open loop control system.

b) Discuss about speed control systems. [5+5]

11.a) What is a servomechanism? Describe the feature of servomechanism.

b) What is a block diagram? Explain the steps involved in the preparation of block diagrams. [5+5]

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