Code No: R32034 **R10** **Set No: 1**

JNT University Kakinada

III B.Tech. II Semester Supplementary Examinations, January/February -2015

INSTRUMENTATION AND CONTROL SYSTEMS

(Common to Mechanical Engineering and Automobile Engineering)

Time: 3 Hours Max Marks: 75 Answer any FIVE Questions

All Questions carry equal marks

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1. a) What is the difference between accuracy and uncertainty, and precession and accuracy?
   b) In a Wheatstone bridge a change of 9 in the unknown arm of the bridge is required to produce a change in the deflection of 3 mm of the galvanometer. Determine i) sensitivity ii) deflection factor

2. a) What are the types of Photo elastic transducers? explain?
   b) Explain the factors which influence the response of a temperature sensing device

3. a) Explain Pirani type thermal conductivity gauge with a sketch?
   b) Explain strain gauge cell with a sketch

4. a) Explain Flow measurement by differential pressure detecting elements
   b) Explain Bubbler lever indicators?

5. a) Explain the working of electrical tachometer?
   b) Describe the principle of accelerometer?

6. a) Why measure surface strain?
   b) Explain strain gauge bridge and amplifier for use with C.R.O?

7. a) What is the importance of humidity? Explain the importance of measurement in various industry process?
   b) Explain mechanical torsion meter and derive its equation?

8. a) Sketch and explain the simple single loop feedback control systems?
   b) Explain speed and position control system?

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Code No: R32034 **R10** **Set No: 2**

JNT University Kakinada

III B.Tech. II Semester Supplementary Examinations, January/February -2015

INSTRUMENTATION AND CONTROL SYSTEMS

(Common to Mechanical Engineering and Automobile Engineering)

Time: 3 Hours Max Marks: 75

Answer any FIVE Questions

All Questions carry equal marks

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1. a) Explain the different sources of error in measurement?
   b) Explain the standard inputs for studying dynamic response of a system?

2. Describe the construction, principle of working and applications of Hall effect transducers?

3. a) Why are manometers are treated as standards for pressure and differential pressure measurements?
   b) What are the applications of thermistors?

4. A bubbler system is to be used to measure the level of a reservoir. If the spanis to be 3 to 10 m of water. What is the minimum pressure required? What would be the desired minimum water supply?

5. a)Explain Eddy current type tachometers ? What are the characteristics of tachometer?
   b) What are the principles of seismic instruments?

6. A rectangular strain gauge rosette gave the following reading at a point :
   $\varepsilon_0=1240\times10^{-6}$ $\varepsilon_{45}=400\times10^{-6}$ $\varepsilon_{90}=200\times10^{-6}$. Determine the magnitudes and direction of the principal stresses present at the point E = 210 GN/m^2, υ =0.3.

7. a) Explain Proving rings with a sketch?
   b) What are the factors affecting accuracy of measurements?

8. a) Explain the evaluation of Process control?
   b) What are the advantages of micro processor based systems?

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Code No: R32034 **R10** **Set No: 3**

JNT University Kakinada

III B.Tech. II Semester Supplementary Examinations, January/February -2015

INSTRUMENTATION AND CONTROL SYSTEMS

(Common to Mechanical Engineering and Automobile Engineering)

Time: 3 Hours Max Marks: 75

Answer any FIVE Questions

All Questions carry equal marks

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1. a) Explain the standard inputs for studying dynamic response of a system.
   b) What is the relation between sensitivity and range? What are the disadvantages of very sensitive instruments?

2. a) Explain electronic tube transducers.
   b) What are the precautions to be taken in the use of thermocouples?

3. a) Explain low pressure measurement devices.
   b) Describe the Construction, Working and theory of McLeod gauge for measurement of Vaccum?

4. The stream velocity in water being measured by a Pitot tube is 400 meter per minute. The manometer differential is 200 mm Hg at 25° C. What is the velocity coefficient of the Pitot tube ?

5. a) Explain the causes of vibrations in machines? Explain optical method of vibration?
   b) Explain electrical tachometer with a neat sketch ?

6. a) Explain the Wheatstone bridge circuit with a sketch.
   b) What are the commercial strain measuring systems.

7. a) Explain sling Psychomotor with a neat sketch?
   b) Explain resistance hygrometer with a sketch?

8. a) What are the difference between open loop and closed loop system?
   b) Explain the working of servo mechanism?

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Code No: R32034 **R10** **Set No: 4**

JNT University Kakinada

III B.Tech. II Semester Supplementary Examinations, January/February -2015

INSTRUMENTATION AND CONTROL SYSTEMS

(Common to Mechanical Engineering and Automobile Engineering)

Time: 3 Hours Max Marks: 75

Answer any FIVE Questions

All Questions carry equal marks

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1. a) Discuss the various types of error.
   b) What is dynamic accuracy of an instrument?

2. a) What are the essential considerations to obtain accurate temperature readings with the minimum dynamic error ?
   b) What are the advantages of force balance type transducers?

3. How are high pressure measured? Explain briefly with a neat sketch the construction and working of Bridgman gauge.?

4. a) Explain Cryogenic fuel level indicators and bubler level indicators with neat Sketches?
   b)What are the methods of mounting orifice plates?

5. a) Explain the methods of motion and vibration measurement?
   b) Explain ignition type tachometers?

6. A T delta rosette bonded to aluminum specimen gave the following readings $\varepsilon_0 = 200$ $\varepsilon_{60} = 250$ $\varepsilon_{90} = -400$, $\varepsilon_{120} = 150$. Calculate the principal stresses present at the point $E = 70\ GN/m^3$, $\upsilon = 0.32$.

7. a) Explain industrial dew point device with a neat sketch.
   b) Explain differential transformer with a sketch.

8. Explain the following:
   a) Open loop transient method
   b) Frequency Response method
   c) Servo mechanism.

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