Code No: RT31034 **R13** SET - 1

III B. Tech I Semester Regular/Supplementary Examinations, October/November - 2017

INSTRUMENTATION & CONTROL SYSTEMS

(Mechanical Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1 a) What is meant by accuracy and precision?
b) What is the working principle involved in measurement of pressure by bimetallic thermometers?
c) List out the different applications of stroboscope.
d) What are the functions of resistance strain gauges?
e) What is meant by dynamometer? What are the different types of dynamometers?
f) What are the advantages of closed loop system?

PART –B

2 a) What are the different types of errors occurred in measurement system? Explain them in detail.
b) Explain the Piezo-electric transducer for measurement of displacement with neat sketch

3 a) Explain the working of thermistor with neat sketch
b) Explain the working of Bourdon Pressure gauge

4 a) Give the classification of mechanical tachometers. Explain the working of mechanical tachometer with neat sketch
b) Explain the working principle involved in seismic instrument

5 a) Explain the working of electrical strain gauge with neat sketch
b) Explain the working of Tension- compression resistance strain gauge load cell

6 a) Explain the working of mechanical humidity sensing absorption hygrometer
b) Explain the working of hydraulic dynamometer with neat sketch

7 Explain how temperature can be measured by using a closed loop with a block diagram. What are the different units present in the block diagram and explain the functions of each unit

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Code No: RT31034 **R13** SET - 2

III B. Tech I Semester Regular/Supplementary Examinations, October/November - 2017

INSTRUMENTATION & CONTROL SYSTEMS

(Mechanical Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1 a) What is meant sensitivity and repeatability?
b) What are the salient features of liquid-in glass thermometers?
c) What is the working principle involved in capacitive level indicator?
d) What are the functions of strain rosettes?
e) What is meant by load cell? What are the applications of load cells?
f) What is the need of feed back in control system?

PART –B

2 a) Explain the basic components of measurement system with the block diagram
b) Explain the ionization transducer for measurement of displacement with neat sketch

3 a) Explain thermo couple with a neat sketch. Explain the dynamics involved in the thermocouple in the measurement of temperature
b) Explain the ionization pressure gauge with neat sketch

4 Write a short note on the following with neat sketch
a) Laser Doppler anemometer b) Cryogenic fuel level

5 a) Explain the working principle of unbounded strain gauge with diagram
b) Write the difference between bonded and unbounded strain gauges

6 a) Explain the working principle of absorption psychrometer with a neat diagram
b) Explain the construction and working of the dew point meter

7 a) What is a closed loop? Show the various elements of closed loop and list out the functions of each element
b) List out the advantages of open loop over the closed loop

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Code No: RT31034 **R13** SET - 3

III B. Tech I Semester Regular/Supplementary Examinations, October/November - 2017

INSTRUMENTATION & CONTROL SYSTEMS

(Mechanical Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1 a) List out the applications of transducers
b) What is the working principle involved in measuring the temperature by electrical resistance thermometer?
c) What are the functions of electrical tachometer?
d) What is meant by torque cell?
e) What are the applications of psychrometers?
f) What do you mean by rate and acceleration feed back?

PART –B

2 a) Explain the different static characteristics of the measurement system
b) Explain the photo-electric transducer with the neat sketch

3 a) Explain the working principle of thermocouple with a block diagram
b) Write a short note on bellow gauges for measurement of pressure

4 a) Write a short on bubbler level indicator with neat sketch
b) Give a brief explanation on working of capacitive level indicator with a neat sketch

5 a) What are the requirements of materials for strain gauges?
b) With help of neat sketch explain how torque can be used in the measurement of strain

6 a) Write a short note on sling psychrometer with neat sketch
b) Explain the working principle of torsion meter

7 a) Classify open and closed systems and explain with suitable sketches
b) Explain the different feedback systems with neat sketches

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Code No: RT31034 **R13** SET - 4

III B. Tech I Semester Regular/Supplementary Examinations, October/November - 2017

INSTRUMENTATION & CONTROL SYSTEMS

(Mechanical Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1 a) What do you mean by environmental errors?
b) What is the working principle of bourdon pressure gauge?
c) List out the applications of vibrometer
d) What is meant by gauge factor?
e) What are the effects caused by moisture present in the gases?
f) What are the disadvantages of open loop ?

PART –B

2 a) Explain the dynamic characteristics of the measurement system
b) Explain the inductive transducer for the measurement of displacement

3 Explain the working of Mcleod pressure gauge with neat diagram. Explain the dynamics involved in the pressure measurement by using this gauge

4 a) Explain the working of Non-contact electrical tachometer with neat sketch
b) Explain the working of accelorometer with neat sketch

5 a) Explain the working of unbounded strain gauge with neat sketch
b) What is the importance of bridge circuit in strain gauge? Explain how the bridge circuit is needed for measurement of strain?

6 a) Explain the working of rope brake dynamometer with neat sketch
b) Explain the importance of load cells in the measurement of force

7 a) Write the difference between the closed and open systems
b) Explain servo mechanisms and their importance.

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