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3 Hours / 100 Marks Seat No. | | | | | | | | |

Instructions – (1) All Questions are *Compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Use of Non-programmable Electronic Pocket Calculator is permissible.

(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any TEN of the following: **20**

a) Define term hysteresis and dead zone.

b) Write the advantages and disadvantages of potentiometer.

c) State any four desirable characteristics of thermocouple material.

d) Draw the characteristic of LVDT and state its significance.

e) Define the term sensitivity of an instrument with example.

f) State different types of strain gauges.

g) What is control system? Give suitable example.

h) Write advantages and disadvantages of RTD.

i) Define any four sound characteristics.

j) Enlist any four type of control actions.

Marks

k) Define span of an instrument and how it is different from range.

l) State the limitations of open loop control system.

m) State the advantages and limitations of thermocouple vacuum guage.

n) State any four applications of encoders.

2. Attempt any FOUR of the following: **16**

a) What is measurement? State its basic requirement and significance.

b) Draw a neat sketch of LVDT and explain its working.

c) State law of intermediate temperature and law of intermediate metals.

d) Explain with neat sketch the working of hot wire anemometer.

e) How the speed measurement is done by stroboscope?

f) Compare open loop and closed loop control system.

3. Attempt any FOUR of the following: **16**

a) Explain the working of platinum resistance thermometer (RTD) with a neat sketch.

b) With the help of functional block diagram explain feedback control system.

c) Differentiate between accuracy and precision.

d) Explain the working of linear potentiometer for displacement measurement with a neat diagram.

e) Explain the working principle of hot wire anemometer in constant current and constant temperature mode with neat sketch.

f) Show that the gauge factor of resistance strain gauge is $F = 1 + 2\mu$ where F = gauge factor and μ = poission's ratio.

Marks

4. Attempt any FOUR of the following: **16**

a) Explain the construction and principle of working of RVDT with the help of neat sketch.

b) Compare active and passive transducer.

c) Explain with neat sketch, working of optical pyrometer.

d) Explain working of hair hygrometer for humidity measurement.

e) Explain the working of ultrasonic flow meter with a neat sketch.

f) Explain proportional control action with a neat diagram. State its applications.

5. Attempt any FOUR of the following: **16**

a) Explain McLeod guage with a neat sketch.

b) Explain radiation pyrometer with a neat sketch.

c) What are the static characteristics of any instrument? State any four static characteristics of measuring instrument.

d) Draw a neat sketch of Rotameter and describe its working in brief.

e) Explain with a neat sketch working of mechanical type Lathe Tool Dynamometer.

f) Differentiate between hydraulic and pneumatic control system.

6. Attempt any FOUR of the following: **16**

a) Define error. Explain different types of errors in measurement.

b) State the working principle of pirani guage with a neat sketch.

c) Differentiate between resistance thermometer thermister.

d) Explain servomotor mechanism, with a block diagram.

e) Define strain Gauge Rosette. How it is used for strain measurement?

f) Describe working of closed loop control system with the help of block diagram.

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