17434

16172

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

Instructions : (1) All Questions are *compulsory.*

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

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

Marks

1. (A) Attempt any SIX : **12**

(a) Classify the following transducers as active or passive transducer :

(i) Thermocouple

(ii) Strain gauge

(b) Define primary and secondary transducer.

(c) Draw the constructional diagram of bimetallic thermometer and label it.

(d) Define laminar flow and turbulent flow.

(e) Define humidity. List any one unit of it.

(f) Draw NTC and PTC characteristics of temperature transducer.

(g) Define Reynolds number. Write its value for laminar flow.

(h) Draw the block diagram of instrumentation system.

(B) Attempt any TWO : **8**

(a) Draw the neat sketch of Rotameter. Explain why it is classified under variable area type flowmeter.

(b) Draw the neat diagram of Dead Weight Tester. Explain its operation in brief.

(c) State any two advantages and any two disadvantages of radiation type level measurement system.

2. Attempt any FOUR : **16**

(a) Draw the diagram of inclined tube manometer. State any two of its advantages over U-tube manometer.

(b) Draw the electromagnetic flow-meter. State its output voltage equation.

(c) Convert 50 °C into any two different scales of temperature.

(d) Explain float type – linear potentiometer type level measurement with neat diagram.

(e) Explain in brief with diagram :

(i) Diaphragm

(ii) Piezoelectric transducer

(f) Draw neat diagram and explain the operation of hair hygrometer.

3. Attempt any FOUR : **16**

(a) Write two names of transducers :

(i) Resistive type transducer

(ii) Primary transducer

(b) Show diagrammatically –

(i) Absolute

(ii) Gauge

(iii) Vacuum

(iv) Atmospheric pressure.

(c) Explain the working principle of RADAR type level measurement with diagram.

(d) Compare RTD and thermistor on the basis of –

(i) Temp. coefficient

(ii) Temp. range

(iii) Materials

(iv) Linearity

(e) Explain the working of photo-electric pick-up type speed measurement with neat diagram.

(f) (i) Calculate the resistance of PT-100 for 40 °C.

(ii) List any **one** name of material used for

(1) RTD

(2) Thermistor

(3) Thermocouple

(4) Bimetallic strip

4. Attempt any FOUR : **16**

(a) Explain the working of capacitance type level measurement with neat diagram.

(b) List any four selection criteria of a transducer.

(c) Draw the neat diagram of pyrometer. Explain principle of working of it.

(d) Define absolute humidity and relative humidity. Write the any one unit of each.

(e) List the values and names of following parameters for thermocouple types J, K :

(i) Temp. range, (ii) Materials used in it.

(f) List any four units for pressure.

5. Attempt any FOUR : **16**

(a) Explain the working principle of ultrasonic flow meter with neat diagram.

(b) Explain the working principle of gas filled thermometer with diagram.

(c) Explain the working principle of piezoelectric transducer with neat diagram.

(d) Explain the working of ultrasonic level measurement with neat diagram.

(e) Compare contact type and noncontact type speed measurement method. (any four points)

(f) Explain the working principle of diaphragm with strain gauge for pressure measurement.

6. Attempt any FOUR : **16**

(a) Compare active and passive transducer. (Any four points)

(b) List the materials used for Bourdon tube and bellows. List the range of pressure measurement by both transducers.

(c) Draw the diagram of different types of orifice plate (any two). Explain working principle of orifice plate for flow measurement in brief.

(d) List the range of level in float type and capacitance type level measurement. Comment on plates of capacitance level measurement when liquid is (i) conducting type and (ii) nonconducting type.

(e) List the range of temperature measured by – (i) RTD, (ii) Pyrometer (iii) Bimetallic thermometer, (iv) Gas filled thermometer.

(f) Convert 520 mm of Hg into bar, PSI.
