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16117

3 Hours / 100 Marks

Seat No.

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

Marks

1. a) Attempt any SIX of the following: 12
- (i) Define:
 - 1) Absolute pressure
 - 2) Gauge pressure
 - (ii) State the need of transducer in instrumentation system.
 - (iii) Draw labeled diagram of gas filled thermometer.
 - (iv) Define laminar and turbulent flow.
 - (v) What is absolute and relative humidity?
 - (vi) Define NTC and PTC.
 - (vii) Draw neat labelled diagram of Rotameter.
 - (viii) Give the classification of pressure measuring devices.

P.T.O.

b) **Attempt any TWO of the following:****8**

- (i) Draw the neat diagram of venturimeter and describe how flow is being measured.
- (ii) Draw the constructional details of 'C' type bourdon tube, and describe its operation for pressure measurement.
- (iii) Draw a neat setup diagram to measure level of liquid in a tank using capacitive method.

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

- a) Draw the constructional details of well type manometer and list its two applications.
- b) Describe the working of ultrasonic flow meter with neat diagram.
- c) With the help of a neat labeled diagram describe the operation RTD.
- d) What is the need of level measurement? Give classification of level measurement methods with two examples for each.
- e) Give the classification of transducer with one example for each.
- f) Describe the dry and wet bulb thermometer method for humidity measurement. What is the unit of humidity expressed by it?

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

- a) List any six selection criterion of a transducer. Why motor / generator is not transducer?
- b) List the names of elastic pressure transducers and draw construction details of any one.
- c) Write two advantages and applications of ultrasonic level measurement.
- d) Compare RTD and Thermistor w.r.t.:
 - (i) Characteristics,
 - (ii) Materials,
 - (iii) Temperature range
 - (iv) any other point
- e) Give the classification of speed measurement methods. Draw neat diagram of any one.

- f) Write the temperature range and material used for following thermocouples:
- (i) J Type
 - (ii) K Type
 - (iii) R Type
 - (iv) T Type

4. Attempt any FOUR of the following: 16

- a) Describe the float type level measurement technique with neat diagram.
- b) Draw the input-output characteristics of LVDT? Why the secondary windings are connected in series opposition?
- c) (i) Give different temperature scales with conversion formulae. Convert 107° into $^{\circ}\text{C}$.
(ii) Write the use of centigrade and Kelvin scale.
- d) Give the construction details of hair hygrometer and describe its operation. List two materials used for it.
- e) Name the materials with temperature ranges and shapes of thermistor.
- f) Draw the construction of spiral and helical bourbon tube. List its one advantage over C-type bourbon tube.

5. Attempt any FOUR of the following: 16

- a) Describe with sketch electromagnetic flow meter. Write the o/p equation of it.
- b) What is pyrometry? State two types and application of it.
- c) State the working principle of potentiometric transducer with two applications.
- d) Describe the working of radiation type level measurement. List the materials used for it.
- e) Explain the speed measurement using photoelectric pick-up. Write the output equation of it.
- f) What is manometer? List types of manometer.

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

- a) Write the principle of piezoelectric transducer with neat diagram. List two applications of it.
 - b) Draw the diagram of electronic pressure transducer:
 - (i) Bourdon tube with LVDT
 - (ii) Diaphragm type to get electrical voltage as output.
 - c) (i) State the materials used for following restrictions:
 - 1) Orifice plate
 - 2) Venturi tube
 - (ii) Draw any two types of orifice plate.
 - d) State two advantages and disadvantages of capacitance level indicator.
 - e) Draw the bimetallic thermometer. Draw its effect for hot and cold temperature. Write the materials used for it.
 - f) How pressure gauge is calibrated with dead weight tester?
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