# 17434

**11920**

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

(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) Draw the suitable diagram indicating following pressures -

(1) Zero pressure

(2) Atmospheric pressure

(3) Absolute pressure and

(4) Gauge pressure

(ii) Define transducer. Write one example.

(iii) What is PT-100? Is PT-100 is PTC type or NTC type?

(iv) Define laminar flow and turbulant flow.

(v) Define humidity. What is absolute humidity?

(vi) Draw NTC type characteristics and write one example of it.

(vii) What is Reynolds number? Write its value for tubulant flow.

**Marks**

(viii) Identify active and passive transducers from the following:

(1) Thermistor

(2) LVDT

(3) Piezoelectric transducer

(4) Thermocouple

b) **Attempt any <u>TWO</u> of the following:** **8**

(i) Draw the diagram of electromagnetic flowmeter.

Write the equation of its output. What is the criteria of the flowing fluid in it?

(ii) Explain the operation of dead weight tester.

(iii) Explain the working of capacitance type level measurement.

Write output equation of it.

**2. Attempt any <u>FOUR</u> of the following:** **16**

a) Draw the diagram of U-tube manometer, inclined tube and well type manometer. Write advantage of well type manometer.

b) Write the name and equation of the principle used in variable head type flow meter. What is the meaning of variable area in Rotameter?

c) Explain the working principle of RTD. Write two advantages and disadvantages of it.

d) Explain the working of Ultrasonic type level measurement.

e) Write the classification of transducers. Write one example of primary and secondary transducers.

f) Draw the diagram of Hair hygrometer and write the two materials used in it.

**Marks**

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

a) List eight selection criterion of a transducer.

b) Define the term: absolute pressure, vacuum pressure.

c) Explain the working principle of Radiation type level measurement. List two radiation materials used in it.

d) Calculate the value of resistance of PT-100 at 40°C

e) Explain the working principle of psychrometer.

f) Compare RTD and Thermistor on the basis of -

(i) Principle

(ii) Materials used

(iii) Temperature range

(iv) Compensation

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

a) Compare ultrasonic type and Radar type level measurement.

b) Write one example of -

(i) Inductive transducer

(ii) Capacitive transducer

(iii) Resistive transducer

(iv) Piezoelectric transducer

c) Mention different temperature scales and give conversion formulae. Convert 35°C in °F and °K.

d) Describe the operation of photoelectric type speed measurement method with neat diagram and equation/formula.

e) List any two types of thermocouple with material, range.

f) Draw C-type Bourdon tube. List other types of Bourdon tubes.

**Marks**

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

a) Explain the principle of Doppler type flow meter, with neat diagram.

b) Describe the operation of Bimetallic thermometer with neat diagram. Write the materials used in it.

c) Draw the block diagram of instrumentation system and write the function of each block.

d) Draw the diagram of Linear and Rotary potentiometer type (Float type) level measurement. Write the level range of it.

e) List one example of contact type and non-contact type sensors/method for the following -

(i) Speed measurement

(ii) Flow measurement

f) Draw the diagram of Diaphragm type pressure transducer. Write the range pressure using Diaphragm type and Bellows type pressure transducer.

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

a) Compare -

(i) Active and passive transducer

(ii) Primary and secondary transducer.

b) List the elastic type and Non-elastic type pressure transducers. (Each any two)

c) Compare orifice plate and venturi plate with reference to

(i) Working principle

(ii) Cost

(iii) Permanent pressure loss

(iv) Maintenance

d) Describe the working principle of Radar type level measurement.

e) Describe the working principle of pyrometer.

f) If a pressure gauge is showing 810 mm of Hg, then calculate the value of

(i) Absolute pressure

(ii) Gauge pressure