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.

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

1. a) Attempt any SIX of the following: 12

    (i) List the four different units of pressure.

    (ii) Define transducer. Give two examples.

    (iii) State seeback and peltier effect.

    (iv) Why Rotameter is called variable area meter?

    (v) Define:

        1) Absolute Humidity

        2) Relative Humidity

    (vi) State the working principle of thermocouple.

    (vii) State the different types of flow.

    (viii) Draw the block diagram of instrumentation system.
b) **Attempt any TWO of the following:**  
   (i) Describe working of venturimeter with neat sketch.  
   (ii) Explain the working of dead weight tester with neat diagram.  
   (iii) With neat diagram, explain working of capacitance level measurement.

2. **Attempt any FOUR of the following:**  
   a) Draw the constructional detail of ‘C’ type Bourdon tube and explain its working.  
   b) Write application of following transducer.  
      (i) Venturi tube  
      (ii) Orifice plate  
      (iii) Ultrasonic flow meter  
      (iv) Positive displacement flow meter.  
   c) Give construction, working principle of RTD with a neat sketch.  
   d) List the advantages and disadvantages of float types level guages.  
   e) State the selection criteria for transducer (any eight points).  
   f) Describe how humidity is measured by using hair type hygrometer.
3. **Attempt any **FOUR** of the following:**

a) Draw construction diagram of LVDT with label. Also state the application of LVDT.

b) What are the different pressure measurement method? State the working principle of U-tube manometer.

c) Describe the radiation type level measurement technique.

d) Compare NTC and PTC w.r.t. thermistor. (any four points)

e) Describe how speed is measured by photoelectric method with neat diagram.

f) Describe with neat diagram how temperature is measured by liquid filled thermometer.

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

a) Describe the work in principle of Ultrasonic level measurement with neat diagram.

b) What is piezoelectric effect? Name two piezoelectric materials.

c) What is pyrometry? Describe working of optical pyrometer with neat diagram.

d) What is tachometer? Explain photo-electric pickup.

e) State two advantages and two drawbacks of liquid filled and gas filled thermometer.

f) What is capsule? How it is used for pressure measurement?
5. **Attempt any FOUR of the following:**

   a) Explain any one type of ultrasonic flow meter with neat diagram.

   b) What is thermistor? Discuss its different types with proper diagram.

   c) Classify each of the following transducers in two different categories.
      
      (i) Thermocouple
      
      (ii) LVDT
      
      (iii) Bourdon tube
      
      (iv) Strain guage

   d) Draw a diagram of radar level measurement. Write an advantages and disadvantages of it.

   e) State the advantages and disadvantages of photoelectric tachometer.

   f) Define guage factor. How strain guage is suitable for pressure measurement.
6. **Attempt any FOUR of the following:**

   a) Explain working principle of RVDT with figure.

   b) Draw the experimental setup to measure pressure in terms of voltage. And also discuss which types of transducer used in it.

   c) Compare orifice plate and venture tube with reference to:

      (i) Working principle

      (ii) Construction

      (iii) Maintenance cost

      (iv) Use.

   d) Compare Ultrasonic and Radar level measurement with respect to working principle and constructions.

   e) Explain working principle of bimetallic thermometer.

   f) Compare between U tube and well type manometers.

   (any four points).