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3 Hours / 70 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.

Marks

1. Attempt any FIVE of the following : **10**

(a) Define Transducer. Give two examples.

(b) Compare Active & Passive Transducers. (2 points)

(c) List the types of variable head flow meters.

(d) Give advantages and disadvantages of float type level sensors. (each 2)

(e) Define laminar flow and turbulent flow.

(f) Give classification of level measurement methods.

(g) State formula for Reynold's number.

2. Attempt any THREE of the following : **12**

(a) Write any two applications of capacitive and inductive transducers.

(b) A pt-100 type RTD has α = 0.00392/ ^{o}C. Find its output resistance for temperature 25 ^{o}C and 80 ^{o}C.

(c) Describe the working principle of 'C' type Bourdon tube with a neat diagram.

(d) Draw and explain Doppler type flow measurement.

3. Attempt any THREE of the following : **12**

(a) State working principle of Bimetallic thermometer with neat diagram.

(b) Compare U tube and well type manometers. (any 4 points)

(c) Explain the working of the rotameter with a neat diagram.

(d) List any two advantages and applications of RADAR type level measurement.

4. Attempt any THREE of the following : **12**

(a) Define : (i) Absolute pressure (ii) Gauge pressure (iii) Atmospheric pressure (iv) Vacuum pressure.

(b) Compare Nuclear Radiation type and Ultrasonic level measurement. (any 4 points)

(c) List types of temperature scales. Write the ice point and boiling point temperature of pure water in any 2 scales.

(d) Differentiate between venturi and orifice plate flow measurement with respect to – (i) Range of flow measurement (ii) Materials used (iii) Working principle (iv) Cost

(e) Draw and explain capacitive type level transducer.

5. Attempt any TWO of the following : **12**

(a) State piezoelectric effect. State materials used for piezoelectric transducers. Draw and explain working of piezoelectric transducers.

(b) What is pyrometry ? Describe the working of an optical pyrometer with a neat diagram.

(c) Explain the working of strain gauge load cells with a neat diagram. Write any 2 applications of it.

6. Attempt any TWO of the following : **12**

(a) Convert 200 ^{o}F into Celsius (^{o}C) Kelvin (^{o}K) and Rankine (^{o}R).

(b) Compare Bellows and diaphragm w.r.t. construction, sensitivity, working principle, application, pressure range, material.

(c) Determine the velocity of flow in an electromagnetic flow meter for flowing condition. The flux density in the liquid has an average value of 0.08 weber/m^2. The diameter of the pipe is 10 cm. The induced voltage of the electromagnetic flow meter is recorded as 0.2 mV.
