

- N.B.:** (1) Question No. 1 is **compulsory**.  
 (2) Attempt any **four** questions from remaining **six** questions.  
 (3) Assume **suitable** data whenever **necessary**.

1. (a) Draw neat sketches of Elastic Pressure Transducers. 5  
 (b) Explain balanced bridge and unbalanced bridge w.r.t. strain gauge. 5  
 (c) Compare orifice with venturimeter. 5  
 (d) Explain Venacontracta and Reynold's number. 5
  
2. (a) Derive Bernoulli's equation. 10  
 (b) Resistance strain gauges with a gauge factor of 2.00 is cemented to a steel member, which is subjected to a strain of  $1 \times 10^{-10}$ . If the original resistance value of gauge is  $130 \Omega$ , calculate output voltage if half bridge and quarter bridge is used. Assume current through the gauge is limited to 25 mA. 10
  
3. (a) Derive Gauge factor =  $1 + 2 \nu$  for strain gauge. 10  
 (b) Draw and explain pressure measurement using Bourdon tube and LVDT. 10
  
4. (a) Explain construction and working of variable area type Flowmeter. 10  
 (b) An inverted U-tube manometer is connected to two horizontal pipes A and B through which water is flowing. The vertical distance between the axes of these pipes is 30 cm. When oil of Sp. gravity 0.8 is used as a gauge fluid, the vertical heights of water column in the two limbs of the inverted manometer (when measured from the respective centre lines of the pipes) are found to be same and equal to 35 cm. Determine the difference of pressure between the pipes. 10
  
5. (a) Explain how Thermocouple is used to measure Low pressure. 10  
 (b) State different units of following measurements :— 10
  - (i) Pressure
  - (ii) Flow
  - (iii) Viscosity
  - (iv) Humidity
  - (v) Low pressure.
  
6. (a) Explain construction and working of Electromagnetic Flowmeter. State its advantages and limitations. 10  
 (b) Explain different types of Manometers. 10
  
7. Write a short notes on :— 20
  - (a) Torque measurement
  - (b) Load cell
  - (c) Strain gauge types
  - (d) Hot wire Anemometer.