**21222**

**3 Hours / 70 Marks**   Seat No. ☐☐☐☐☐☐☐☐

15 minutes extra for each hour

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

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

**Marks**

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

a) State the principle of positive displacement flow meter.

b) Draw a neat diagram of metallic diaphragm gauge.

c) Define measurement and calibration.

d) Define control system.

e) Name any two methods of indirect liquid level measurement.

f) Give any two advantages of LVDT.

g) Convert 98°F to degree centigrade

Marks

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

a) Describe with sketch the working of ultrasonic method of level measurement.

b) Explain with sketch the use of dead weight tester for calibration of pressure gauge.

c) State the factors to be considered for valve selection.

d) Differentiate between resistance thermometer and thermistor. (any four points)

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

a) Describe working of Mcleod gauge with neat diagram.

b) Explain construction and working of bimetallic thermometer with neat diagram.

c) Draw block diagram of Architecture of a programmable logic controller.

d) Define the following:

    (i) Static error

    (ii) Repeatability

    (iii) Dead Zone

    (iv) Drift

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

a) Draw a neat diagram of spiral bourdon tube and helical bourdon tube.

b) Describe with neat sketch the construction of capacitance level indicator.

c) Describe with sketch the use of functional elements for measurement of any physical system.

d) Enlist types of control valve. Give the function of valve actuators.

e) Give the detailed classification of temperature measurement.

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

   a) Describe construction and working of magnetic flow meter with neat diagram.

   b) State the mathematical relation between the fluid flow rate through the valve and valve opening for :

      (i) Linear inherent flow characteristics.

      (ii) Equal percentage inherent flow characteristic.

      (iii) Quick opening characteristics.

   c) Describe construction and working of radiation pyrometer with neat diagram.

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

   a) Differentiate between open loop system and closed loop system (any six points)

   b) Describe construction and working of Air purge method of level measurement with neat diagram.

   c) Describe with neat sketch the construction and working of pneumatic PID controller.

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