



# 17414

**21718**

**3 Hours / 100 Marks**

Seat No.

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- Instructions :**
- (1) Illustrate your answers with neat sketches **wherever** necessary.
  - (2) Figures to the **right** indicate **full** marks.
  - (3) **Assume** suitable data, if **necessary**.
  - (4) **Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.**

	<b>Marks</b>
<b>1. Attempt any ten :</b>	<b>(2×10=20)</b>
a) Draw circuit diagram for inverting amplifier using IC 741.	2
b) Define :	
i) Accuracy	2
ii) Linearity.	2
c) Define :	
i) Dynamic error	2
ii) Settling time.	2
d) Compare primary and secondary transducer (any two points).	2
e) State working principle of thermocouple.	2
f) State any four criteria for selection of transducer.	2
g) List any four applications of rotary encoder.	2
h) State two examples of passive transducer.	2
i) State two examples of active transducer.	2
j) State any four functions of data acquisition system.	2
k) Draw circuit diagram for measurement of pressure using Bourdon tube and LVDT.	2
l) List any four drawbacks of LVDT.	2
<b>2. Attempt any four of the following :</b>	<b>(4×4=16)</b>
a) With mathematical expression describe dynamic response of first order system.	4
b) Give comparison of Bourdon tube and Diaphragm.	4
c) List materials used for any four thermocouple along with their temperature range.	4
d) With neat diagram explain working of Ratiometric conversion.	4
e) Explain working of integrating type ADC.	4
f) Explain in brief concept of virtual ground.	4

**P.T.O.**

**Marks**

- 3. Attempt any four of the following :** (4×4=16)
- a) Explain the working principle of electromagnetic flow meter. 4
  - b) Explain how level is measured by using float ? 4
  - c) Draw the response of first order instrument to
    - i) ramp input
    - ii) step input. 4
  - d) Draw block diagram of Data Acquisition System (DAS). Write function of each block.
  - e) Give comparison of Active and Passive Filter (any four points). 4
  - f) Explain how force is measured using load cell. 4
- 4. Attempt any two of the following :** (2×8=16)
- a) Draw and explain the working principle of ultrasonic level measurement system. Also give advantages, disadvantages and applications of it. 8
  - b) Draw and explain working of adder and subtractor using op-amp. 8
  - c) Draw and explain temperature measurement using RTD. State its advantages and disadvantages. 8
- 5. Attempt any two of the following :** (2×8=16)
- a) Draw the generalized block diagram of instrumentation system. Explain the function of each block. 8
  - b) Describe construction of bounded metal foil strain gauge and explain its operation. 8
  - c) Describe the resistive method for liquid level measurement. Write its advantages and disadvantages. 8
- 6. Attempt any four of the following :** (4×4=16)
- a) Define absolute pressure and gauge pressure. State the different units for pressure measurement. 4
  - b) Explain the need of cold junction compensation. 4
  - c) Draw and explain instrumentation amplifier using 3 of amps. 4
  - d) With neat diagram explain working of Dual slope integrator ADC. 4
  - e) Define : 4
    - i) Hysteresis
    - ii) Drift
  - f) Draw the diagram of zero crossing detector using op-amp and explain its working. 4
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