

17414

16117

3 Hours / 100 Marks

Seat No.

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- 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.

Marks

1. Attempt any TEN of the following:

20

- Draw and label pins of IC 741.
- Define range and span.
- State seebeck effect.
- State four points to be considered while selecting transducer.
- State working principle of AID converter.
- Draw the diagram for force measurement using lead cell.
- State the difference between volumetric flow rate and mass flow rate.
- State any four objectives of DAS.
- Define fideality and measuring lag.
- Define supply vtg. rejection ratio and output vtg. swing.
- Compare NTC and PTC thermistor (two points).
- List four different units of pressure.

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- 2. Attempt any FOUR of the following:** **16**
- a) Draw and explain response of second order system for step input.
 - b) Define calibration. Explain process of calibration in detail.
 - c) Define gauge factor. Explain the working principle of strain gauge.
 - d) State working principle of column type load cell and state its any four applications.
 - e) Define transducer and give in detail classification.
 - f) Explain in brief the concept of virtual ground in op-amp.
- 3. Attempt any FOUR of the following:** **16**
- a) Draw and explain block diagram of instrumentation system.
 - b) Define following term:
 - (i) Precision
 - (ii) Drift
 - (iii) Static error
 - (iv) Dead zone
 - c) Define:
 - (i) Gauge pressure
 - (ii) Atmospheric pressure
 - (iii) Differential pressure
 - d) Draw and explain ultrasonic method of liquid level measurement.
 - e) State principle of hall effect transducer and explain its working in detail.
 - f) Draw a neat diagram of turbine flowmeter and explain its working.

- 4. Attempt any TWO of the following:** **16**
- a) With the help of neat labelled describe how pressure can be measure using LVDT.
 - b) Compare:
 - (i) RTD and Thermistor (any four points).
 - (ii) Active transducer and Passive transducer (any four points).
 - c) Draw the block diagram of multichannel data acquisition system and explain in detail.
- 5. Attempt any TWO of the following:** **16**
- a) Explain the concept of comparator. Draw and explain the working of schmitt trigger.
 - b) State and explain different signal conditioning techniques used in DAS.
 - c) Explain the measurement set up used for speed measurement using non-contact type of transducer.
- 6. Attempt any FOUR of the following:** **16**
- a) Draw:
 - (i) Adder
 - (ii) Substructor circuit using op-amp.
 - b) Explain op-amp as a integrator.
 - c) Explain working rotary encoder.
 - d) Explain how AC current is measured using hall effect transducer.
 - e) Explain liquid level measure by resistive sensor.
 - f) With the help of mathematical expression describe dynamic response of first order instrument.
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