

17414

21415

3 Hours / 100 Marks

Seat No.

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- Instructions :** (1) All Questions are *compulsory*.
(2) Answer each Section on same / separate answer sheet.
(3) Illustrate your answers with neat sketches wherever necessary.
(4) Figures to the right indicate full marks.
(5) Assume suitable data, if necessary.
(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any TEN :

20

- Draw block diagram of instrumentation system.
- What do you mean by static and dynamic characteristics of Instrument ?
- What is Range and Span of Instrument ?
- Define : (i) Sensitivity (ii) Resolution.
- What is calibration of Instrument ?
- Draw the step, ramp and sinusoidal inputs.
- Define the term transducer.
- List two active transducers.
- List two application of active transducers.
- Compare active and passive transducer. (Any two points)
- Draw pin diagram of IC 741.
- Define : (i) CMRR (ii) SVRR

2. Attempt any FOUR :

16

- What is dynamic error & settling time ? Draw proper sketch.
- Define : (i) Accuracy (ii) Precision with suitable example.
- Draw the Hall effect transducer and explain the hall effect.
- Draw the diagram of RTD and State it's working principle.
- Compare open loop and closed loop configuration of OP-amp. (Any 4 points)
- Draw the circuit diagram of OP-amp as integrator and give derivation for output voltage.

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- 3. Attempt any FOUR :** **16**
- (a) With the help of mathematical expression describe dynamic response of zero order instrument.
 - (b) Describe the working strain gauge using Wheatstone configuration.
 - (c) Draw the schematic of electromagnetic Flow meter and explain it's working.
 - (d) Describe the working of Instrumentation amplifier. (using 3 OP-amp) with neat diagram.
 - (e) Describe the Hot-wire anemometer method for flow measurement using proper diagram.
 - (f) Draw the Instrumentation System for displacement measurement using LVDT and describe it's operation.
- 4. Attempt any FOUR :** **16**
- (a) Describe with neat labeled diagram measurement of level using ultrasonic radiations.
 - (b) Define : (i) Absolute pressure (ii) Gauge pressure (iii) Differential pressure (iv) Pressure.
 - (c) Draw the circuit diagram of voltage to current converter with floating load and explain it's operation.
 - (d) What is DAS ? Draw single channel DAS.
 - (e) Explain with neat diagram liquid level measurement by resistive sensor.
 - (f) List any four factor that decides the configuration of DAS.
- 5. Attempt any FOUR :** **16**
- (a) Define Seeback and Peltier effect.
 - (b) Explain with neat diagram working of AC tacho-generator.
 - (c) Explain with neat circuit diagram working of OP-amp as subtracter.
 - (d) With neat labeled diagram explain the working of successive approximation type analog to digital converter.
 - (e) Draw the labeled diagram of method for measurement of speed by non-contact type transducer.
 - (f) Select a suitable transducer for following application :
 - (i) Measurement of angular displacement
 - (ii) Measurement of Room temperature
 - (iii) Measurement of Air pressure inside car tyre.
- 6. Attempt any FOUR :** **16**
- (a) List any six criteria for selecting a proper transducer for an application.
 - (b) Explain the working of turbine flow meter using proper diagram.
 - (c) State the concept of Ratio metric conversion and logarithmic conversion in DAS.
 - (d) List the types of load cell and explain any one with neat diagram.
 - (e) Compare RTD and Thermistor. (Any four points)
 - (f) Explain pressure measurement using diaphragm with neat diagram.
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