

17414

15116

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 indicates full marks.
- (4) Assume suitable data, if necessary.
- (5) Use of Non-programmable Electronic Pocket Calculator is permissible.
- (6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any TEN of the following : 20
- Define accuracy and tolerance.
 - Give two examples of active and passive transducer.
 - Draw the pin configuration of IC 741 OP-AMP.
 - Define the following.
 - CMMR
 - Slew rate
 - Draw the input / output characteristics for sensitivity drift and zero drift.
 - State seebeck effect.
 - List four factors to be considered while selecting a transducer.
 - State the working principle of turbine flow meter.

P.T.O.

17414

[2]

Marks

- i) List two types of signal converters.
- j) Name the metals used for resistance thermometer.
- k) List four dynamic characteristics.
- l) List two advantages of electrical transducer.

2. Attempt any FOUR of the following :

16

- a) Draw the block diagram of instrumentation system and state the function of each component.
- b) Explain the working of an electromagnetic flow meter with neat diagram.
- c) Label the pin No 1 to 8 of pin diagram of LF 398 as shown in Fig No. 1.

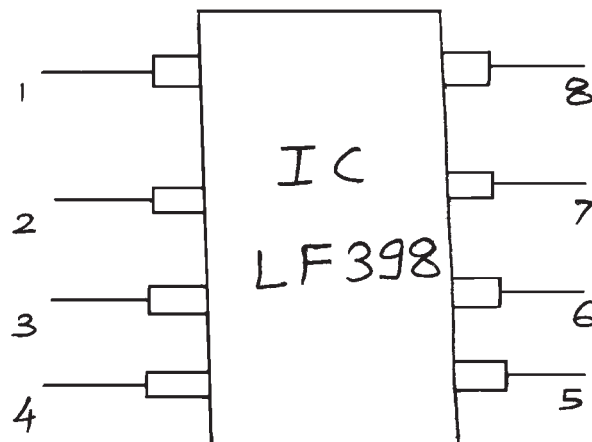


Fig No. 1.

- d) Draw constructional diagram of LVDT. State its working principle.
- e) Define the following terms.
 - (i) Precision
 - (ii) Resolution
 - (iii) Measuring lag
 - (iv) Dynamic error
- f) Compare open loop and closed loop configuration of OP-AMP with neat diagram. (Any four points)

17414

[3]

Marks**3. Attempt any FOUR of the following :****16**

- a) Draw ideal characteristics of :
 - (i) Low pass filter
 - (ii) High pass filter
 - (iii) Band pass filter
 - (iv) Band stop filter
- b) Draw and explain the block diagram of multi-channel DAS.
- c) What is thermocouple ? Explain its working.
- d) Explain the force measurement using load cell.
- e) Explain with neat sketch construction and working of bonded strain gauge
- f) Write comparison between magnetic flow meter and turbine flow meter on the basis of accuracy, cost, pressure drop and application.

4. Attempt any FOUR of the following :**16**

- a) Draw a block diagram of generalised data acquisition system. State function of each block.
- b) Write stepwise procedure to carry out calibration.
- c) Draw the response of first order instrument to step input and explain it.
- d) Define transducer. Give the classification of transducer with one example each.
- e) Define the following terms related to OP-AMP.
 - (i) Supply voltage rejection ratio
 - (ii) Output voltage swing.
 - (iii) Input offset voltage.
 - (iv) Input bias current.
- f) Give the comparison between thermistor and RTD (Any four points).

P.T.O.

17414

[4]

Marks**5. Attempt any FOUR of the following :****16**

- a) Draw and explain pressure measurement using diaphragm type transducer.
- b) Explain construction and working principle of photo electric type non-contact tachometer with diagram.
- c) Write four objectives of Data Acquisition system.
- d) Draw and explain circuit diagram of phase detector.
- e) Explain with diagram liquid level measurement using ultrasonic method.
- f) Draw the neat sketch of diaphragm. Explain its construction and working.

6. Attempt any FOUR of the following :**16**

- a) Define torque. Explain measurement of torque using torque cell.
- b) Define stress and strain. List types of strain gauges.
- c) Draw and explain ratio metric conversion.
- d) Explain rotary motion measurement system using optical encoder.
- e) Give difference between active and passive transducers.
(Any four points)
- f) Explain AC current RMS indication using hall effect transducer.
