17414

16172

3 Hours / 100 Marks Seat No. | | | | | | | | |

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.*

Marks

1. Attempt **any ten** of the following. **20**

a) Define :
   i) Accuracy ii) Precision
b) List dynamic characteristics of instruments.
c) Explain principles of calibration.
d) Draw block diagram of instrumentation system.
e) List any 4 undesirable characteristics of instruments.
f) State the effect of hysteresis on instrument.
g) Define :
   i) Dynamic error ii) Tolerance
h) Define :
   i) CMMR ii) SVRR
i) Define the term Transducer and sensor.
j) Give 2 examples each of Active and Passive Transducer.
k) Give pin functions of IC's 741.
l) Draw ideal voltage transfer curve for Op-Amp.

2. Attempt **any four** : **16**

a) Explain why LVDT gives a residual output at null position. State its 2 applications.
b) Describe logarithmic conversion signal conditioning in DAS.
c) Describe with neat diagram working of DC tacho-generator.
d) Discuss any 4 points to be considered while selecting a transducer for its intended applications.
e) What is Hall effect ? State its applicability in parameter measurement.
f) Draw circuit diagram of Op-Amp as differentiator with inverting configuration. State its output equation.

P.T.O.

Marks

3. Attempt **any four** of the following . **16**

a) Describe ratio metric conversion in brief.

b) State the principle of working for Thermocouple. Why cold junction compensation is required in Thermocouple ?

c) State advantages of active filter over passive filter. Hence draw frequency response of major active filters.

d) Explain the working of diaphragm for pressure measurement.

e) Define gauge factor. Describe bonded metal for strain gauge.

f) With the help of mathematical expression describe dynamic response of zero order instrument.

4. Attempt **any four** of the following. **16**

a) Draw generalized block diagram of data acquisition system and explain it.

b) Explain force measurement using lead cell.

c) List any 4 advantages of platinum resistance Thermometer.

d) State types of Bourdon tubes. Describe 'C' type bourdon tube.

e) Explain instrumentation amplifier using three Op-Amp. State its applications.

f) Explain the concept of virtual ground in op-amp.

5. Attempt **any four** of the following. **16**

a) Describe how liquid level is measured by resistive sensor.

b) Select a suitable transducer for following application.

i) Measurement of Air pressure inside car tyre.

ii) Measurement of Room Temperature.

iii) Measurement of Force

iv) Measurement of Rotary motion.

c) Explain working of hot wire anemometer with the help of diagram.

d) List any 4 factors that decides the configuration of DAS.

e) List the different types of ADC. Explain any one in detail.

f) Describe dynamic response of second order system for step input.

6. Attempt **any four** of the following. **16**

a) Describe the working of strain gauge using wheatstone configuration.

b) Describe with neat labeled diagram measurement of level using ultrasonic radiations.

c) Compare RTD and Thermistor (any four points).

d) Define :

i) Absolute pressure ii) Gauge pressure

iii) Differential pressure iv) Pressure

e) Describe the operation of turbine flow meter.

f) Describe instrumentation system for speed measurement using non-contact type transducer.