17414

11920

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

Instructions : (1) All Questions are *compulsory.*

(2) Answer each next main Question on a new page.

(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 of the following : **20**

(a) Define Accuracy and Precision. **2**

(b) Define Stress and Strain. **2**

(c) List different types of thermistor. **2**

(d) Define Slew rate and output voltage swing. **2**

(e) Define Hall effect. **2**

(f) State principle of calibration. **2**

(g) Draw input output characteristics of zero drift and sensitivity drift. **2**

(h) State any four objectives of DAS. **2**

(i) Compare Active and Passive transducer. **2**

(j) Draw ideal voltage transfer curve. **2**

(k) Define (i) Dynamic error, (ii) Settling time. **2**

(l) State the hysteresis effect on instrument. **2**

2. Attempt any FOUR of the following : **4 × 4 = 16**

(a) Describe the response of first order system with Ramp input. **4**

(b) Explain operation of resistive strain gauge. **4**

(c) Compare open loop and closed loop configuration of op-Amp with neat sketch. **4**

(d) Draw and explain block diagram of instrumentation system. **4**

(e) Explain measurement of torque by using torque cell. **4**

(f) Label the pin no. 2, 3, 4 and 6 in the following dia of IC-741. **4**

3. Attempt any FOUR of the following : **4 × 4 = 16**

(a) Draw a neat diagram of ultrasonic level measurement and state its working principle. **4**

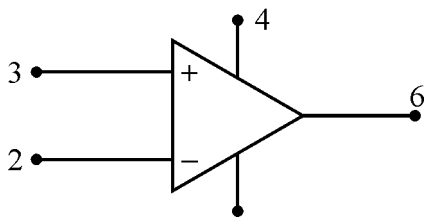
(b) State and explain calibration chain and traceability. **4**

(c) Explain the working principle of LVDT. **4**

(d) Draw the circuit diagram and input output waveform of zero crossing detector. **4**

(e) Describe construction and working principle of electromagnetic flow meter. **4**

(f) Explain with neat diagram construction and working principle of bonded strain gauge. **4**



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

(a) Compare RTD and thermistor. (any 4 points) **4**

(b) Derive the output equation of adder with neat diagram. **4**

(c) Draw and explain block diagram of generalized DAS. **4**

(d) Explain measurement of pressure using diaphragm with neat diagram. **4**

(e) Describe the method of force measurement using load cell. (column type) **4**

(f) Explain working principle of successive approximation type A to D convertor. **4**

5. Attempt any FOUR of the following : **4 × 4 = 16**

(a) Explain working principle of DC tacho-generator with neat diagram. **4**

(b) Draw and explain instrumentation amplifier by using 3 op-Amp. **4**

(c) Classification of electrical transducer in detail. **4**

(d) List criteria for selecting a transducer for an application. **4**

(e) Explain multi-channel data acquisition system with neat diagram. **4**

(f) Describe with neat diagram resistive method for liquid level measurement. **4**

6. Attempt any FOUR of the following : **4 × 4 = 16**

(a) Describe the measurement of rotary motion using optical encoder. **4**

(b) Explain with neat labelled diagram of single channel DAS. **4**

(c) Explain the measurement set up used for speed measurement using non-contact type tachometer. **4**

(d) Suggest suitable thermocouple for following temperature range. **4**

(i) – 250° to 400 °C

(ii) 0° to 2100 °C

(iii) – 200° to 800 °C

(iv) –0° to 1400 °C

(e) Describe the measurement set up used for temperature measurement using RTD. **4**

(f) Describe the working of hall effect transducer for measurement of AC current with neat diagram. **4**
