22333

11920

3 Hours / 70 Marks Seat No. | | | | | | | | |

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) 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 FIVE of the following : **10**

(a) Define the term 'Measurement'.

(b) List different types of errors.

(c) Give any two applications of LED and LCD each.

(d) Define transducer. Give two examples of transducer.

(e) Define : (i) Laminar flow

(ii) Turbulent flow

(f) State significance of Lissajous figure.

(g) List the applications of DAS.

2. Attempt any THREE of the following : **12**

(a) Draw and explain working of half wave rectifier type AC voltmeter.

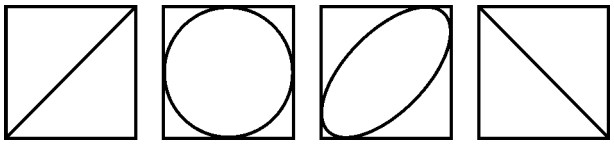
(b) Explain D'Arsonal PMMC movement in detail.

(c) Draw block diagram of CRO & explain function of each block of it.

(d) Draw the block diagram of instrumentation system and explain function of each block.

3. Attempt any THREE of the following : **12**

(a) What will be the phase shift for following Lissajous patterns ?



(i) (ii) (iii) (iv)

Fig. 3(a)

(b) Draw and describe the constructional diagram of LVDT.

(c) Describe working principle of radiation level measurement with neat diagram.

(d) Explain the need of signal conditioning.

4. Attempt any THREE of the following : **12**

(a) Suggest instrument to measure unknown frequency above 5 MHz and store result. Justify it.

(b) Convert the PMMC movement into a dc-ammeter of the range 0 to 100 mA.

(c) Draw and explain the block diagram of DAS.

(d) Draw the block diagram of function generator and explain its working.

(e) Explain the calibration of series type ohmmeter.

5. Attempt any TWO of the following : **12**

(a) Sketch DC signal conditioning circuit for pressure measurement using strain gauge. Justify it.

(b) Draw the sketch of electromagnetic flow meter and explain it. State advantages, disadvantages and applications of it.

(c) Explain Piezo-electric transducer with diagram. State its applications, advantages and disadvantages.

6. Attempt any TWO of the following : **12**

(a) Define accuracy and precision. Voltmeters (V_1, V_2, V_3 and V_4) are used to measure a voltage of 150 volts (true value). The voltage is measured four times by each voltmeter as mentioned in below table;

	Readings Shown			
$V_1 \rightarrow$	145	145	145	145
$V_2 \rightarrow$	149.1	150.1	149.5	149.6
$V_3 \rightarrow$	145	152	148	155
$V_4 \rightarrow$	150	150	150	150

By observing the above performance of each voltmeter, comment on the accuracy and precision of each voltmeter.

P.T.O.

(b) For the waveform shown in Fig. 6(b) if vertical attenuation is 3 mV/div.

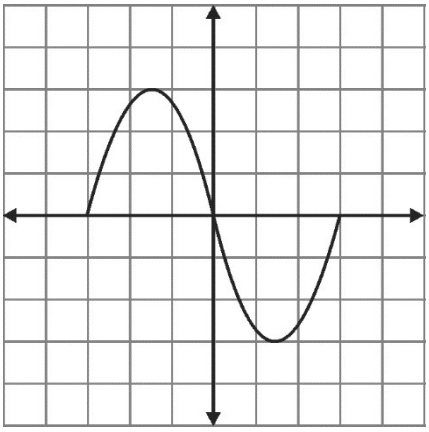


Fig. 6 (b)

Find, (i) Peak to peak voltage.

(ii) Amplitude

(iii) rms value of the signal.

(c) Sketch and describe pressure measurement system for 800 mm pressure, that contain Bourdon tube and LVDT.
