

17317

21819

3 Hours / 100 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) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. (A) Attempt any SIX :

12

- (a) Define :
 - (i) Accuracy
 - (ii) Sensitivity
- (b) List two advantages of PMMC instrument.
- (c) State any four specifications of digital voltmeter.
- (d) List four applications of digital multimeter.
- (e) List four applications of CRO.
- (f) List four controls on front panel of dual trace CRO.
- (g) List four specifications of function generator.
- (h) State any four applications of spectrum analyzer.

- (B) Attempt any TWO :** **8**
- (a) List the different types of errors and list out their sources.
 - (b) Define the term standards, state the types of standard.
 - (c) State any four precautions to be taken while using an Ammeter and Voltmeter.
- 2. Attempt any FOUR :** **16**
- (a) Define calibration of instruments. Explain why calibration is needed for measuring instruments.
 - (b) Give any four points of comparison between dual trace CRO & dual beam CRO.
 - (c) Sketch block diagram of single trace CRO. State function of delay line.
 - (d) Draw labelled diagram of CRT.
 - (e) Explain vertical deflection subsystem with neat diagram.
 - (f) Draw block diagram of digital storage oscilloscope.
- 3. Attempt any FOUR :** **16**
- (a) List four dynamic characteristics of instruments. Define any two of them.
 - (b) Describe working of A.C. voltmeter using half wave rectifier with neat circuit diagram.
 - (c) Draw the circuit diagram of multi-range AC voltmeter and describe its working.
 - (d) Explain how CRO is used for measurement of frequency and amplitude with suitable diagram.

- (e) Draw block diagram of AF sine & square wave generator and explain its working.
- (f) Describe working of pulse generator with proper block diagram.

4. Attempt any FOUR :**16**

- (a) Draw the diagram of PMMC instrument and state the deflection torque equation.
- (b) Describe the following terms w.r.t. analog voltmeter :
 - (i) Sensitivity
 - (ii) Loading effect
- (c) Draw and explain construction diagram of average responding voltmeter.
- (d) Design multi-range DC ammeter with $R_m = 50 \Omega$
 $I_m = 1 \text{ mA}$ for current ranges (i) 0-20 mA (iii) 0-100 mA
- (e) Explain range extension for analog DC voltmeter.
- (f) Sketch the circuit of basic DC ammeter, derive equation for shunt resistance.

5. Attempt any FOUR :**16**

- (a) Define Lissajous pattern. Explain how Lissajous pattern is useful for frequency and phase measurement.
- (b) Draw and describe horizontal deflection system in CRO.
- (c) Sketch block diagram of pattern generator and draw any four test patterns.
- (d) Describe block diagram of spectrum analyser and explain its working.
- (e) Explain function of each block of logic analyzer with proper block diagram.
- (f) Explain block diagram of distortion factor meter and explain how it operates.

P.T.O.

6. Attempt any FOUR :**16**

- (a) Compare analog instruments with digital instruments. (any four points)
 - (b) State significance of $\frac{1}{2}$ digit with an example.
 - (c) Draw block diagram of digital frequency meter and state its principle of operation.
 - (d) Draw block diagram of successive approximation Digital Voltmeter. State its two advantages and two disadvantages.
 - (e) Draw block diagram of dual slope integrating digital voltmeter and also draw waveform for voltage V/s time.
 - (f) Draw block diagram of digital LCR-Q meter and explain its working.
-