

17317

13141

3 Hours / 100 Marks

Seat No.

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- 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) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. a) Attempt any **SIX** of the following: **12**
- i) Define precision and dead zone.
 - ii) Classify analog instruments.
 - iii) Define linearity and monotonicity with respect to digital instruments.
 - iv) Define quality factor.
 - v) Draw block diagram of single trace CRO.
 - vi) State uses of oscilloscope.
 - vii) State any two requirements of signal generator.
 - viii) State any two applications of spectrum analyzer.

P.T.O.

b) Attempt any **TWO** of the following:

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- i) Define the following:
 - 1) Speed of response
 - 2) Fidelity
 - 3) Lag
 - 4) Dynamic error.
- ii) Define standard and state its classification
- iii) State requirements of shunt in the multirange meter.

2. Attempt any **FOUR** of the following:

16

- a) What is calibration ? State its necessity.
- b) Draw labelled diagram of CRT. State the function of accelerating anode.
- c) Draw block diagram of dual trace CRO. State the function of each block.
- d) Draw block diagram of vertical deflection system. State function of each block.
- e) Draw block diagram of dual beam CRO. State function of each block.
- f) State how frequency and phase can be measured using Lissajous Pattern.

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

- a) State what is
 - i) Gross error
 - ii) Systematic error
 - iii) Random error.
- b) State four advantages and disadvantages of PMMC instrument.
- c) Why ammeter never connected across a source of emf ? Justify.
- d) List out any four advantages and applications of DSO.
- e) With the help of block diagram state working principle of function generator.
- f) Draw block diagram of pulse generator. State its operation.

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

- a) Draw circuit of basic DC ammeter derive equation of shunt resistance.
- b) Draw constructional diagram of PMMC instrument. Derive deflecting torque equation.
- c) Convert a basic D'Arsonval movement with an internal resistance of 50Ω and full scale deflection current of 200 A into multirange DC voltmeter with voltage range of 0-10V, 0-50V, 0-100V, 0-250V.
- d) Draw electrical circuit of analog multimeter.
- e) State the reasons for voltmeter never connected in series with source of emf.
- f) Draw block diagram of basic rectifier type AC voltmeter. State its working.

5. Attempt any FOUR of the following: 16

- a) Draw time base generator circuit. State role of time base generator in CRO.
- b) List various front panel controls of CRO.
- c) Draw characteristics of pulse and define:
 - i) Rise time
 - ii) Fall time
 - iii) Droop.
- d) Draw block diagram of spectrum analyzer. State function of each block.
- e) Draw block diagram of logic analyzer. State its two applications.
- f) Draw block diagram of distortion factor meter. State its operation.

6. Attempt any FOUR of the following: 16

- a) Draw block diagram of digital frequency meter. State function of each block.
 - b) State advantages of digital voltmeter over analog voltmeter (four points).
 - c) Draw block diagram of digital LCR-Q meter. State role of oscillator in the LCR-Q meter.
 - d) Draw labelled block diagram of dual slope integrating DVM. State its operation.
 - e) Compare analog multimeter and digital multimeter (four points).
 - f) Draw the circuit of basic Q meter. State how inductance can be measured by Q meter.
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