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17317

3 Hours / 100 Marks

Seat No.

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- 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**.*

Marks

1. A) Solve **any six** :

12

- a) Define :
 - i) Accuracy
 - ii) Precision.
- b) Compare analog and digital multimeter.
- c) State applications of digital frequency meter.
- d) State the advantages of Digital instrument.
- e) List different types of CRO probes (any four).
- f) State the difference between CRO and DSO.
- g) Define signal generator and state its need.
- h) State two uses of logic analyzer.

B) Attempt **any two** :

8

- a) Define standards. State and explain classification of standards.
- b) How are instruments classified ? Describe the different types.
- c) Design a multirange DC ammeter (Shunt resistor type) for $R_m = 100 \Omega$, $I_m = 1\text{mA}$ and required current ranges are 0-50 mA, 0-100 mA and 0-200 mA.

2. Attempt **any four** :

16

- a) Explain gross error, systematic error and random error.
- b) Draw and explain block diagram of Horizontal deflection system.

P.T.O.



- c) Draw the construction of CRT . Write two materials used for CRT display screen.
- d) Explain the measurement of voltage and frequency using CRO.
- e) Explain the concept of single beam dual trace CRO with its block diagram.
- f) Explain measurement of phase and frequency using Lissagous pattern. Write the formula for each one.

3. Attempt any four :**16**

- a) Define the following :
 - 1) Speed of Response
 - 2) Lag
 - 3) Fidelity
 - 4) Dynamic Error.
- b) Draw the construction and explain working principle of PMMC instruments.
- c) Derive the relation for deflection torque in PMMC instrument.
- d) Draw the basic block diagram of single trace CRO and describe the function of delay line.
- e) Draw block diagram of function generator. Write two specifications of it.
- f) What is a video pattern generator ? State its application.

4. Attempt any four :**16**

- a) A basic D' Arsonval movement with internal resistance of 50Ω and full scale deflection current of 1 mA is to be used as a multirange voltmeter. Design a series of string of multiplier to obtain the voltage range of 0-20 V and 0-40 V.
- b) Explain sensitivity and loading effect in voltmeter.
- c) State and explain any four specifications of analog multimeter.
- d) Explain the working of full wave rectifier type analog AC voltmeter with its circuit diagram.
- e) Write four specification of DMM.
- f) Draw and state how Aryton shunt type DC ammeter operates. State advantage of using Aryton shunt.



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Marks
16

5. Attempt any four :

- a) Draw block diagram of DSO. State applications of DSO.
- b) State and describe different triggering available in CRO.
- c) Draw block diagram of RF signal generator and explain its operation.
- d) Define wave analyzer and state its need. Draw the block diagram of it.
- e) Draw block diagram of spectrum analyzer. State applications of spectrum analyzer.
- f) Draw block diagram of distortion factor meter and explain its operation.

6. Attempt any four :

16

- a) Compare analog and digital instruments.
 - b) Draw block diagram of digital voltmeter and describe its operation.
 - c) Draw Q meter circuit of series connection and explain it.
 - d) What is LCR meter ? Draw digital LCR-Q meter block diagram.
 - e) Draw block diagram of DMM. State its advantages.
 - f) Draw block diagram of digital frequency meter in time mode and describe its operation.
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