



# 17317

16117

3 Hours / 100 Marks

Seat No.

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- Instructions :**
- (1) *All questions are compulsory.*
  - (2) *Attempt 06 questions including Question No. 1 which is compulsory.*
  - (3) *Answer each next main question on a new page.*
  - (4) *Illustrate your answers with neat sketches wherever necessary.*
  - (5) *Figures to the right indicate full marks.*
  - (6) *Assume suitable data, if necessary.*
  - (7) *Use of Non-programmable Electronic Pocket Calculator is permissible.*
  - (8) *Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.*

**Marks**

1. A) Attempt **any six** of the following :

**(6×2=12)**

- I) Define the term
  - i) Resolution
  - ii) Sensitivity.
- II) State two advantages and two disadvantages of PMMC instrument.
- III) List four application of CRO.
- IV) State four applications of digital storage oscilloscope.
- V) State the need of wave analyzer.
- VI) State two applications of Logic Analyzer.
- VII) State any two disadvantages of digital instruments.
- VIII) Which section of DMM decides its resolution ?

B) Attempt **any two** of the following :

**(4×2=8)**

- I) Differentiate between absolute instrument and secondary instrument.
- II) A basic D' Arsonval movement with an internal resistance of  $50\Omega$  and a full scale deflection current of 1 mA is to be used as a multirange voltmeter. Design a series of string of multipliers to obtain the voltage ranges of 0 – 15 V and 0 – 30 V.
- III) Draw a Q-meter circuit of series connection and explain it.

**P.T.O.**



**Marks**  
**(4×4=16)**

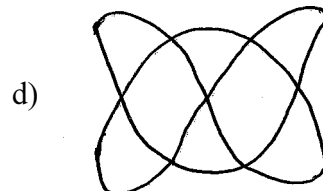
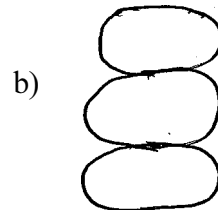
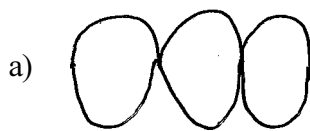
2. Attempt **any four** of the following :

- Describe the different standards.
- Draw the block diagram of vertical deflection system and describe its operation.
- Draw the labeled diagram of CRT.
- Explain the working of successive approximation type DVM.
- How function generator differs from signal generator ?
- Differentiate digital instruments with Analog Instruments.

3. Attempt **any four** of the following :

**(4×4=16)**

- Derive the relation for deflection torque in PMMC instruments.
- Define calibration. Explain why calibration is needed for measuring instrument.
- Calculate the ratio of vertical to horizontal frequencies for an oscilloscope, which displays the following Lissajous patterns shown in Fig.1.



- Explain the function of each block of horizontal deflection system of CRO.
- Draw the block diagram of Logic Analyzer and describe its operation.
- Describe the working of spectrum analyzer with the help of block diagram.

4. Attempt **any four** of the following :

**(4×4=16)**

- Describe the working of Shunt Resistance Ammeter with diagram.
- Why ammeter never connected across source of emf ? Justify.
- What do you mean by  $3\frac{1}{2}$  digit display in digital voltmeter ?
- Explain how frequency is measured with the help of digital frequency meter.
- Draw the block diagram of Dual trace CRO.
- Describe with neat block diagram the operation of frequency selective wave analyzer.



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Marks

(4×4=16)

5. Attempt **any four** of the following :

- a) Design a Ayrton shunt to provide an ammeter with current ranges of 2A, 5A and 12 A. A basic meter with an internal resistance of  $50\Omega$  and a full scale deflection current of 1 mA is to be used.
- b) Describe the working of digital multimeter with block diagram.
- c) Draw the block diagram of DSO and describe its working.
- d) Differentiate between Dual trace CRO and Dual Beam CRO for two points.
- e) State how frequency and amplitude can be measured on CRO.
- f) Draw the block diagram of pulse generator. State its operation.

6. Attempt **any four** of the following :

(4×4=16)

- a) Define unit and give any two examples of base, supplementary and derived units.
  - b) State detailed classification of error.
  - c) Draw neat electrical circuit diagram of Analog Multimeter.
  - d) Describe the working of LCR meter with diagram.
  - e) Explain the process of phase measurement by Lissajous pattern.
  - f) Draw the block diagram of pattern generator. Explain generation of cross hatch pattern.
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