

B.Tech. IV Sem. (Main/Back) Examination, June/July - 2015

Electronics & Communication Engg.

4EC3A Electronic Measurement & Instrumentation

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 26

Instructions to Candidates:

Attempt any **five** questions, selecting **one** question from **each unit**. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)

Unit - I

1. a) The following eight observations were recorded when measuring a voltage 20.6, 21.4, 22.0, 21.8, 22.6, 22.1, 21.9, 22.2 volt.
Find (i) Probable error of one reading
(ii) Probable error of mean. (8)

- b) Define the following for Gaussian distribution of data:
(i) Precision index
(ii) Standard deviation of standard deviation. (8)

OR

1. a) A circuit was tuned for resonance by eight different students and the values of resonant frequency in KHz were recorded as 345, 349, 346, 341, 340, 347, 348, 342. Calculate
(i) Standard deviation
(ii) Variance. (8)

- b) Explain the following errors with suitable examples.
(i) Systematic errors
(ii) Random errors. (8)

Unit - II

2. a) Explain the block diagram of vector impedance meter and its applications. (8)
- b) How will you measure RF power and voltage? What are the problems encountered in such measurements. (8)

OR

2. a) A Coil of resistance 8Ω is connected in the Q meter circuit. The resonance occurs at a frequency of 1 MHz with the tuning capacitor set at 87 PF. Calculate the percentage error introduced in the calculated value of Q if a resistance of 0.04Ω is used across the oscillator circuit. (8)
- b) Define the following terms related to the measuring instrument
- (i) Shielding
 - (ii) Grounding
- (8)

Unit - III

3. a) Why is a delay line used in the vertical section of the oscilloscope. (8)
- b) Why are the operating voltage of a cathode ray tube arranged so that the deflection plates are nearly at ground potential. (8)

OR

3. a) Explain the following terms of CRO:
- (i) A stigmation control
 - (ii) Sources of synchronization.
- (8)
- b) Explain the construction and working of following CRO probes:
- (i) Direct probe
 - (ii) Isolation probe.
- (8)

Unit - IV

4. a) Explain the working principle of frequency selective wave analyser with suitable diagram and applications. (8)
- b) What do you mean by distortion factor. How can distortion factor be measured. (8)

OR

4. a) Explain the functioning of sweep frequency generator with the help of neat block diagram. Also, explain its uses in measurement equipments. (8)
- b) Explain the working of heterodyne wave analyzer with suitable diagram. (8)

Unit - V

5. Write short notes on the following:

- (a) Strain gauges (8)
- (b) Piezoelectric Transducers (8)

OR

- 5. (a) Explain the working principle of ultrasonic flow meters with merits and demerits. (8)
- (b) Draw and explain the characteristics of Thermocouples. Discuss about the 'seeback effect' of Thermocouple. (8)
