

29/6/2016

4E4132

Roll No. _____

Total No of Pages: **4**

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B.Tech. IV-Sem (Main & Back) Exam; June-July 2016
Electronics & Communication
4EC3A Electronic Measurement & Instrumentation

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks (Main & Back): 26

Min. Passing Marks (Old Back): 24

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.

Use of following supporting material is permitted during examination.

(Mentioned in form No.205)

1. NIL

2. NIL

UNIT-I

Q.1 (a) Errors in measurements can be classified as –

[6+2=8]

(i) Gross errors

(ii) Systematic errors

(iii) Random errors

Explain these errors by giving suitable examples. Discuss the means adopted to minimize these errors.

- (b) A 0 – 10 A ammeter has a guaranteed accuracy of 1.5 percent of full scale reading. The current measured by the instrument is 2.5 A. Calculate the limiting values of current and the percentage limiting error. [8]

OR

- Q.1 (a) Define the following for Gaussian distribution of data. [2×4=8]

- (i) Precision index
- (ii) Probable error
- (iii) Standard deviation of mean
- (iv) Standard deviation of standard deviation

- (b) A resistor is measured by Voltmeter - Ammeter methods. The voltmeter reading is 123.4 V on the 250V scale and the ammeter reading is 283.5mA on the 500mA scale. Both meters are guaranteed to be accurate within ± 1 percent of full scale reading. Calculate –

- (i) The indicated value of resistance
- (ii) The limits within which the result can be guaranteed. [4+4=8]

UNIT-II

- Q.2 (a) Describe the functional block diagram of a vector impedance meter. Explain how phase angle measurements are carried out with it. [6+2=8]

- (b) The self capacitance of a coil is measured by a Q meter. The circuit is set into resonance by at 2 MHz and the tuning capacitor at 460 PF. The frequency is now adjusted to 4 MHz and resonance conditions are obtained by tuning capacitor at 100 PF. Calculate the value of self capacitance of the coil. [8]

OR

Q.2 (a) ~~Explain the circuit diagram~~ of following types of electronic voltmeters. [4+4=8]

- (i) Voltmeters using a series connected diode.
 - (ii) Voltmeters using a full wave bridge rectifier.
- (b) Explain the functioning of an integrating type digital voltmeter. [8]

UNIT-III

- Q.3 (a) Derive an expression for vertical deflection of an electron beam in a CRT. [8]
- (b) Describe in detail, the construction and working on analog type storage oscilloscope. Explain the principle of secondary emission. [6+2=8]

OR

- Q.3 (a) The deflection sensitivity of an oscilloscope is 35 v/cm. If the distance from the deflection plates to the CRT screen is 16 cm, the length of the deflection plates is 2.5 cm, and the distance between the deflection plates is 1.2 cm. What is the acceleration anode voltage? [8]
- (b) Describe the following types of oscilloscope:-

- (i) Dual trace type
- (ii) Dual beam type

[4+4=8]

UNIT-IV

- Q.4 (a) What is a frequency synthesizer? Describe its circuit in detail. [8]
- (b) Describe the working of a harmonic distortion analyzer with a suitable block diagram. [8]

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OR

- Q.4 (a) Describe the working of a sweep frequency generator. What are the sweeper errors? [6+2=8]
- (b) Describe the basic circuit of a spectrum analyzer. Explain how the spectra of the following are displayed: [4+4=8]
- (i) Amplitude modulated signals
 - (ii) Frequency modulated signals

UNIT-V

- Q.5 (a) Explain the working and characteristics of following temperature transducers.
- (i) RTD [4+4=8]
 - (ii) Thermocouple
- (b) Explain the construction of wire wound strain gauges and derive the expression for the gauge factor. [8]

OR

- Q.5 (a) Explain the working of ultrasonic flow meters with a suitable diagram. [8]
- (b) Explain the working of piezoelectric transducers and draw its electric equivalent circuit. [8]