



(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 131403

Roll No.

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B. Tech.

(SEM. IV) THEORY EXAMINATION, 2014-15 ELECTRONIC INSTRUMENTATION AND MEASUREMENTS

Time : 3 Hours]

[Total Marks : 100

- Note :
- (1) Attempt rill questions .
 - (2) All questions carry equal marks.

- 1 Attempt any four parts of the following : 5×4=20
- a) Determine the dimensions of Magnetic Flux density, Electric field Strength. Explain the absolute error and Gross error.
 - b) Current was measured during a test as 30.4A, flowing in a resistor of 0.105Ω It was discovered later that the ammeter reading was low by 1.2 percent and the marked resistance was high by 0.3 percent, Find the true power as a percentage of the power that was originally calculated.
 - c) Explain the construction and working of Galvanometer.
 - d) What is the effect' of temperature change in Ammeter and Voltmeter? How can we minimize the temperature effect in Ammeter and Voltmeter?

- e) A PMMC instrument has a three resistor ayrtton shunt connected across it to make an ammeter. The resistance values are $0.05\ \Omega$, $0.45\ \Omega$ and $4.5\ \Omega$. The meter resistance is $1\ \text{K}\ \Omega$ and FSD is $50\ \mu\text{A}$. Calculate the three ranges of ammeter.
- f) How can we measure unknown resistance using Series Ohmmeter?

2 Attempt any four parts of the following : $5 \times 4 = 20$

- a) Draw and explain the circuit diagram of Voltage to current converter with full wave rectifier AC electronic Voltmeters.
- b) Explain the working of FET Input Voltmeter with its circuit diagram.
- c) Draw and explain the block diagram of the Ramp Type DVM with its system waveform.
- d) What are the two methods of measuring current using high current probes of multimeter?
- e) Compare Digital and Analog Multimeter. Explain the concept of Burden Voltage.
- f) A digital frequency meter has a time base derived from $2\ \text{MHz}$ clock generator frequency divided by decade counters. Determine the measured frequency when $3.524\ \text{kHz}$ sine wave is applied and when the time bases uses i) Six - decade counters ii) four decade counters.

3 Attempt any two parts of the following : $10 \times 2 = 20$

- a) Explain the working of Q-meter. What is the measuring procedure for high impedance measurement in Q-meter?
- b) Explain the Kelvin Bridge for unknown resistance measurement method. A wheat stone bridge has

$P = 3.5\ \text{K}\ \Omega$, $Q = 7\ \text{K}\ \Omega$ and $S = 4\ \text{K}\ \Omega$ when $R = 2\ \text{K}\ \Omega$. Resistors are arranged in such a way that the bridge is in balanced condition. The supply voltage is $10\ \text{V}$ and galvanometer has a current sensitivity of $1\ \mu\text{A}/\text{mm}$ and its resistance is $2.5\ \text{K}\ \Omega$. Calculate the minimum change in R which is detectable by the bridge.

- c) Write short note on :
- Series resistance Capacitance Bridge also draws its phasor diagram.
 - Hay Inductance Bridge and its application.

4 Attempt any two parts of the following : $10 \times 2 = 20$

- a) Draw the block diagram of automatic time base of oscilloscope. Show the waveforms and explain its operation.
- b) write a short note on
- DSO operation
 - 1:1 oscilloscope probes.
- c) Draw and explain the block diagram of Delayed- time-base (DTB) system, Show the system waveforms.

5 Attempt any two parts of the following : $10 \times 2 = 20$

- a) Draw and explain the circuits for calibration of d.c. voltmeter and wattmeter with standard instruments.
- b) Describe with the help of block diagram the operation of X-Y recorder. Also list the application of X-Y recorder.
- c) Write a short note on
- Galvanometric strip chart recorders
 - Plotters.