

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

Paper ID : 131417

Roll No.

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B.TECH.

Theory Examination (Semester-IV) 2015-16

**ELECTRONIC MEASUREMENTS
& INSTRUMENTATION**

Time : 3 Hours

Max. Marks : 100

Section-A

Q1. Attempt all parts. All carry equal marks. Write answer of each part in short. (2×10=20)

- a. Define random error and Gross error with suitable example.
- b. Define accuracy and precision with suitable example.
- c. What do you mean by Dissipation factor? Explain.
- d. What is Quality factor and its importance in measurement.

- e. Define importance of Kelvin double bridge over Wheatstone bridge.
- f. Explain rise time and fall time with neat diagram.
- g. What do you mean by pulse distortion?
- h. Why triggering is needed in CRO?
- i. What do you understand by Instrument calibration?
- j. How Emitter-Follower structure reduces Voltmeter loading effect?

Section-B

Q2. Attempt any five questions from this section.

(10×5=50)

- (a) Define systematic errors in details. A batch of resistors each has a nominal resistance of 330Ω are to be tested and classified as $\pm 5\%$ and $\pm 10\%$ components are specified at 25°C , and their temperature coefficient is $-300 \text{ ppm}/^\circ\text{C}$. Calculate the maximum and minimum resistance for these components at 100°C and Calculate the maximum and minimum absolute resistance for each case.

- (b) Explain the construction of PMMC instrument. Mathematically prove that the scale of such an instrument is linear.
- (c) Design a multi range FET Voltmeter circuit and explain its working with diagram.
- (d) Derive an expression for finding unknown resistance and Inductance for Maxwell Bridge.
- (e) Explain construction and working of X-Y recorder.
- (f) Write short note on DSO. Compare it with Sampling Oscilloscope.
- (g) Explain the construction and working of Q-meter.
- (h) How dielectric loss and unknown capacitance are measured by Schering Bridge?

Section-C

Note: Attempt any two questions from this section.

(15×2=30)

Q3. Explain the following in detail with their diagram:

- i. Attenuator Probe
- ii. 1:1 Probe

Q4. Explain construction and working of Galvanometer. A PMMC instrument with FSD of $100 \mu\text{A}$ and a coil resistance of $2\text{k}\Omega$ is to be converted into a voltmeter. Determine the required multiplier resistance if the voltmeter is to measure 35V at full scale. Also calculate the applied voltage when the instrument indicates 0.8, 0.5, and 0.2 of FSD with neat circuit diagram.

Q5. Explain the working procedure of following:

- i. Plotter
- ii. Sampling Oscilloscope