

Printed Pages: 4

NEC-403

(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  $330 \Omega$  are to be tested and classified as  $\pm 5\%$  and  $\pm 10\%$  components are specified at  $25^\circ\text{C}$ , and their temperature coefficient is  $-300 \text{ ppm}/^\circ\text{C}$ . Calculate the maximum and minimum resistance for these components at  $100^\circ\text{C}$  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  $35\text{V}$  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