

**II B.Tech II Semester (R09) Regular & Supplementary April/May 2012 Examinations
ELECTRONIC MEASUREMENTS**

(Common to Electronics & Instrumentation Engineering & Electronics & Control Engineering)

Time: 3 hours

Max Marks: 70

**Answer any FIVE Questions
All Questions carry equal marks**

1. (a) Discuss about different forms and methods of measurements.
(b) A 0-250 mA milliammeter has an accuracy of 2% FSR. The ammeter measures 150 mA. Determine the limiting error.
2. (a) Discuss about primary and secondary standards of measurements with examples.
(b) Discuss about the following:-
(i) Accuracy (ii) Precision (iii) Error (iv) Expected value.
3. (a) Discuss about primary and secondary calibration.
(b) Explain how a voltmeter is calibrated.
4. (a) With a neat circuit diagram, explain how a voltmeter will be working?
(b) With a neat circuit diagram, explain about the working principle of a rectifier type AC and DC voltmeter.
5. (a) Draw the circuit of a wheat stone bridge and explain the working principle.
(b) Write in detail about Q-meter with the help of a neat circuit diagram.
6. (a) With a neat diagram explain about frequency measurement.
(b) Distinguish between time, time period and time period measurements.
7. (a) Explain the working principle of a CRT with a neat construction diagram.
(b) With a neat block diagram, explain the working principle of a sampling oscilloscope.
8. (a) Discuss about an X-Y plotter.
(b) Explain about a logic analyzer.

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1. (a) With examples, discuss about types of errors in measurement.
(b) Two capacitors $C_1=99\pm1\ \mu\text{F}$ and $C_2=49\pm1\ \mu\text{F}$ are connected in series and in parallel. Determine the limiting error.
2. (a) With examples discuss about international standards of measurement.
(b) Define the following terms with examples:
(i) Sensitivity (ii) Resolution (iii) Error (iv) Precision.
3. (a) Discuss about indirect and routine calibration.
(b) Explain how an ammeter is calibrated.
4. (a) With a neat circuit diagram, explain the working principle of an ammeter.
(b) With the help of a neat diagram explain about the thermocouple type electronic voltmeter.
5. (a) Discuss about shielding and grounding problems in bridge circuits. Draw the necessary diagram.
(b) Draw the circuit of a Kelvin's bridge and explain its working principle.
6. (a) Discuss about a frequency synthesizer circuit with a neat circuit diagram.
(b) Discuss about an output power meter.
7. (a) With a neat block diagram, explain the principle of operation of a CRO.
(b) Discuss about standard specifications CRO and also about lissajous figures.
8. (a) Discuss about magnetic recording techniques.
(b) Briefly discuss about types of spectrum analyzer.

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1. (a) Give the statistical analysis of random errors.
(b) The current passing through a resistor $50 \pm 0.2 \Omega$ is $4 \pm 0.02 \text{ A}$. Determine the limiting error in resistor, ammeter and power.
2. (a) Discuss about working standards of measurements and give examples.
(b) Discuss about the following:
(i) Repeatability (ii) Reproducibility (iii) Resolution (iv) Error.
3. (a) Discuss about testing and calibrations.
(b) Explain how an oscilloscope is calibrated.
4. (a) Discuss about the design of a series type and shunt type ohmmeter.
(b) With neat diagrams discuss about dual slope integrating type DVM (Digital volt meter).
5. (a) Draw the Maxwell's bridge circuit and explain about its working principle. Give its limitations.
(b) With a neat circuit diagram of an Anderson bridge explain its working principle.
6. (a) Draw a wave analyzer circuit and discuss about its working principle.
(b) Discuss about a frequency counter.
7. (a) Derive the expression for deflection sensitivity in electro static field.
(b) Draw the block diagram of a storage oscilloscope and explain its working principle.
8. (a) Discuss in detail about display devices and display systems.
(b) Discuss about state and time referenced data capture.

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1. (a) Discuss about probability of errors and Gaussian curve.
(b) A 0-50v milli voltmeter has an accuracy of 1% FSR. The voltmeter measures 25mV. Determine the limiting error.
2. (a) Discuss about voltage and current standards with examples.
(b) Define the following terms:
(i) Accuracy (ii) Sensitivity (iii) Error (iv) Repeatability.
3. (a) Discuss about the following terms:
(i) Traceability (ii) Measurement reliability.
(b) Discuss about direct calibrations and indirect calibration.
4. (a) Discuss about the range extension of an ammeter.
(b) With a neat diagram, discuss about the working principle of a staircase ramp-type DVM (digital volt meter).
5. (a) Draw the circuit of a Schering bridge and explain its working principle. Give its merits and demerits.
(b) Discuss about grounding and shielding problems in bridges.
6. (a) Discuss about the errors associated with counter and also different modes of operation of a counter.
(b) Discuss about a wave meter.
7. (a) Derive the expression for magnetic deflection sensitivity.
(b) Discuss about CRO probes.
8. (a) With a neat block diagram discuss the principle of operation of a spectrum analyzer.
(b) Discuss about various types of recorders.
