

B.Tech III Year II Semester (R15) Regular Examinations May/June 2018
ELECTRONIC MEASUREMENTS & INSTRUMENTATION
 (Electronics & Communication Engineering)

Time: 3 hours

Max. Marks: 70

PART – A
 (Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- What are dynamic characteristics of instruments?
 - What are differential voltmeters?
 - What is sync selector circuit?
 - What are active probes?
 - What is logic analyzer?
 - What is random noise in signal generators?
 - List all precautions in using bridges.
 - Draw the circuit diagram of Kelvin bridge.
 - What is signal conditioning circuit?
 - Compare active and passive transducers.

PART – B
 (Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

- 2 (a) Explain different types of errors along with their sources and precautions to minimize them.
 (b) The accuracy of five digital voltmeters is checked by using each of them to measure a standard 1.0000 V from a calibration in instrument. The voltmeter readings are as follows:
 $V_1 = 1.001 \text{ v}$, $V_2 = 1.002 \text{ v}$, $V_3 = 0.999 \text{ v}$, $V_4 = 0.998 \text{ v}$ and $V_5 = 1.0000 \text{ v}$.
 Calculate the average measured voltage and the average deviation.
- OR
- 3 (a) Explain the basic principle of a shunt type ohmmeter.
 (b) Calculate the maximum percentage error in the sum and difference of two voltage measurements when $V_1 = 100 \text{ v} \pm 1\%$ and $V_2 = 80 \text{ v} \pm 5\%$.

UNIT – II

- 4 (a) Derive an expression for electrostatic deflection sensitivity of a CRO.
 (b) A sinusoidal voltage of 83.3 kHz from a standard signal generator gave nine free waves on the screen starting from the X-axis when connected to 'y'-terminal of a CRO, while the tenth wave was slightly short of being a full wave, the end of the trace being at a position that was half the amplitude away from X-axis. If the time base is internally synchronized, determine the rise and decay time of the saw tooth time base voltage.
- OR
- 5 (a) Explain the measurement of frequency, time and phase difference using CRO.
 (b) An electro statically deflected CRT has plates which are 2.5 cm long and 0.5 cm apart and the distance from their centre to the screen is 20 cm. The electron beam is accelerated by a potential difference of 2500 volts and is projected centrally between the plates. Calculate the deflecting voltage required to cause the beam to strike a deflecting voltage and find the corresponding deflection of the screen.

Contd. in page 2

UNIT – III

6 Draw the block diagram of function generator and explain its operation.

OR

- 7 (a) With a neat sketch of the block diagram, explain the principle of operation of Heterodyne wave analyzer. Explain what makes its performance better than a resonant type wave analyzer.
- (b) What is the minimum detectable signal (MDS) of a spectrum analyzer with a (i) N.F of 25 dB using/KHz 3-dB filter? (ii) If N.F is increased to 40 dB using same filter as above, estimate MDS and write the inference from the above two cases.

UNIT – IV

8 Draw the circuit Wheatstone bridge and explain its operation. Also write about errors occur in DC bridges.

OR

- 9 (a) Explain the working principle of a Q-meter and state the factors that causes errors during Q measurement.
- (b) What is interference and discuss about its reduction techniques.

UNIT – V

10 Explain any two methods to measure displacement using suitable circuit diagrams.

OR

11 Write about:

- (a) pH measurement.
- (b) Velocity measurement.
