BE Semester-IV EC Question Bank

Electronic Measurement & Instruments

All questions carry equal marks (10 marks)

Q.1	State and explain types of error and sources of error. Explain the difference between accuracy and precision.
Q.2	Define (1) instrumental error (2) limiting error (3) calibration error (4) environmental error (5) Random error (6) probable error.
Q.3	Attempt the following.
	(A) The voltage reading is 70 V on its 100 V range and an ammeter reading is 80 mA on its 150 mA range are used to determine the power dissipated in the resistor. Both the instruments are guaranteed to be accurate within ±1.5 per cent at full scale deflection. Calculate (a) the power dissipated in the resistor (b) the percentage error in the computed values of power dissipation. (B) The resistance of an unknown resistor is determined by the Wheatstone bridge method. The solution for the unknown resistor is stated as $R_x = R_1R_2/R_3$, where $R_1 = 500\Omega \pm1\%$, $R_2 = 615\Omega \pm1\%$, $R_3 = 100\Omega \pm0.5\%$ Calculate (a) the nominal value of the unknown resistor; (b) the limiting error in ohms of the unknown resistor; (c) the limiting error in per cent of the unknown resistor.
Q.4	An ac bridge has the following constants: arm AB, R=1000 Ω in parallel with C = 0.159µF; BC, R = 1000 Ω; CD, R = 500 Ω; DA, C = 0.636 µF in series with an unknown resistance. Find the frequency for which this bridge is in balance and determine the value of the resistance in arm DA to produce this balance.
Q.5	A bridge is balanced at 1,000Hz and has the following constants: AB,0.2µF pure capacitance; BC,500Ω pure resistance; CD, unknown; DA, R = 300Ω parallel with C = 0.1µF. Find the R and C or L constants of arm CD, considered as a series circuit.
Q.6	Describe the measurement error of Wheatstone bridge. Why it is modified to Kelvin's Double Bridge? Derive equations at balance for Kelvin's Double Bridge.
Q.7	Explain Maxwell bridge and justify that it is limited to the measurement of medium Q coils.
Q.8	Explain Anderson's bridge with phase diagram and derive its balance equations.
Q.9	Which bridge is used for frequency measurement? Give its circuit and derive the equation for frequency. Give its application and limitations.
Q.10	Describe the working of Schering bridge. Derive the equations for capacitance and dissipation factor.
Q.11	Describe the working of Hay's Bridge for measurement of inductance. Derive the equations for balance. Why is this bridge suited for measurement of inductance of high Q coil.
Q.12	Draw and explain basic circuit for measurement of Frequency with Gate control F/F.
Q.13	Explain the operation of Period measurement.
Q.14	Explain the working of Digital frequency measurement with basic block diagram.
Q.15	What are the advantages of digital instruments over analog instruments? Explain the operation of a basic digital multimeter.

Q.16	Draw the block diagram of basic CRO and explain the function of each block in detail.
Q.17	Explain dual beam CRO and dual trace CRO.
Q.18	Explain how CRO can be used to measure following parameters. (1) frequency and phase by Lissajous pattern (2) rms value of a sine wave
Q.19	Explain sampling oscilloscope in detail.
Q.20	Derive the formula of Deflection Sensitivity S and Deflection Factor G of CRT.
Q.21	Write short note on Storage Oscilloscope.
Q.22	Why delay line is required in vertical section of CRO? Explain lumped parameter delay line and distributed parameter delay line.
Q.23	Write short note on Digital Storage Oscilloscope.
Q.24	Draw the block diagram of function generator. Explain each block in detail.
Q.25	Write a short note on frequency synthesized signal generator.
Q.26	With the help of block diagram, explain working of frequency divider type signal generator.
Q.27	Write short note on sweep frequency generator.
Q.28	Define following characteristics of a pulse. (1) Rise time (2) Fall time (3) overshoot (4) Pulse repetition rate Explain how the astable multivibrator can be used to generate pulses.
Q.29	With the help of block diagram, explain the working principle of frequency selective wave analyzer. List its applications.
Q.30	Explain the concept of wave analysis and with the help of block diagram explain the construction and working of heterodyne wave analyzer.
Q.31	Write short note on Spectrum Analyzer.
Q.32	Explain difference between LED and LCD. Mention its advantages and disadvantages.
Q.33	Explain in detail BCD to 7 segment converter.
Q.34	Explain the construction and working of an ultraviolet recorder with neat sketch. Describe its application.
Q.35	Write a short note on: (1) Strip chart recorder (2) XY recorder
Q.36	Write a short note on: (1) period measurement (2) Potentiometric recorder
Q.37	Explain the principle of operation of a Q meter. Also outline the factors that cause errors during a Q measurement.
Q.38	Define following parameter of digital meter. (1) Accuracy,(2) Sensitivity (3) Resolution A 4 ½ digit voltmeter is used for voltage measurements. (i) Find its resolution (ii) How would 12.98V be displayed on a 10V range? (iii) How would 0.6973 be displayed of 1V and 10V ranges.
Q.39	What are objectives of data acquisition system? Explain in detail the difference between generalised DAS, Single DAS, and multichannel DAS.
Q.40	What is data acquisition system? Describe the components of an digital data acquisition.