



CBCS SCHEME

18EE36

Third Semester B.E. Degree Examination, Aug./Sept.2020 Electrical and Electronic Measurements

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Obtain the expression for sensitivity of Wheatstone bridge. (08 Marks)
b. Explain the construction and working of Megger. (06 Marks)
c. A very small resistance $100\pi\Omega$ is measured using Kelvin's double bridge having following resistors. The standard resistor = $300.05\mu\Omega$ inner ratio arms = 100.41Ω and 300Ω , outer ratio arms = 100.32Ω and 300Ω . The resistance of link = $800\mu\Omega$. Calculate the unknown resistance. (06 Marks)

OR

- 2 a. Explain with sketch and vector diagram Maxwell's inductance – capacitance bridge to find inductance and Q-factor of coil. (08 Marks)
b. Explain sources and detectors that are used in A.C and D.C bridges. (06 Marks)
c. An Anderson bridge consists of 4 and R_1 in arm AB, a variable resistance in arm BC, a fixed resistance of 800Ω each in arms CD and DA, a variable resistance in arm DE and fixed capacitor of $1.2\mu\text{f}$ in arm CE. A supply of frequency 1000Hz is connected across A and C. The detector is connected between B and E. The balance is obtained in the arm DE is 500Ω and resistance of 900Ω in arm BC calculate the value of the unknown inductance L_1 and resistance R_1 . (06 Marks)

Module-2

- 3 a. Explain the types of errors and how to minimize errors in Wattmeters. (08 Marks)
b. Obtain the expression for reactive power and power-factor. (06 Marks)
c. A Wattmeter has a coil of 0.03Ω resistance and pressure coil of 6000Ω resistance. Calculate the percentage error if the Wattmeter is so connected that
I. The current coil is on load side.
II. The pressure coil is on load side.
i) If the load takes 20A at a voltage of 220V and 0.6 power factor in each case.
ii) What load current would give equal errors with the two connections? (06 Marks)

OR

- 4 a. Explain with neat sketch, calibration of single phase energymeter. (08 Marks)
b. Explain with neat sketch, construction and operation of power-factor meter. (06 Marks)
c. The meter constant of 230V , 20A single phase energymeter is 1800rev/kwh . The meter makes 200 revolutions in 120secs when tested at full-load at 0.8pf lag at the rated voltage. Determine the error in the meter reading. (06 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. $42+8 = 50$, will be treated as malpractice.

Module-3

- 5 a. A moving coil instrument gives a full scale deflection for a current of 25mA with a potential difference of 200mV across it. Calculate: i) Shunt required to use it as an ammeter to get a range of 0-200A ii) Multiplier required to use it as a voltmeter of range 0-500V. (05 Marks)
- b. Obtain expression for transformation ratio 'R' and phase angle 'θ'. (10 Marks)
- c. Differentiate between CT and PT. (05 Marks)

OR

- 6 a. Explain errors of CT and PT. (04 Marks)
- b. Explain the method to measure flux using Ballistic galvanometer with a neat sketch. (08 Marks)
- c. Explain Ewing's double-bar method to find magnetizing force. (08 Marks)

Module-4

- 7 a. Mention the advantages of digital instruments. (04 Marks)
- b. Explain with neat sketch, true RMS reading voltmeter. (08 Marks)
- c. Explain with neat sketch, working of integrating type digital voltmeter. (08 Marks)

OR

- 8 a. With neat sketch, explain successive approximation type digital voltmeter. (08 Marks)
- b. Explain with neat sketch, how Q-meter can be used for high impedance measurement. (08 Marks)
- c. A coil is tuned to resonance at 600kHz with a resonating capacitance of 40μf. At 300kHz, the resonance is obtained with a resonating capacitance of 175μf. Find the self capacitance of the coil and its inductance. (04 Marks)

Module-5

- 9 a. Explain seven segment display and Bargraph display. (10 Marks)
- b. Explain LED and LCD display and also Nixie tube. (10 Marks)

OR

- 10 a. Explain strip-chart recorder and potentiometric recorder. (10 Marks)
- b. Explain X-Y recorder and Electro Cardio Graph (ECG). (10 Marks)
