

NEW SCHEME

Third Semester B.E. Degree Examination, Dec. 06 / Jan. 07
IT/EE/EC/TC/ML/BM

Electrical and Electronics Measurements

Time: 3 hrs.]

[Max. Marks:100

Note: Answer any FIVE full questions.

1.
 - a. With μ_0 as permeability and ϵ_0 as the permittivity, prove dimensionally that the expression $(\mu_0 \epsilon_0)^{1/2}$ has the dimensions of velocity. (10 Marks)
 - b. The expression for the eddy current loss P per meter length of wire may be written as $P \propto f^a B_m^b d^c \rho^g$, where f = frequency, B_m = maximum flux density, d = diameter of wire, ρ = resistivity of material. Find the values of a, b, c and g using LMTI system. (10 Marks)
2.
 - a. Explain Kelvin's Double Bridge network and hence obtain an expression for the low resistance subjected for measurements. (10 Marks)
 - b. Write a note on 'Sources and Detectors' used for AC Bridge. (04 Marks)
 - c. An ac bridge is balanced at 2 kHz with the following components in each arm:
 Arm AB = 10 k Ω ,
 Arm BC = 100 μ F in series with 100 k Ω ,
 Arm AD = 50 k Ω ,
 Find the unknown impedance $R \pm jx$ in the arm DC, if the detector is between BD. (06 Marks)
3.
 - a. What are shunts and multipliers? Derive an expression for both, with reference to the meters used in electrical circuits. (06 Marks)
 - b. Write the comparison of CT and PT. (04 Marks)
 - c. A current transformer has a single turn primary and 400 turns secondary. The secondary is supplying a pure resistive load of 2 Ω at 5 A. The magnetizing mmf required to set up the flux in the core is 100 AT. The frequency is 50 Hz. While core has cross-sectional area of 8 cm². Calculate the ratio and phase angle of the current transformer. Also obtain the maximum flux density in the core. Neglect iron losses and copper losses. (10 Marks)
4.
 - a. Explain the working of single phase induction type energy meter and discuss its errors. How can the errors be minimized? (10 Marks)
 - b. Explain phase sequence indicators, their need and working. (10 Marks)
5.
 - a. What is Q meter? (02 Marks)
 - b. Explain digital voltmeters using successive approximation method. (10 Marks)
 - c. Explain with neat figure, the true RMS responding voltmeter. (08 Marks)
6.
 - a. What is the principle of electric resistance strain gauge? Explain the unbounded resistance wire strain gauge. (10 Marks)
 - b. Explain with block diagram the essential functional operation of a digital data acquisition system. (10 Marks)
7.
 - a. Explain with a block diagram, interfacing of frequency counter with IEEE 488 Bus (06 Marks)
 - b. Explain the measurement of power in optical fiber. (10 Marks)
 - c. Write the classification of electrical transducers. (04 Marks)
8. Write short notes on any four of the following: (20 Marks)
 - a) Meggar b) Weston frequency meter c) Stabilized and calibrated light sources
 - d) Schering Bridge e) Shielding and grounding of bridges.

Following.

(06 Marks)

(06 Marks)

show that

(08 Marks)

(08 Marks)

for the same

(04 Marks)