PVP 19

Code: 19EE4501B

III B.Tech - I Semester – Regular Examinations – JANUARY 2022

ELECTRICAL MEASUREMENTS
(ELECTRICAL & ELECTRONICS ENGINEERING)

Duration: 3 hours Max. Marks: 70

Note: 1. This question paper contains two Parts A and B.
2. Part-A contains 5 short answer questions. Each Question carries 2 Marks.
3. Part-B contains 5 essay questions with an internal choice from each unit. Each question carries 12 marks.
4. All parts of Question paper must be answered in one place

PART – A

1. a) Define recording and integrating instruments with one example.
   b) State two applications of CT and PT.
   c) What is the purpose of compensating coil in wattmeter?
   d) Write the advantages of Maxwell's bridge?
   e) What are the properties of a passive transducer?

PART – B

UNIT – I

2. a) Explain how the ranges of ammeters and voltmeters can be extended? 6 M
   b) Design an Aryton shunt to provide an ammeter with the current ranges 1 A, 5 A and 10 A. A basic meter resistance is 50 Ω and full scale deflection current is 1 mA? 6 M

OR

3. a) Explain the purpose of lag adjustment devices in an Induction type of energy meter. Explain the different ways of achieving it? 6 M

b) List the advantages & disadvantages of MI type instruments. 6 M

UNIT – II

4. a) Why secondary of C.T should not be open? 4 M

b) A current transformer with single turn primary has 300 secondary turns and R = 1.5, iron loss of 1.2W and X = 1Ω. When secondary carries 5 A current, magnetising m.m.f at of 100 A and calculate ratio and phase angle errors**.** 8 M

OR

5. a) With neat figure explain the working of Potential Transformer. 6 M

b) A potential transformer of ratio 1000/100 has primary resistance 94.5Ω, secondary resistance 0.86Ω, primary reactance 66.2Ω, total equivalent reactance 110Ω, and no load current 0.02A at 0.4 power factor. Calculate the phase angle error at no load. 6 M

UNIT-III

6. a) Explain the construction and working of moving iron type power factor meters with neat diagram. 8 M

b) Explain the advantages and disadvantages of moving iron type power factor meters. 4 M

OR

7. a) What are the different methods of measurement of frequency in the power frequency range. 4 M

b) Explain the working of Weston Type Frequency meter with neat diagram. 8 M

UNIT – IV

8. a) Explain how the inductance is measured in terms of known capacitance using Maxwell's bridge? 6 M

b) Explain the kelvins double bridge method for the measurement of low resistance with a neat diagram. 6 M

OR

9. a) A Maxwell bridge is used to measure inductive impedance. The bridge consists at balance are R1 = 47 kΩ and C1 = 0.01 μF in arm AB, R2 = 5.1 kΩ in arm BC, R3 = 100 kΩ in arm AD. Find the unknown impedance? 8 M

b) Explain how an unknown resistance can be measured by Wheatstone bridge. 4 M

UNIT – V

10. a) Explain in detail about the factors to be considered while selecting a transducer. 6 M

b) Discuss in detail about the advantages and limitations of Thermistor. 6 M

OR

11. a) Describe with neat sketch, the working of digital phase angle meter. 6 M

b) Explain with neat diagram the operation of a DVM. State the advantages of DVM. 6 M