R18

Code No:151AG

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

B .Tech I Year I Semester Examinations, December - 2018

BASIC ELECTRICAL ENGINEERING

(Common to EEE, CSE, IT)

Time: 3 hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A **(25 Marks)**

1.a) Define linear and non linear elements. [2]
b) What is complex power? [2]
c) What is meant by equivalent resistance of a 1-Φ transformer when referred to primary? [2]
d) Write the merits and demerits of slip-ring induction motor. [2]
e) What is MCB? [2]
f) Five 2V cells, each having an internal resistance of 0.2Ω are connected in series to a load of resistance 14 Ω. Find the current flowing in the circuit. [3]
g) What is phase difference? Explain. [3]
h) Write different types of losses in transformers. [3]
i) What is the necessity of starter in starting of a 3-Φ Induction motor? [3]
j) What is the necessity of earthing in domestic buildings? [3]

PART - B **(50 Marks)**

2.a) Explain about different types of sources.
b) Calculate the power absorbed by each component in the circuit shown in figure 1. [5+5]

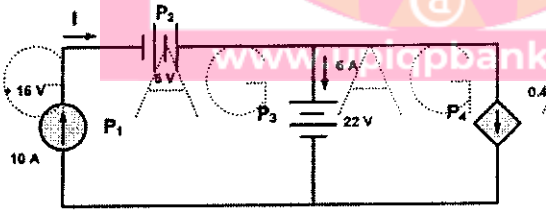

Figure 1

OR

3.a) State and explain Thevenin's theorem.
b) In the circuit shown in figure 2, determine 'V' using Thevenin's theorem. [5+5]

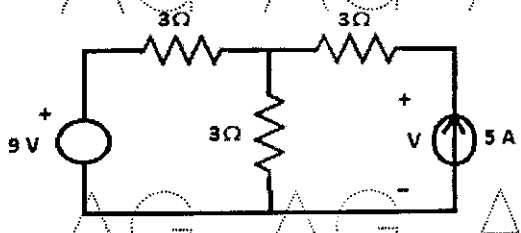

Figure 2

4.a) Compute the average value of square wave form shown in below figure 3.

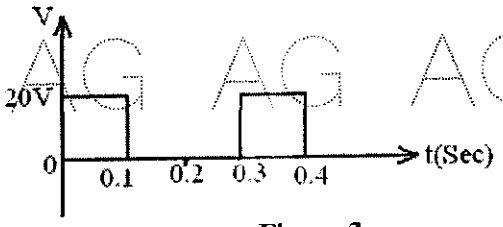

Figure 3

b) A coil takes a current of 1 A at 0.6 lagging power factor from a 220 V, 60 Hz single phase source. If the coil is modeled by a series RL circuit, find i) The complex power in the coil and ii) The values of R and L. [5+5]

OR

5.a) Derive the expression for RMS value of alternating current wave $I = I_m \text{Sin } \omega t$.

b) Derive the relation between phase and line voltages and currents in balanced three phase star connection. [5+5]

6.a) Explain regulation of a transformer with phasor diagrams.

b) Derive the condition for maximum efficiency in a single phase transformer. [5+5]

OR

7.a) Explain the operation of an auto transformer with a neat diagram.

b) What are the advantages of 3-phase Transformers? [5+5]

8.a) Explain the speed control of 3- Φ induction motor using Rotor resistance control.

b) Sketch the Torque-slip characteristics of Induction motor and explain. [5+5]

OR

9.a) Explain the principle of production of rotating magnetic field in a 3-phase induction Motor.

b) Derive the condition for maximum torque under running condition of 3-phase Induction Motor. [5+5]

10.a) What is ELCB? Explain the working principle of ELCB.

b) Mention advantages and disadvantages of ELCB. [5+5]

OR

11.a) What are the different types of wires and cables? Explain.

b) Give applications of the primary and secondary batteries. [5+5]

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