Code No: 152AC

R18

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech I Year II Semester Examinations, August - 2019
BASIC ELECTRICAL ENGINEERING
(Common to ECE, EIE)

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) The voltage across 5Ω resistor is 10 volts, Find the current and power dissipated in that resistor? [2]

b) Define RMS and Average value of an alternating quantity. [2]

c) Write the relation among primary and secondary voltages, currents and winding turns. [2]

d) What is rotating magnetic field? [2]

e) What are the characteristics of batteries for longer life? [2]

f) Explain Kirchhoff's laws. [3]

g) What is the significance of form factor and peak factor? [3]

h) Why rating of the transformer is given in KVA? Explain. [3]

i) Draw the torque-speed characteristics of separately excited d.c. motors. [3]

j) What is the significance of earthing? [3]

PART-B

(50 Marks)

2.a) For the circuit shown in figure 1 below, calculate the current I and voltage V_{ab} when i) $R_x = 0\ \Omega$ ii) $R_x = 15\ K\Omega$ iii) $R_x = \infty\ \Omega$.

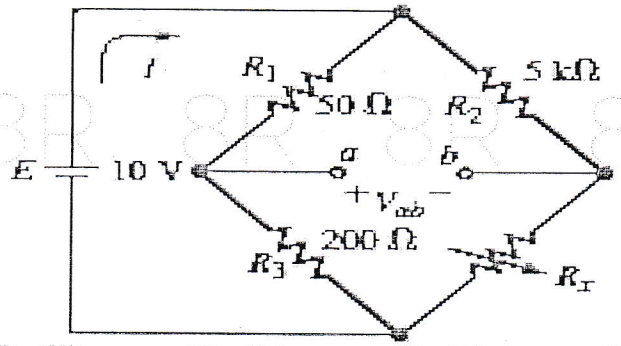

Figure: 1

b) Calculate the current flowing through $R_L = 20\Omega$ of the network shown below in the figure 2 by using Thevenin's theorem. [5+5]

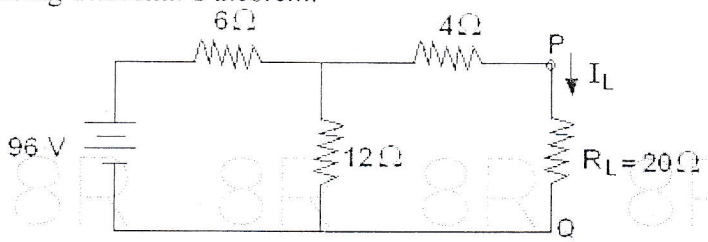

Figure: 2

OR

3.a) For the arrangement shown in figure 3 below find:
i) The equivalent capacitance of the circuit and
ii) The voltage across a 4.5 μF capacitor.

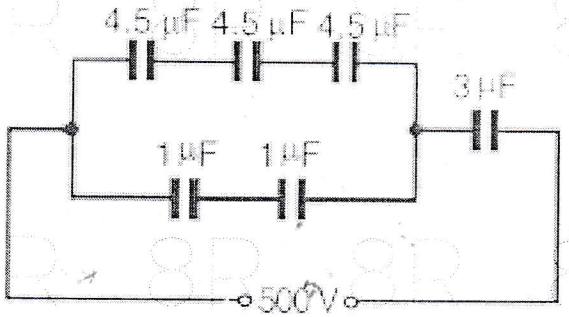

Figure: 3

b) Determine the current I in the network by using Thevenin's theorem in figure 4 shown below. [5+5]

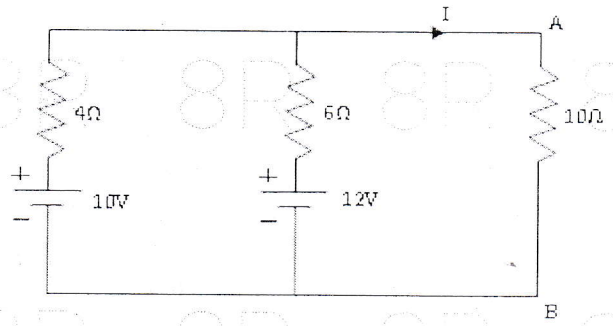

Figure: 4

4.a) Explain the following with an example:
i) Addition and subtraction of phasors
ii) Multiplication and division of phasors.

b) In an a.c. circuit, v = 200 Sin(ωt+300) V, i = 15 Sin(ωt-300) A. Find the active and reactive power. [5+5]

OR

5.a) Find the impedance of series R-L-C circuit with R=100Ω, X_L=50Ω and X_C=20Ω.

b) Calculate:
i) The admittance Y ii) The conductance G and iii) Susceptance B of a circuit consisting of a resistor of 10 Ω in series with an inductor of 0.3 H, when the frequency is 50 Hz. [5+5]

6.a) Derive an expression for emf induced in a transformer.

b) What are the tests to be conducted on a single phase transformer to find efficiency and regulation of a transformer? [5+5]

OR

7.a) Determine the efficiency of a single phase 150 KVA transformer at 50% full load and 0.8 power factor lag if the copper loss at full load is 1600 watts and iron loss is 1400 watts.

b) With the help of diagram explain the principle of operation of transformer. [5+5]

8.a) Explain the working principle of single phase induction motor.

b) Explain the constructional details of synchronous generator. [5+5]

OR

9.a) A 3-phase, 60 Hz induction motor has 2 poles. If the slip is 2% at a certain load, determine:

i) The synchronous speed

ii) The speed of the rotor and

iii) The frequency of the induced e.m.f.'s in the rotor.

b) What are the merits and demerits of induction motor? [5+5]

10.a) What is the difference between MCB and MCCB, describe their schematic diagrams?

b) What are the different types of wires and cables? Explain. [5+5]

OR

11.a) Describe the operation of ELCB with its schematic diagram.

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

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