JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech I Year I Semester Examinations, May/June - 2019
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) State Thevenin's theorem. [2]
 b) What is meant by apparent power? [2]
 c) Why the copper losses are more in a transformer? [2]
 d) What is necessity of rotating magnetic field in the induction motor? [2]
 e) What is the difference between fuse unit and switch fuse unit? [2]
 f) What is meant by capacitor charging current, obtain its expression in terms of its time
     constant in case of R-C circuit? [3]
 g) An alternating voltage $e_1 = 300 \sin\left(\omega t + \dfrac{\pi}{3}\right)$, what is its instantaneous voltage at $t = 5$ ms

     and 10 ms for 50 Hz frequency? [3]
 h) What is the difference between ideal transformer and practical transformer? [3]
 i) What are the advantages of armature winding placing in its stator? [3]
 j) What are the characteristics of batteries for longer life? [3]

PART-B

(50 Marks)

2.a) State Kirchhoff Current Law and Voltage law, determine the values for I_X and V_Y in the
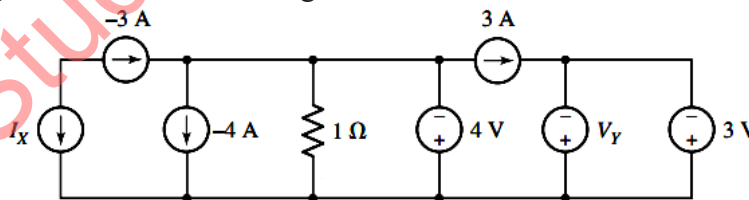   following given circuit shown in figure 1.

Figure: 1

 b) In the following given circuit shown in figure 2, calculate i) v_1, v_2 and v_3 ii) power
     delivered to R_1, R_2 and R_3. [5+5]
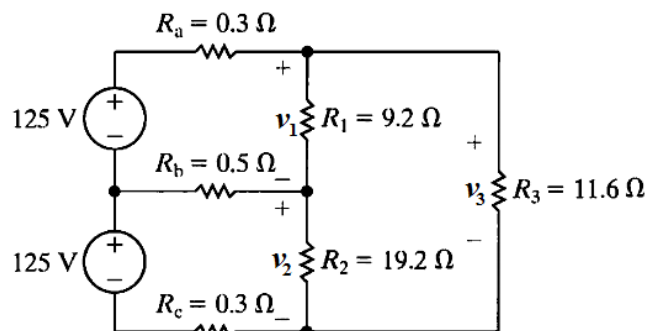

Figure: 2

OR

3.a) Find the Norton equivalent circuit of the following given circuit shown in figure 3 with respect to the   terminals 'a-b'?
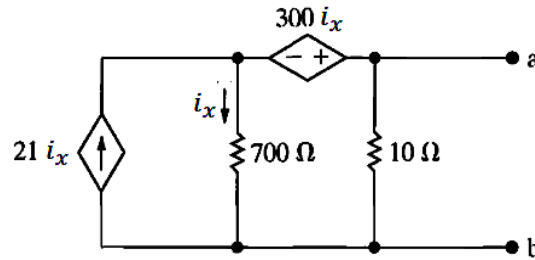

Figure: 3

b) State and explain superposition theorem. [5+5]

4.a) Describe phasor representation of RL series circuit? If admittance of a series circuit is $(0.010 + j0.004)$ S. Determine the values of the circuit components for the frequency value of 50 Hz?

b) Balanced Y-connected load of 10 kW at 0.8 power factor lagging supplied by a 50-Hz, 300-V, three-phase system. Find the line current delivered by the source. Draw the phasor diagram. [5+5]

OR

5.a) Explain how the sinusoidal waveform is represented as phasor quantity with example.

b) A coil is connected in series with a capacitor of 20 μF to a 200 V variable frequency supply. The current is a maximum at 50 A, when the frequency is set to 50 Hz. Determine the resistance and inductance of the coil. [5+5]

6.a) Draw and explain the phasor diagram of single phase transformer on lagging load.

b) A 50 kVA, 1000/10000 V, 50Hz single phase transformer has iron loss of 1200W. The copper loss with 5 A in the high voltage winding is 500 W. Calculate the efficiency at i) 25 %, ii) 50 % iii) 100 % of normal load at power factor of 0.8. [5+5]

OR

7.a) Describe the principle of operation of auto transformer, what is the saving of copper in this transformer when compared with two winding transformer?

b) Discuss the various three phase transformer groups and their significance? [5+5]

8.a) Describe the constructional details of three phase slip ring induction motor.

b) Describe the torque speed characteristics of separately excited dc motor. [5+5]

OR

9.a) What are the various losses occurs in the three phase induction motor in their operation?

b) Describe briefly construction details of any three phase synchronous generator? [5+5]

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

b) What are the drawbacks of low power factor, describe how it is improved? [5+5]

OR

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

b) Calculate total energy consumed per day by the use of following loads:
i) 5 number of 40 W lights operated 5 hours per day
ii) 1 h.p. motor is operated 2 hours per day
iii) 1 k.W heater is operated 1 hour per day
iv) 1 computer is used for 6 hours per day with printer about 30 minutes. [5+5]

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