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I B.Tech I Sem Regular Examination, Dec 2019/Jan 2020
BASIC ELECTRICAL ENGINEERING
(EEE, CSE & IT)

Time: 3 Hours.   **Max. Marks: 70**

Note: 1. This question paper contains two parts A and B.
    2. Part- A is Compulsory. Answer all Questions which carries 20 marks.
   3. Part – B consists 5 units. Answer any one question from each unit.
      Each question carries 10 marks and may have a, b as sub questions.

PART- A
(10 x 2 Marks = 20 Marks)

1. a) Write the voltage and current equations across capacitor with a DC excitation? 2 M

   b) Write the initial and final condition for pure inductor supplying with a DC excitation. 2 M

   c) Define power factor. What is the formula for RL series circuit with AC excitation? 2 M

   d) Derive the average value of sinusoidal current. 2 M

   e) Draw the no load characteristics of 1-phase practical transformer. 2 M

   f) Differentiate between the 1-phase transformer and auto transformer. 2 M

   g) Why single-phase induction motor is not self-starting? 2 M

   h) Write the differences between self and separately excited motor? 2 M

   i) Define fuse and circuit breaker. 2 M

   j) What is earthing? and what is the importance of earthing? 2 M

PART - B
(5 x 10 Marks = 50 Marks)

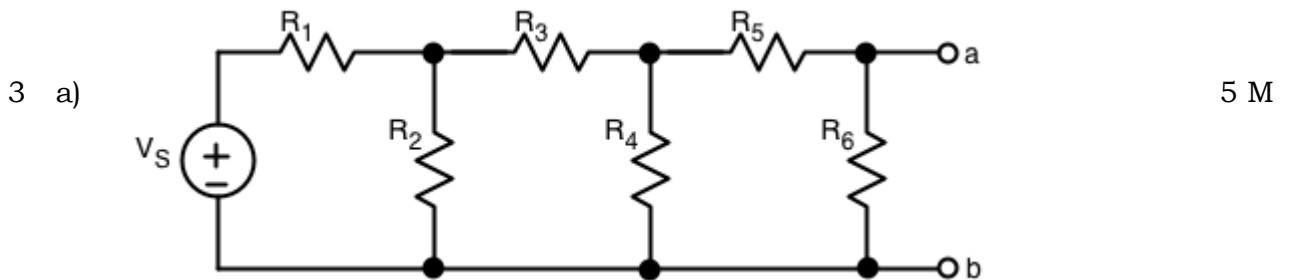Find the equivalent resistance R_{EQ} for the following resistor combination circuit.

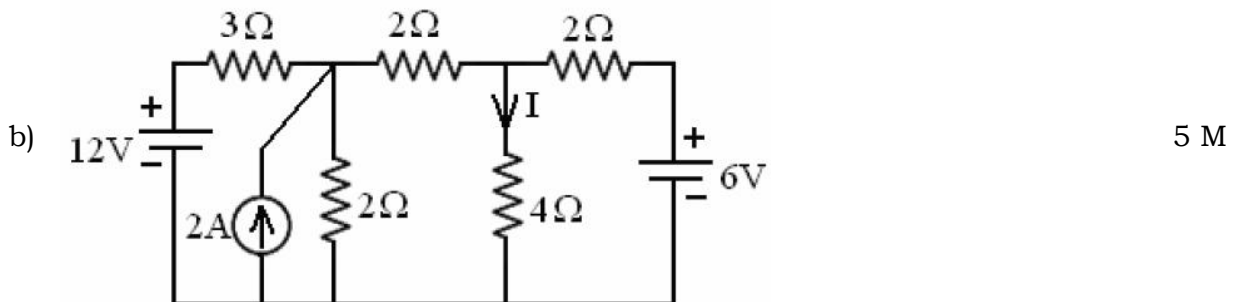2 a)   5 M
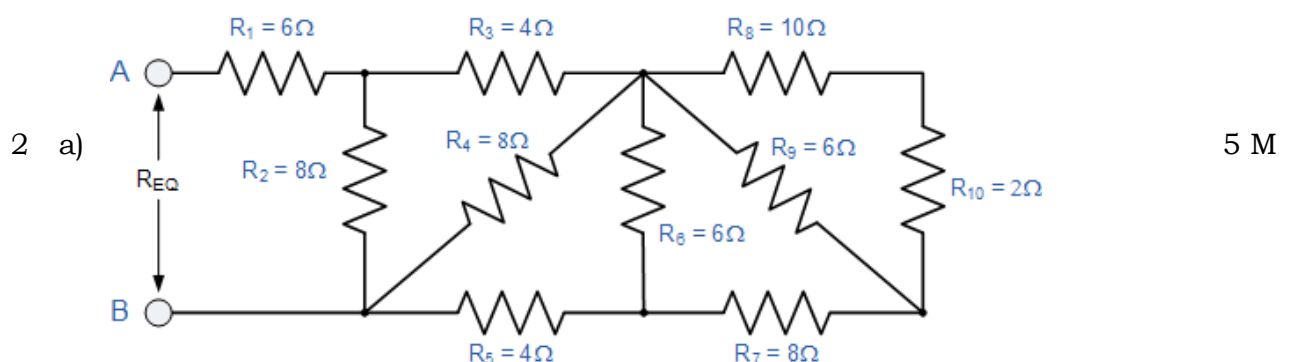
b) State the superposition theory and thevenin's theory. 5 M

For the circuit show below R_1 =6kΩ, R_2 =80kΩ, R_3=4kΩ, R_4 =25kΩ, R_5 =4kΩ, R_6 =45kΩ and V_s =40v find the values for Norton's equivalent circuit respect to the terminals a and b.

3 a)   5 M

Find current 'I' in the below circuit by using Nodal Analysis.

b)   5 M

4 a) Derive the equation of impedance, current, phase angle, voltage drop across resistor and capacitor, power factor in a series RC single phase AC circuit.   5 M

Determine the input impedance of the circuit shown in below Figure at ω = 10 rad/s.

b)   5 M

OR

5 a) A balanced star connected load of 8+j6Ω per phase is connected to a 3-phase 230V supply find (i) Line current (ii) Active power (iii) Reactive power (iv) Apparent power.   5 M

b) Derive the relation between line voltages and phase voltages, line currents and phase currents in star connection with phase diagram.   5 M

6 a) Explain the open circuit test and short circuit test on the 1-phase transformer with neat circuit diagrams.   10 M

OR

7 a) Explain the principle of operation of single phase transformer with a neat circuit diagram and derive the transformation ratio.   5 M

b) A 10kVA, 2000/400V single phase transformer has the following data: R1= 5Ω, X1= 12Ω: R2= 0.2 Ω, X2= 0.48Ω.
Determine the secondary terminal voltage at full-load, 0.8p.f lagging when the primary supply voltage is 2000V.   5 M

8 a) Explain the construction details and working principle of 3-phase induction motor with a neat diagram. 10 M

OR

9 a) Explain the speed control methods of separately excited dc motor 5 M

   b) What are the starting methods of 3-phase induction motor? explain with neat circuit diagrams. 5 M

10 a) What are the different types of batteries? explain in detail. 5 M

    b) Explain the operation of MCB and ELCB components of LT switchgear. 5 M

OR

11 a) Explain the operation of FSU and MCCB components of LT switchgear. 5 M

    b) What are the different types of wires and cables? explain. 5 M

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