

## STESC203 - Basic of Electrical and Electronics Engineering

P. Pages : 3

Time : Three Hours



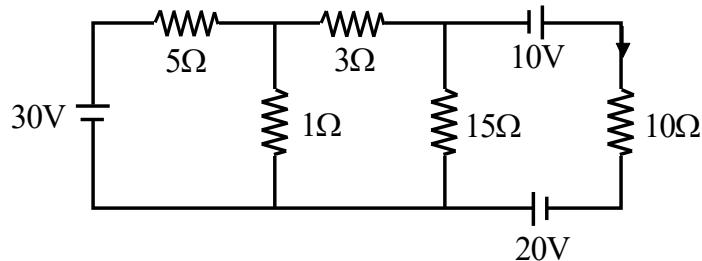
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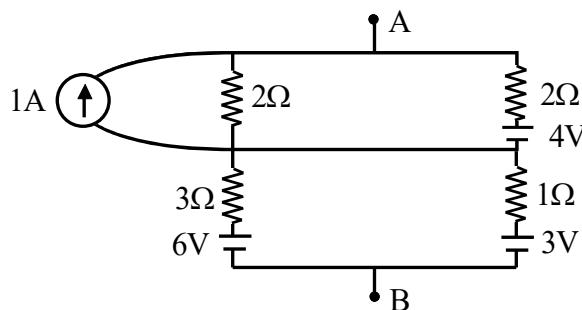
Max. Marks : 80

- Notes :
1. All questions carry equal marks.
  2. Due credit will be given to neatness and adequate dimensions.
  3. Assume suitable data wherever necessary.
  4. Illustrate your answers wherever necessary with the help of neat sketches.
  5. Use of slide rule, Logarithmic tables, Steam tables, Mollier's chart, Drawing instruments, Thermodynamic tables for moist air, Psychrometric charts and Refrigeration charts is permitted.

1. a) Calculate the branch current through 10 ohm resister using Thevenin's theorem? 8

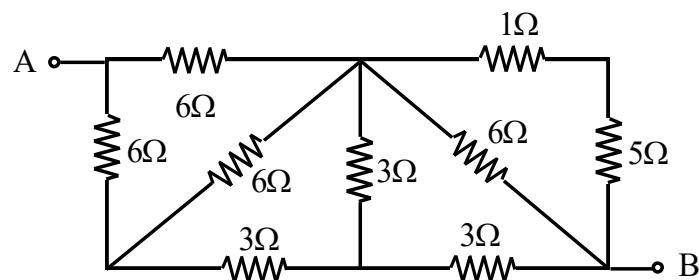


- b) Write the steps to Nortonize the circuit? 4
- c) Reduce network shown into a single voltage source and single resistor between terminal A and B? 4

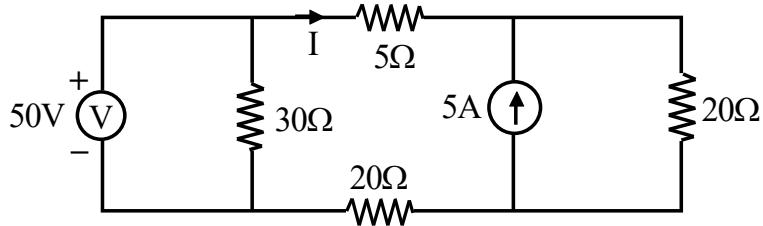


**OR**

2. a) Calculate the equivalent resistance across terminals A and B? Using star-Delta Transformation? 8

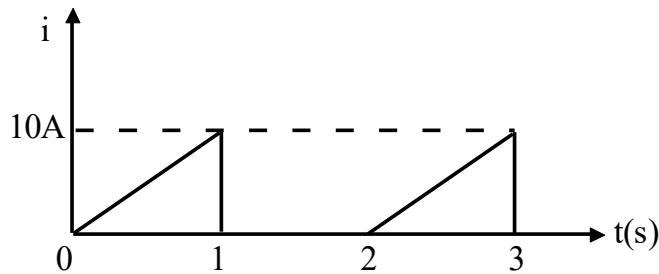


- b) Using Superposition theorem find current 'I' in 5 ohm resistance?



3. a) Explain the Production and Representation of sinusoidal wave form with neat and clean diagram? 6

- b) Find the average value And RMS value of given waveform? 6



- c) An alternating voltage is represented by  $v=65.25\sin 332t$ , find' 4  
 i) Maximum value  
 ii) Frequency  
 iii) Time period  
 iv) Instantaneous value of voltage when  $t$  is 5ms

**OR**

4. a) Explain the series RL, RC, RLC circuit with suitable Phasor diagrams? 8

- b) A3-phase, 230 volt system supplies a total load of 2000 watt at a line current of 6 amp when three identical impedances are in star-connection across the line terminal of the system. Determine the resistive and reactive components of each impedance.? 8

5. a) Explain the construction and working Principle of Transformer and its types? 6

- b) Derive the EMF equation for Transformer? 4

- c) Draw and explain briefly Equivalent circuit model of the transformer and explain Primary and Secondary side referred vice-versa? 6

**OR**

6. a) Derive and explain the condition for maximum efficiency and regulation of a transformer? 4

- b) When a transformer is connected to a 1000-v, 50 Hz supply the core loss is 1000 W, of which 650 is hysteresis and 350 is eddy current loss. If the applied voltage is raised to 2000 V and the Frequency to 100 Hz, find the new losses? 8

- c) Explain why transformer is rated in KVA not in KW? Also explain why transformer cannot work on DC supply? 4

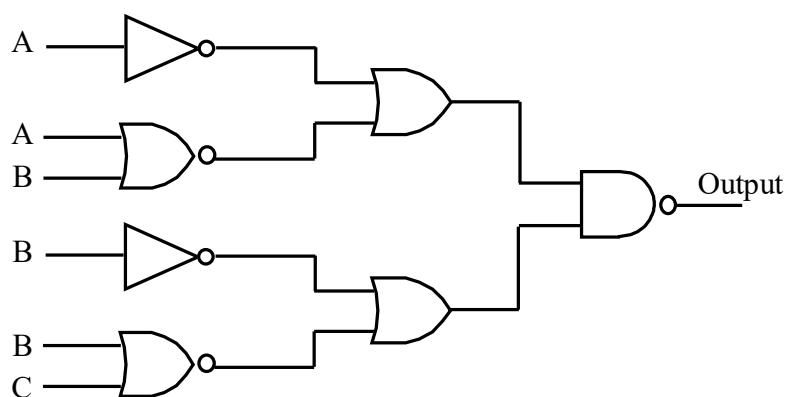
7. a) Explain the application of diode as full wave rectifier and half wave rectifier with circuit diagram and waveform? 10  
 b) Derive the Gain of Non-inverting and inverting Op-amp? 6

**OR**

8. a) Explain briefly working of PN junction diode with its characteristics? 8  
 b) Draw Op-amp circuit with different configuration and write application as adder and Subtractor? 8
9. a) Explain NAND gate as universal Gates? 4  
 b) Verify by the truth table method.  
 a)  $A + \bar{A}B + AB = A + B$   
 b)  $(A + \bar{B})(\bar{A} + B) = AB + \bar{A}\bar{B}$
- c) Solve 8  
 I)  $(2777)_{10} = (?)_{\text{Octal}}$   
 II)  $(101100)_2 = (?)_{\text{Decimal}}$   
 III)  $(87D4)_{16} = (?)_{\text{Binary}}$   
 IV)  $(3AF)_{16} = (?)_{10}$

**OR**

10. a) Write down the truth table with its symbol for the following gates 4  
 i) Ex-NOR  
 ii) EX-OR
- b) Simplify 4  
 i)  $\overline{AB(C + \overline{BD} + \overline{AB})}CD$   
 ii)  $\overline{(A + BC)(\overline{AB} + C)}$
- c) Draw the simplest possible logic Diagram that Implements the output of the logic Diagram shown below. 8



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