Bangladesh Army University of Science and Technology

Department of Computer Science and Engineering

Referred/ Improvement/ Backlog Examination, Winter 2018-19 **Level-1** **Term-I**

Course Code: EEE 1163 **Course Title: Basic Electrical Engineering**

Time: 03 (Three) hours **Full Marks: 210**

N.B. (i) Answer any three questions from each PART (ii) Use separate answer script for each PART
(iii) Marks allotted are indicated in the margin (iv) Symbols and abbreviations bear usual meanings

PART A

1. (a) What is electrical circuit? Differentiate between DC current and AC current. 10
   (b) What do you understand by active and passive circuit elements? Explain with example. 10
   (c) Find the currents and voltages in the circuit of Fig. 1(c). 15

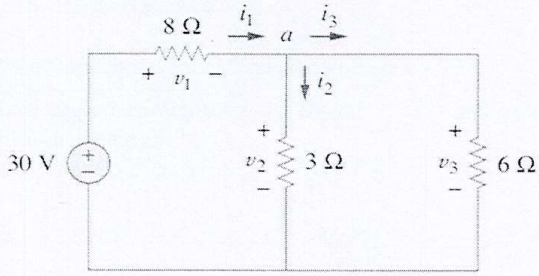

Fig. 1(c)

2. (a) State and derive Ohm's Law. Define short circuit and open circuit in electrical circuit analysis. 10
   (b) Find R_{ab} in the circuit of Fig. 2 (b). 10

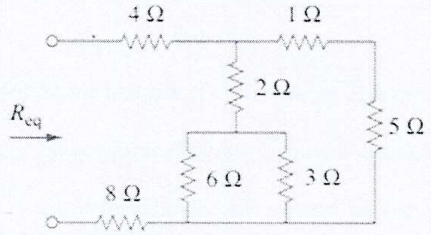

Fig. 2(b)

   (c) Calculate I_0 in the circuit of Fig. 2 (c). 15

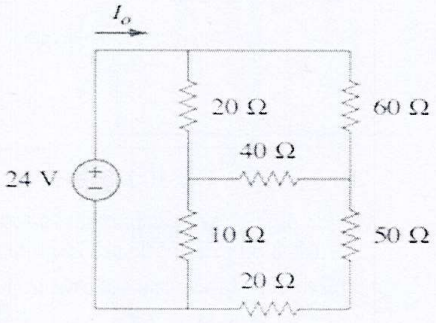

Fig. 2(c)

3. (a) Define Super Mesh and Super Node. 05
   (b) For the circuit shown in the Fig. 3 (b), find v and i. 15

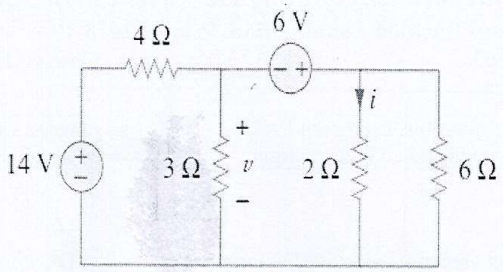

Fig. 3(b)

(c) For the circuit in Fig. 3 (c) determine the voltages at the nodes. 15

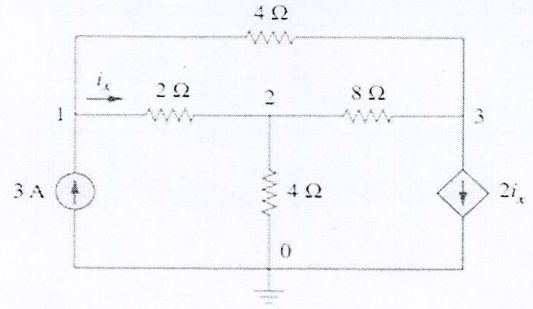

Fig. 3(c)

4. (a) Explain Kirchhof's current law (KCL) and Kirchhof's voltage law (KVL). 10

(b) Use mesh analysis to determine i_1, and i_2 in Fig. 4 (b). 15

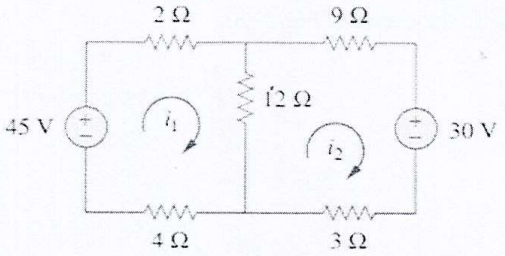

Fig. 4(b)

(c) Find I in the circuit of Fig. 4 (c), using superposition. 10

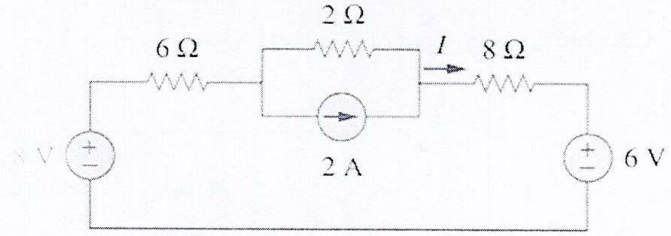

Fig. 4(c)

PART B

5. (a) Find the Thevenin equivalent of the circuit shown in 5 (a). Let R_L= 16 Ω. 15

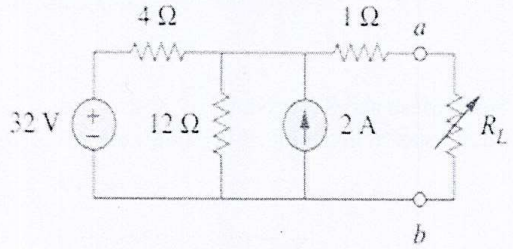

Fig. 5(a)

(b) For maximum power transfer theorem prove that $R_L = R_{TH}$. 10

(c) Find the value of R_L for maximum power transfer in the circuit of Fig. 5 (b). Find the maximum power. 10

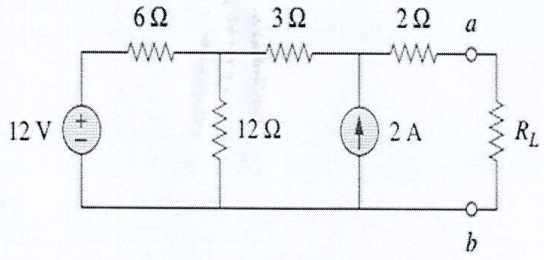

Fig. 5(b)

6. (a) Prove that, in a pure Capacitor current leads the voltage by 90^0. 10

(b) Calculate the phase angle between $v_1 = -10\cos(\omega t + 50^0)$ and $v_2 = 12\sin(\omega t - 10^0)$. State which sinusoid is leading? 10

(c) Determine v_0 in the circuit of Fig. 6 (c). 15

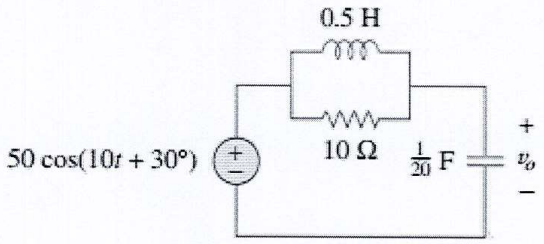

Fig. 6(c)

7. (a) What is Effective value? Show that the effective value of a periodic signal is its root mean square value. 10

(b) What do you mean by power factor? Draw a power triangle and an impedance triangle. 10

(c) In the circuit of Fig. 7 (c), determine the pf as seen by the source. Calculate the average power delivered by the source. 15

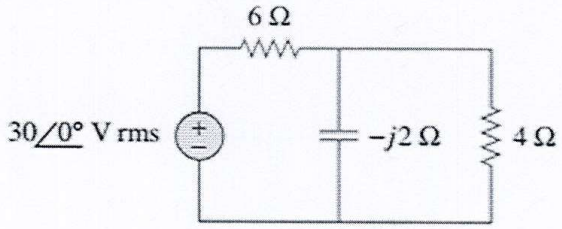

Fig. 7(c)

8. (a) What are the advantages of three phase over single phase? 5

(b) Find the wattmeter reading of the circuit in Fig. 8 (b). 15

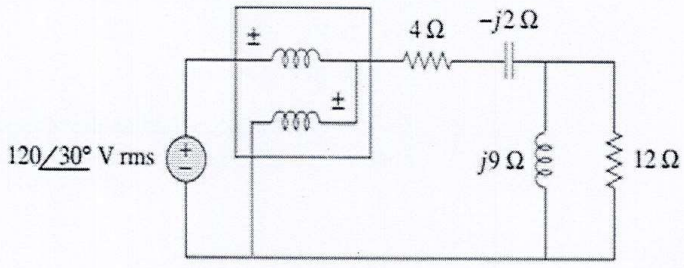

Fig. 8(b)

(c) Calculate the currents in the three Y-Y system of Fig. 8(c). 15

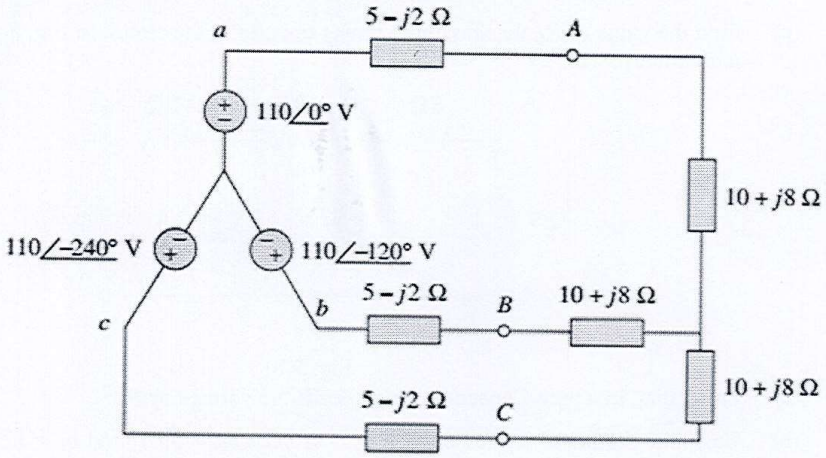

Fig. 8(c)