

## Final Assessment Test - November 2016

Course: EEE1001 - Basic Electrical and Electronics Engineering

Class NBR(s): 7339 / 7347 / 7355 / 7363 / 8046 / 8048 / 8683 / 8799

Time: Three Hours

Slot: F2

Max. Marks: 100

Answer any FIVE Questions  
(5 X 20 = 100 Marks)

1. a) Using mesh analysis, determine the current through  $4\Omega$  resistor in the circuit shown in Fig. 1. [10] 8

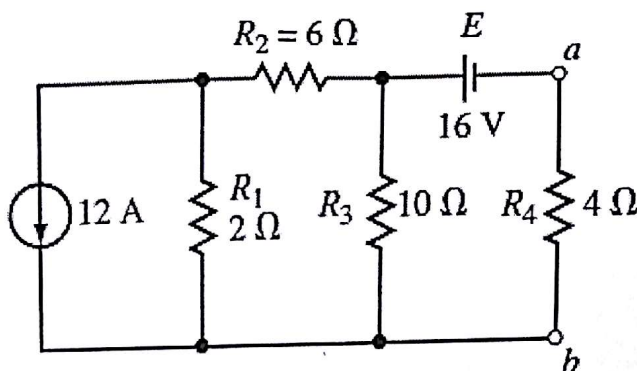


Fig. 1

- b) For the network shown in Fig. 2, obtain the Thevenin's equivalent circuit as seen from terminals  $a-b$ . [10] 5

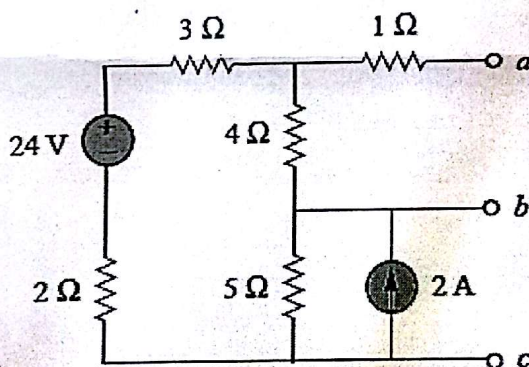


Fig. 2

2. a) A  $40\ \mu\text{F}$  capacitor in series with a coil of resistance  $8\Omega$  and an inductance of  $80\ \text{mH}$  is connected to a  $200\ \text{V}$ ,  $100\ \text{Hz}$  supply. Calculate (i) the circuit impedance (ii) the current through the circuit (iii) the phase angle between voltage and current (iv) the voltage across the coil and (v) the voltage across the capacitor. [10] 8
- b) Three inductive loads, each of resistance  $4\Omega$  and reactance  $9\Omega$ , are connected in delta. When connected to a 3-phase supply the loads consume  $1.2\ \text{kW}$ . Calculate (i) the power factor of the load (ii) the phase current (iii) the line current and (iv) the supply voltage. [10] 8

3. a) Design 8:1 multiplexer using two 4:1 multiplexers with common selection inputs. [10] 2

b) Simplify the following Boolean expression using four-variable K-map and draw the implementation diagram using logic gates. [10] 8

$$F = B'D + A'BC' + AB'C + ABC'$$

*(Handwritten: A, B, C, D)*

4. a) Explain the working principle of a transformer with a neat diagram and derive its EMF equation. [10] 6

b) Mention the classification of a DC generator with the necessary diagrams. Also explain how the bidirectional current generated in DC generator is converted to a unidirectional current. [8] 6

c) Why the armature core in D.C machines is constructed with laminated steel sheets instead of solid steel sheets? [2] 1

5. a) State the difference between amplitude and frequency modulations with necessary waveforms. [6]

b) With neat circuit diagram and waveforms, explain the working of half wave, full wave and bridge rectifiers. Also compare the following parameters for all three rectifier design [10]

- Average DC current
- RMS current
- Peak inverse voltage

c) Draw the input and output characteristics of a BJT with common emitter configuration. [4]

6. a) For the circuit shown in Fig. 3, determine the branch currents using nodal analysis. [10] 2

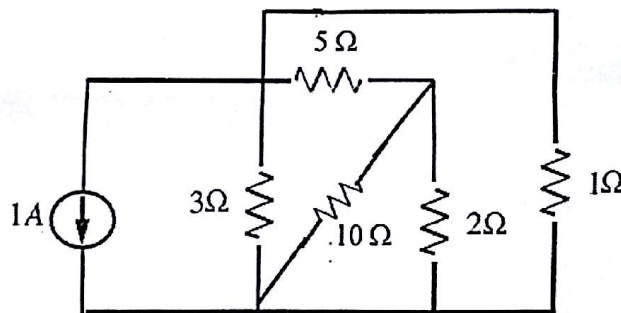


Fig.3

b) Convert the given binary number  $1101101011.0110_2$  to

- Decimal
- Octal
- Hexadecimal

c) Which machine is called as rotating transformer? Justify your answer. [4] 0

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