1022

Code : 9EE-23

Register Number | | | | | | | |

II Semester Diploma Examination, April/May-2015

ELECTRICAL CIRCUITS

Time : 3 Hours] **[Max. Marks : 100**

Note : (i) Section – **I** is *compulsory*.

(ii) Answer any **two** full questions from the remaining Sections – **II**, **III** and **IV**.

SECTION - I

1. (a) Fill in the blanks : **5**

(i) Resistors, Inductors and capacitors are called _____ elements.

(ii) Relative permeability of air is equal to _____.

(iii) The average value of alternating voltage is _____.

(iv) The reciprocal of impedance is called _____.

(v) Power in 3-ϕ Y connected system is given by P = _____.

(b) Compare the magnetic circuit with the electric circuit. **5**

SECTION - II

2. (a) Define the following : **5**

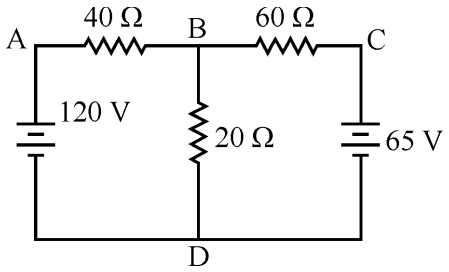
(i) Unilateral circuit

(ii) Passive Network

(iii) Branch

(b) State and explain KVL. **4**

(c) Find the magnitude and direction of current following through BD branch of the given Network using KVL : **6**

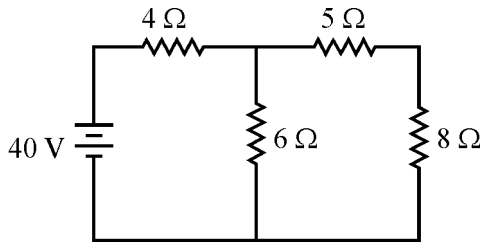


[Turn over

3. (a) Explain about the ideal voltage source & practical voltage source. **4**

(b) State and explain Thevenin's Theorem. **5**

(c) Using Thevenin's Theorem. Find the current through 6 Ω Resistor in the given circuit below. **6**



4. (a) State and explain the Maximum power transfer Theorem. **5**

(b) Explain the following terms :

(i) Permeability

(ii) Reluctance

Mention the units. **4**

(c) An iron ring has mean circumferential length of 60 cm. with an air gap of 1 mm and a uniform winding of 300 turns with a current of 1A flows through the coil. Find the flux density. Take the relative permeability of iron is 300. **6**

SECTION - III

5. (a) Define self and mutual inductance. **4**

(b) State and explain Lenz's Law. **5**

(c) Describe magnetic field around a current carrying conductor. **6**

6. (a) Define the following terms and maintain their units of a sinusoidal wave : **4**

(i) Amplitude

(ii) Frequency

(b) Explain RMS value and average value of A.C. sine wave. **5**

(c) A voltage waveform given by the expression $v = 200 \sin (628\ t + 60°)$

Determine :

(i) Maximum value

(ii) RMS value

(iii) Frequency **6**

7. (a) Convert the value of given vector from rectangular to polar and Polar to rectangular. **4**

(i) $200 + j\,700$

(ii) $8 \angle 90°$

(b) Two impedances $Z_1 = 20 + j\ 10$ and $Z_2 = 8 + j\ 20$ are connected in parallel. Find the magnitude of total impedance and power factor of the circuit. **5**

(c) Two Phasors are given $V_1 = 4 + j\ 3$ and $V_2 = 5 + j\ 6$. **6**

Find :

(i) $V_1 \times V_2$

(ii) $\frac{V_1}{V_2}$

SECTION - IV

8. (a) Define the following : **7**

(i) Impedance

(ii) Inductive reactance

(iii) Power factor

(iv) Capacitive reactance

(b) A series R-L-C circuit has R = 10 Ω, L = 5 mH and C = 100 μF is supplied with 200 V, 50 Hz. Find the current, power and power-factor of the circuit. **8**

9. (a) Compare the Single Phase and Three Phase system. **4**

(b) Derive the relationship between Line Voltage and Phase Voltage in 3-phase star system. **5**

(c) Three impedances each of containing 20 Ω resistance and 15 Ω inductive reactance in series; connected in delta across 400 V, 3-phase supply. **6**

Calculate :

(i) Line current

(ii) Phase current

(iii) Total power consumed

[Turn over

10. (a) State and explain Faraday's Laws of Electromagnetic Induction. **5**

(b) Draw an A.C. sine wave and mark the following : **5**

(i) Peak value

(ii) RMS value

(iii) Cycle

(iv) Instantaneous value

(c) Define Absolute Permeability and relative Permeability and mention their units. **5**

———————