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OIEE-001

B.Tech. DECVI / DELVI / DCSVI / ACECVI / ACELVI / ACCSVI

Term-End Examination

00435

December, 2014

OIEE-001 : BASICS OF ELECTRICAL ENGINEERING

Time : 2 hours *Maximum Marks : 70*

Note : *There are **eight** questions. Attempt any **five** questions including question no. 1 which is **compulsory**. All questions carry equal marks. Use of scientific calculator is allowed.*

1. This part contains objective type questions. Select most appropriate option. *7×2=14*

(a) kWh is the unit of

(i) Voltage

(ii) Power

(iii) Energy

(iv) None of these

(b) The current I_o of the Figure 1 is

(i) 6 A

(ii) – 6 A

(iii) 34 A

(iv) – 34 A

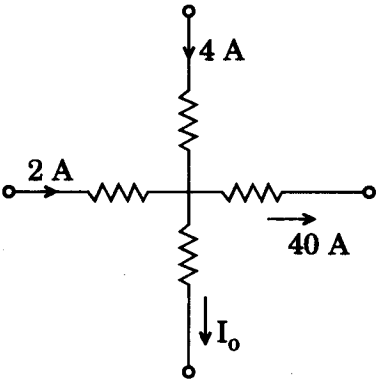

Figure 1

(c) The Power Factor of RC series circuit is

(i) Leading

(ii) Lagging

(iii) 0

(iv) None of these

(d) The imaginary part of impedance is called

(i) Resistance

(ii) Reactance

(iii) Susceptance

(iv) None of these

(e) According to Fleming's left hand rule, the thumb represents the direction of

(i) Field

(ii) Current

(iii) Force

(iv) Motion

(f) Reactive Power is measured in

(i) Watts

(ii) VA

(iii) VAR

(iv) None of these

(g) In a Y – Y system a line voltage of 220 V produces a phase voltage of

(i) 220 V

(ii) 127 V

(iii) 381 V

(iv) None of these

2. (a) Explain the star-delta transformation and vice-versa. 7

(b) Find the current 'I' for the circuit shown in Figure 2 by using Superposition Theorem. 7

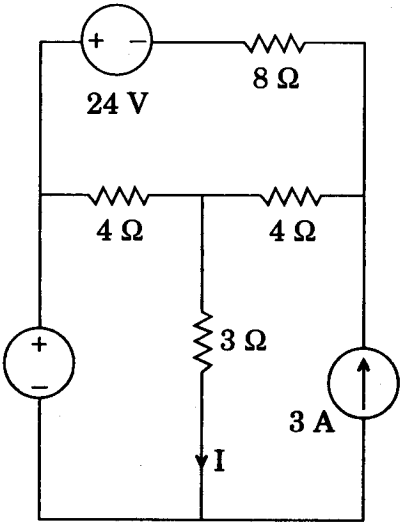

Figure 2

3. (a) State the Norton's Theorem and explain the procedure to analyze the electrical network. 7

(b) Explain the construction, working and application of Nickel-Cadmium cell. 7

4. (a) Derive the relation for the force per unit length between two infinitely-long, parallel, straight conductors carrying current. 7

(b) An iron ring of mean circumference equal to 80 cm is uniformly wound with 500 turns of a wire. When a current of 1 A is passed through the coil, a flux density of 1·1 T is produced in the iron. Calculate relative permeability of the iron. 7

5. (a) A conductor of 1·5 m length moves at right angles to a uniform magnetic field of flux density 1 Tesla with a velocity of 100 m/s. Calculate the e.m.f. induced in it and also find the value of induced e.m.f., when the conductor moves at an angle of 30° to the direction of field. 7

(b) Determine the phasor currents I_1 and I_2 in the circuit of Figure 3. 7

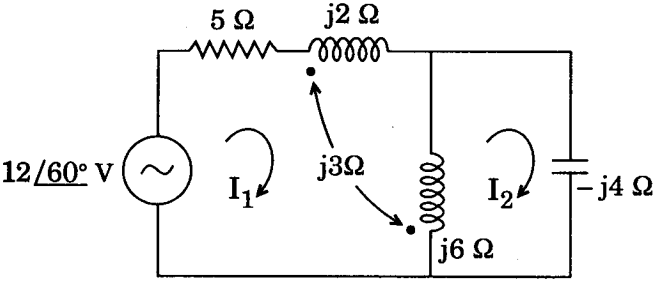

Figure 3

6. (a) The two a.c. voltages are represented by $v_1(t) = 30 \sin(\omega t + 45°)$, $v_2(t) = 60 \sin(\omega t + 60°)$. Calculate the resultant voltage v(t). Also draw the Phasor diagram. *7*

(b) Define the following terms : *7*

(i) **Frequency**

(ii) **Amplitude**

(iii) **Time Period**

(iv) **Instantaneous Value**

(v) **Average Value**

(vi) **RMS Value**

7. (a) What is three-phase system ? How can we generate three-phase voltage ? Give its necessity and advantages. *7*

(b) A balanced delta-connected load of impedance $16 + j12\,\Omega$ per phase is connected to a three-phase 400 V supply. Find the phase current, line current, power factor and total power. *7*

8. Write short notes on any ***four*** of the following : $4 \times 3\frac{1}{2} = 14$

(a) Ohm's Law

(b) Lenz's Law

(c) Fleming's left hand rule

(d) Fleming's right hand rule

(e) Primary cell and Secondary cell

(f) Superposition Theorem