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Total Number of Pages: 3

**B.TECH**  
**15BE2102**

**2<sup>nd</sup> Semester Regular Examination 2015-16**  
**BASIC ELECTRICAL ENGINEERING**

**BRANCH(S): ALL**

**Time: 3 Hours**

**Max Marks: 100**

**Q.Code : W504**

**Answer Part-A which is compulsory and any four from Part-B.**  
**The figures in the right hand margin indicate marks.**

**Part – A (Answer all the questions)**

- Q1** Fill in the blanks. **(2 x 10)**
- a) If 1 A current flows in a circuit, the number of electrons flowing through this circuit is.....
  - b) Practical current source offer ..... internal resistance.
  - c) In RC series circuit total voltage is 10V and voltage across resistor is 6V, then the voltage across capacitor is.....
  - d) The transient voltage growth in a capacitor (RC series circuit ) is.....
  - e) The resistance of a conductor of diameter D and length L is R  $\Omega$ . If the diameter of the conductor is halved and its length is doubled, the new resistance is.....
  - f) Biot-Savarts law states the relation between magnetic intensity and.....
  - g) The operation of electric generators and motors depend on the interaction between magnetic field and.....
  - h) Thin laminations are used in a machine in order to reduce.....
  - i) The AC motor has ..... poles, when the frequency is 50Hz and speed of the motor is 500 rpm?
  - j) If a resistor is connected across the voltage source and the frequency of voltage and current wave form is 50Hz, then the frequency of instantaneous power is.....
- Q2** Answer the following questions: *Short answer type* **2 x 10)**
- a) Write the expression for active power, reactive power, apparent power and complex power of three phase system.
  - b) Define Unilateral and bilateral elements.
  - c) What is the difference between grounded and floating signal sources.
  - d) Write the methods of noise reduction.

- e) Three resistor of resistance ( $R_1=10 \Omega$ ,  $R_2=5 \Omega$  and  $R_3=3 \Omega$ ) are connected in star network, convert it into delta network and find out its equivalent delta resistance.
- f) Calculate the time taken by a capacitor of  $1 \mu\text{F}$  in series with a  $1\text{M} \Omega$  resistance to be charged up to 80% of the final value.
- g) We require a transformer to deliver 500 mA at 24 V from 120 V supply, .How many turns required in the secondary? ( Given: number of turns in primary =3000)
- h) A 4 pole 50 Hz induction motor is running at 1470 rpm. What is the slip value?
- i) What is back emf
- j) Write the Types of DC machines.

**Part – B (Answer any four questions)**

- Q3 a) In the circuit of figure.1, find current through  $1 \Omega$  resistor using both Thevenin's Theorem and superposition theorem. (10)

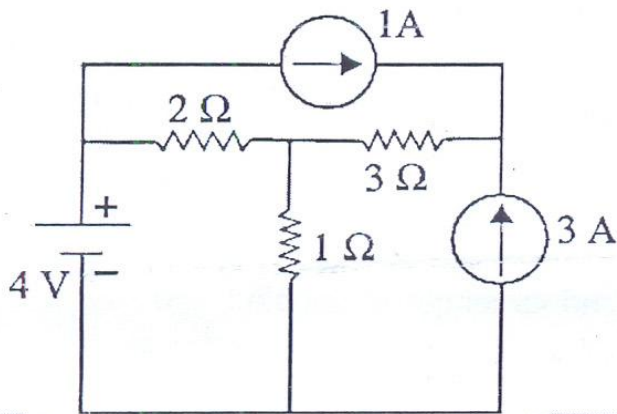


Figure 1

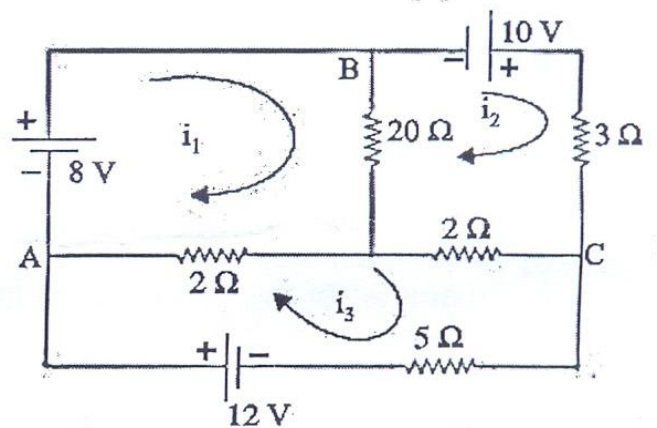


Figure 2

- b) Explain maximum power transfer theorem and Show that for maximum power transfer condition, the power transfer efficiency is 50% only. (5)

- Q4 a) Determine current  $i_1$ ,  $i_2$  and  $i_3$  using mesh analysis method for fig-2 (5)

- b) Derive the expression for Roots Mean Square (RMS) Value and Average value of sinusoidal AC signal. and Define (i)Peak factor (ii)Form factor (iii) Instantaneous value (iii)Time period (iv) phase angle (v)phase difference (10)

- Q5 a)** Define the following terms: (5)
- (i) B-H Curve. (ii) Ampere's Circuit Law. (iii) Hysteresis Loss.
- b)** Derive the Expression for growth and decay of transient current in RL circuit with DC excitation. An inductor coil of inductance 0.5 H and resistance  $10 \Omega$  is connected to a DC source of 100 V. Assuming that steady state is already achieved, the battery is suddenly removed and replaced with shorted link at  $t=0$ . Calculate (i) Time constant of the circuit (ii) Initial and final steady state current and (iii) Time taken for the circuit to decay the current to 70% of the initial current. (10)
- Q6 a)** Discuss the different method of Signal Conditioning. and write the working of LVDT. (5)
- b)** A balanced delta connected load having resistance of  $15 \Omega$  and capacitance of  $600 \mu\text{F}$  per phase is connected to a balanced three-phase supply of 440 V, 50 Hz. Find the Line voltage, phase voltage, line current, phase current and power factor, total active power and also draw the phasor diagram of voltage and currents of the network. (10)
- Q7 a)** Sketch the torque–slip characteristics of a three-phase induction motor. (5)
- b)** What is transformer, discuss the operating principle of single phase transformer. A 1000 kVA transformer has primary and secondary turns of 400 and 100 respectively and induced voltage in the secondary is 1000V. Find (i) primary voltage (ii) primary and secondary full load current and (iii) the secondary current when 100 kW load at 0.8 pf is connected at the output. (10)
- Q8 a)** Explain the principle of operation of DC generator and Derive its emf equation. (5)
- b)** Discuss the analogy between electric circuits and magnetic circuits. An iron ring made up of three parts,  $l_1=12\text{cm}$ ,  $a_1=6 \text{ cm}^2$ ,  $l_2 =10 \text{ cm}$ ,  $a_2=5 \text{ cm}^2$ ,  $l_3=8 \text{ cm}$  and  $a_3 = 4 \text{ cm}^2$ . It is surrounded by a coil of 200 turns. Determine the exciting current required to create a flux of 0.5 mwb in the iron ring. [ Given  $\mu_1=2670$ ,  $\mu_2= 1055$ ,  $\mu_3= 680$  ] (10)
- Q9 a)** Explain briefly the comparison between three phase and single phase system. (5)
- b)** Briefly describe Resonance condition in RLC series circuits. The resistor and a capacitor are connected in series with a variable inductor. When a circuit is connected to a 240 V, 50 Hz supply, the maximum current by varying the inductance is 0.5 A. at this current the voltage across the capacitor is 250 V. Calculate R,C and L. (10)