No. of Printed Pages : 6

BIEE-033

DIPLOMA IN ELECTRICAL ENGINEERING (DELVI)

Term-End Examination

00686

June, 2016

BIEE-033 : ELECTRICAL CIRCUIT THEORY

Time : 2 hours *Maximum Marks : 70*

Note : *Attempt any **five** questions. Question no. **1** is **compulsory**. All questions carry equal marks. Use of scientific calculator is allowed. Assume missing data, if any.*

1. Write the correct alternative answer. *7×2=14*

(a) Internal resistance of an ideal current source is

(i) infinite

(ii) zero

(iii) very low

(iv) low

(b) The relationship between voltage and current is same for two opposite directions of current. The network is

(i) active

(ii) bilateral

(iii) unilateral

(iv) passive

(c) A terminal where two or more than two branches meet is called

(i) combination

(ii) terminus

(iii) anode

(iv) node

(d) The current and power factor of a series resonant circuit is

(i) maximum, zero

(ii) minimum, zero

(iii) maximum, unity

(iv) minimum, unity

(e) A 100 μF capacitor is connected to a 100 volt d.c. supply. The capacitive reactance of the capacitor will be

(i) $10^{-6}\ \Omega$

(ii) $1/10^{-6}\ \Omega$

(iii) infinite Ω

(iv) 0 Ω

(f) Thevenin's theorem is applicable to

(i) d.c. circuit only

(ii) both a.c. and d.c. circuits

(iii) a.c. circuit only

(iv) None of the above

(g) In a star connection, if each resistance is R, then in equivalent delta connection, this value will be

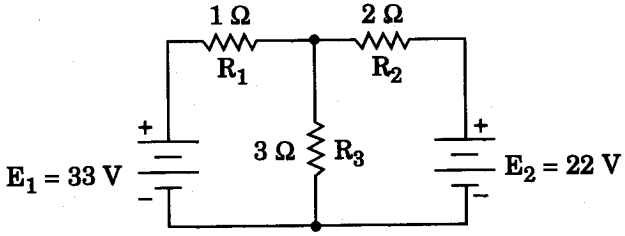
(i) 3 R

(ii) R/3

(iii) R

(iv) 6 R

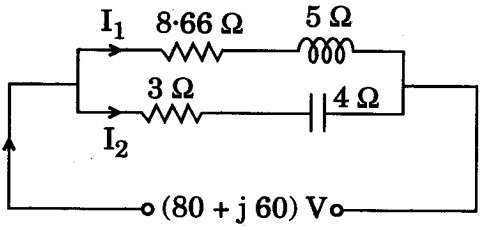
2. (a) Using superposition theorem, determine the current through R_3. 7



(b) State and prove the maximum power transfer theorem. 7

3. (a) Derive the condition and find resonant frequency in a series RLC circuit. Also draw the phasor diagram at resonant condition. 7

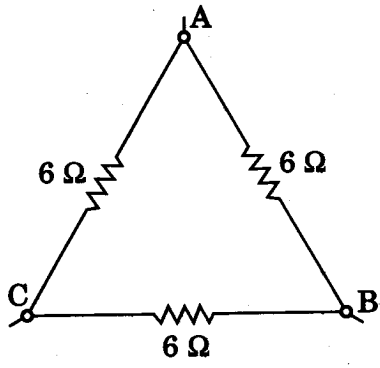
(b) An impedance of (8·66 + j 5) Ω is connected in parallel with another impedance of (3 – j 4) Ω across a supply of (80 + j 60) volts. Calculate the currents (I_1 and I_2) in each branch. 7



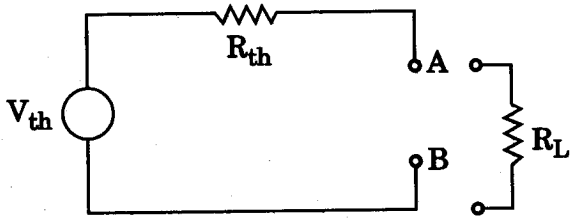
4. (a) Define quality factor, half power frequencies and bandwidth of a resonant circuit. Also draw the current frequency/resonant curve and mark half power frequencies on it. 7

(b) Draw the power triangle and define active, reactive and apparent power with their units. Also define power factor. 7

5. (a) Find the star equivalent of the given delta connected network. 7

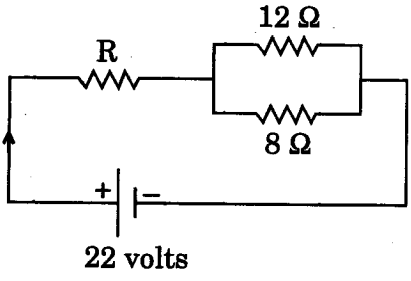


(b) Find the Norton's equivalent of the Thevenin's equivalent given below and find the value of current flowing through R_L connected across Norton's equivalent network. 7



6. (a) Explain Maxwell's loop analysis with the help of a suitable example and neat sketches. 7

(b) A resistance R is connected in series with a parallel circuit comprising two resistances of 12 Ω and 8 Ω, respectively. The total power dissipated in the circuit is 70 watts when the applied voltage is 22 volts. Calculate R. *7*



7. Write short notes on any ***two*** of the following : *2×7=14*

(a) Duality and Dual Networks

(b) Source Transformation

(c) Concept of Phasor and Complex Impedance

(d) Parallel Resonant Circuit