

DIPLOMA ELECTRICAL ENGINEERING (DELVI)

00221

Term-End Examination

December, 2012

BIEE-033 : ELECTRICAL CIRCUIT THEORY

Time : 2 hours

Maximum Marks : 70

Note : Attempt any five questions. All questions carry equal marks.

1. (a) Explain the following with example : 6
- (i) Active and passive elements
 - (ii) Unilateral and Bilateral elements
 - (iii) Linear and non linear elements
- (b) With the help of V-I characteristics explain 4
ideal and practical voltage source.
- (c) Calculate power supplied by 60 V source in 4
fig - 1.

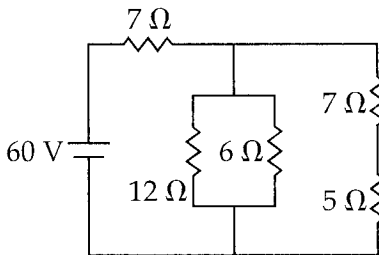


Fig. 1

2. (a) State Kirchoff's current and voltage law with suitable circuit. 7
- (b) Find equivalent resistance between A and B of fig - 2. 7

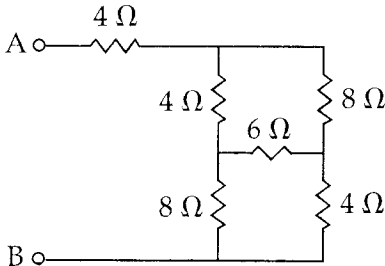


Fig. 2

3. (a) State and explain Super position Theorem. 7
- (b) Find R_L between AB terminals so that maximum power is consumed by R_L for circuit shown in fig - 3. 7

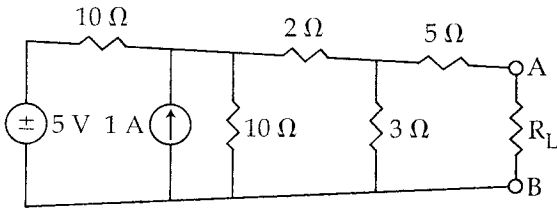


Fig. 3

4. (a) What are transients ? Why they are produced ? Explain with an example. 7
- (b) Define power factor. What are the disadvantage of low power factor ? 7

5. (a) A current $i = 14.14 \sin \left(\omega t - \frac{\pi}{3} \right)$ flows in 7
 an electric circuit when a voltage of $\vartheta = 141.4 \sin \omega t$ is applied to it. Find power and power factor of the circuit. State whether power factor is leading or lagging.
- (b) A 120V, 50Hz ac supply is connected across 7
 a coil of 10Ω resistance and 30Ω reactance. What would be the average power in the circuit? Also calculate power factor of the circuit.
6. Explain resonance in R-L-C series circuit. Derive 14
 the expression for resonance frequency. Also prove that resonance frequency $f_r = \sqrt{f_1 f_2}$ where f_1 and f_2 are the frequencies corresponding to half power points.
7. (a) Derive step response of R-C circuit. 7
 (b) For R-L series circuit draw impedance and 7
 power triangles.
8. Write short notes on **any four** of the following :
 (a) Duality 3.5x4=14
 (b) Thevenin Theorem
 (c) Star - delta Transformation
 (d) Q - factor
 (e) Nodal analysis