No. of Printed Pages : 4 **BIEE-014**

01102

B.TECH. - VIEP-ELECTRICAL ENGINEERING

Term-End Examination

December, 2011

BIEE-014 : NETWORK THEORY

Time : 3 hours *Maximum Marks : 70*

Note : *(i) Attempt **any seven** Questions.*

*(ii) All questions carry **equal** marks.*

(iii) All the questions are to be answered in English language only.

1. (a) Explain the following terms : **5x1=5**

(i) Graph

(ii) Tree

(iii) Incidence matrix with a suitable example.

(iv) Twings

(v) Oriented graph

(b) For the graph shown in fig. (1), consider the tree formed by branches (2, 3, 4), using this tree, find out reduced incidence matrix (A), tie - set matrix (B_f) and cut - set matrix (Q_f). **5**

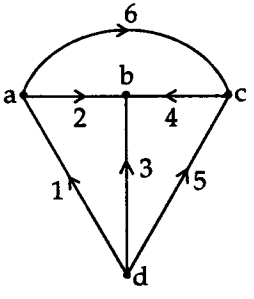

Fig. (1)

2. (a) In graph theory, Derive the relation among A and θ_f where A is incidence matrix and θ_f is fundamental cut - set matrix. 5

(b) Explain the concept of duality with the help of fig. (2). 5

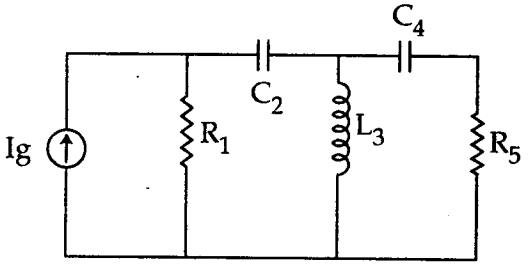

Fig. (2)

3. (a) State and prove the maximum power transfer theorem for an AC circuit. 5

(b) Find the Thevenin's equivalent circuit for the network given in fig. (3) across A and B. 5

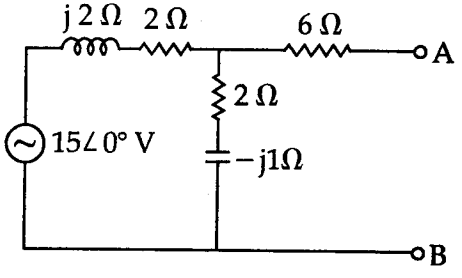

Fig. (3)

4. State super - position theorem and find the current through the 2Ω resistor using super - position theorem in fig. (4). **10**

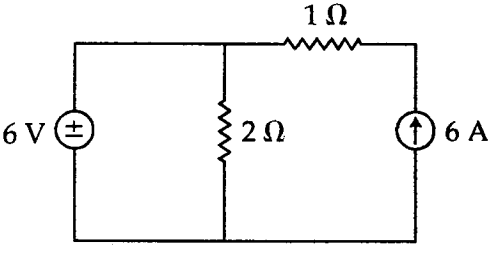

Fig. (4)

5. Enlist the necessary conditions for transfer function in terms of pole and zero locations. Draw the pole-zero diagram of the given function and obtain time domain response using it. **10**

$$I(s) = \frac{4S}{(S+2)\left(S^2+2S+4\right)}$$

6. Describe the Routh Hurwitz stability criterion for stability. Determine the stability of the system whose characteristic equation is : **10**

$S^4 + 2S^3 + 3S^2 + 4S + 5 = 0$

7. Explain in detail with figures (without proofs) the interconnection of all two port networks. **10**

8. Derive the condition for reciprocity and symmetry. **10**

   (a) In term of Z parameter

   (b) In term of T parameter

9. Synthesize the given impedance function in Foster - I and II forms. **10**

$$Z(s) = \frac{8\left(S^2+4\right)\left(S^2+25\right)}{S\left(S^2+16\right)}$$

10. Write short notes on *any two* of the following : **5x2=10**

(a) Active and passive filter

(b) Positive real function

(c) Image parameters