

**B.Tech. – VIEP – ELECTRICAL ENGINEERING
(BTELVI)**

Term-End Examination

June, 2016

00206

BIEE-014 : NETWORK THEORY

Time : 3 hours

Maximum Marks : 70

Note :

- (i) *Attempt any five questions.*
- (ii) *Use of scientific calculator is allowed.*
- (iii) *Missing data, if any, may be suitably assumed.*

1. (a) Explain the following with an example each : 6
- (i) Network mesh and Network loop
 - (ii) Planar and Non-planar graphs
 - (iii) Incidence matrix and Reduced incidence matrix
- (b) Draw the graph of the network shown in Figure 1. Select a suitable tree to write tie-set schedule. Hence, find the three loop currents. 8

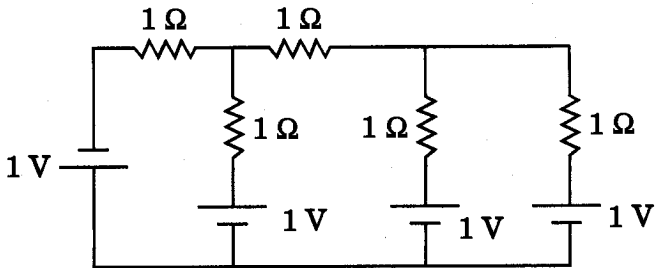


Figure 1

2. (a) Discuss the maximum power transfer theorem for either in a.c. or d.c. circuit. 7

(b) In the network shown in Figure 2, there are four sources that act on the load Z_L . If the load is variable, for what value will load Z_L receive the maximum power? 7

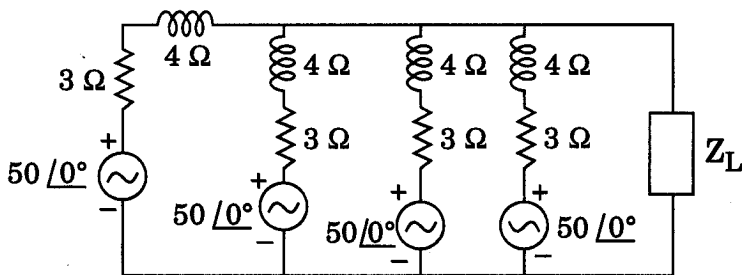


Figure 2

3. (a) What are the restrictions on Driving point function? 7

(b) Obtain the Pole-zero diagram of the given function and obtain the time domain response. 7

$$I(s) = \frac{2s}{(s+1)(s^2+2s+4)}$$

4. (a) Solve the circuit shown in Figure 3 using Millman's theorem. 7

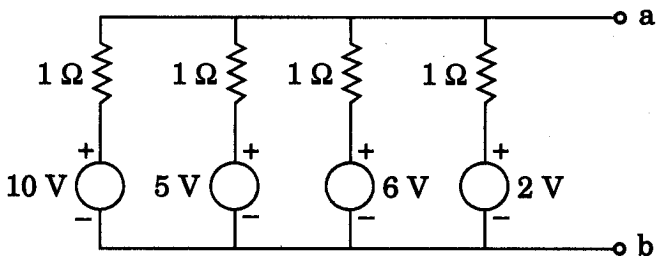


Figure 3

- (b) (i) State the Super position theorem.
 (ii) Find out the current I shown in Figure 4.

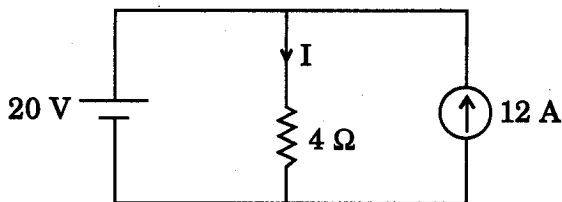


Figure 4

4+3=7

5. (a) Write in detail about the conditions to be fulfilled for a function to be positive real. 7
- (b) Check whether $F(s) = s + \sqrt{s^2 + 1}$ is a positive real function. 7

6. (a) The image impedance of the network shown in Figure 5 are $Z_{i1} = 200 \Omega$ and $Z_{i2} = 100 \Omega$. Calculate the values of impedances Z_1 and Z_2 .

7

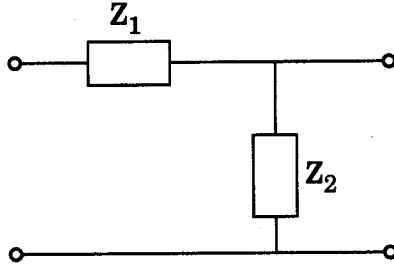


Figure 5

- (b) What is a band pass filter ? Prove that the cut-off frequency $f_c = \frac{1}{4\pi\sqrt{LC}}$ for constant-K high pass filter (T-section).

7

7. Write short notes on any **two** of the following :

$2 \times 7 = 14$

- (a) Transfer function and its properties
- (b) Interconnections of two port networks
- (c) Cut set matrix
