# DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING (DECVI)/ ADVANCED LEVEL CERTIFICATE COURSE IN ELECTRONICS AND COMMUNICATION ENGINEERING (ACECVI)

**Term-End Examination** 00400

**June, 2012**

## BIEL-028 : CIRCUITS AND NETWORKS

*Time : 2 hours* *Maximum Marks : 70*

***Note :*** *First question is **compulsory** and Attempt **any five** questions from 2 to 8, each question carry **equal** marks.*

**1.** (a) For even function, the necessary condition is : **2x7=14**

(i) $f(t) = -f(-t)$

(ii) $f(t) = +f(-1)$

(iii) $f(t) = \frac{1}{f(-t)}$

(iv) $f(t) = -(t \pm T/2)$

(b) The laplace transform of $f(t) = t$ is given by :

(i) $\frac{1}{S^2}$ (ii) $\frac{1}{S}$

(iii) $\frac{2}{S^3}$ (iv) S



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(c) A two port network is symmetrical if :

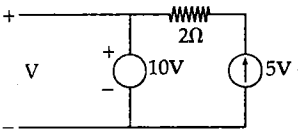
(i) $Z_{11}Z_{22} - Z_{12}\,Z_{21} = 1$

(ii) $AD - BC = 1$

(iii) $h_{11}h_{12} - h_{12}h_{21} = 1$

(iv) $y_{11}y_{22} - y_{12}y_{21} = 1$

(d) The voltage V in the circuit shown in fig. :




(i) 10 V (ii) 15 V

(iii) 5 V (iv) None of these

(e) Convolution of $x(t+5)$ with impulse function $\delta(t-7)$ is equal to :

(i) $x(t-12)$ (ii) $x(t+12)$

(iii) $x(t-2)$ (iv) $x(t+2)$

(f) The average value of the half-wave rectified sine wave of amplitude Am is :

(i) $\frac{Am}{\pi}$ (ii) $\frac{Am}{\sqrt{2}}$

(iii) $\frac{Am}{2}$ (iv) $\frac{2Am}{\pi}$

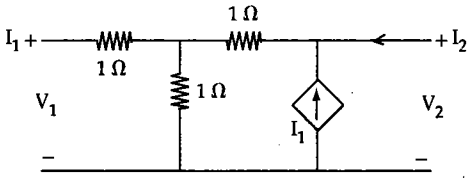
(g) In a two-port network containing linear bilateral passive circuit elements, which one of the following condition for Z Parameters would hold :

(i) $Z_{11} = Z_{22}$ (ii) $Z_{12}Z_{21} = Z_{11}Z_{12}$

(iii) $Z_{11}Z_{12} = Z_{22}Z_{21}$ (iv) $Z_{12} = Z_{22}$

2. Attempt *any two* parts : **7x2=14**

(a) Determine ABCD parameters for the network in fig. :




(b) Discuss Norton theorem with the help of suitable example.

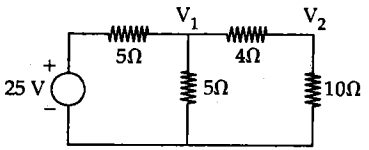
3. (a) Explain Impedance transformation in resonance circuits. **7x2=14**

(b) Discuss super position theorem with example. How it is helpful in Network analysis.

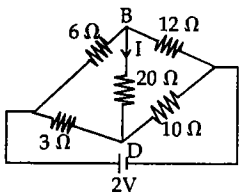
4. (a) Discuss the significance of pole and zero in Network function. **14**

(b) If $F(s) = \frac{s(s+1)}{(s+4)(s^2+4s+Q)}$ find $f(t)$ using the pole-zero diagram of the functions. **14**

5. (a) Determine the voltage across the 10Ω resistor using Nodal analysis in fig. **14**

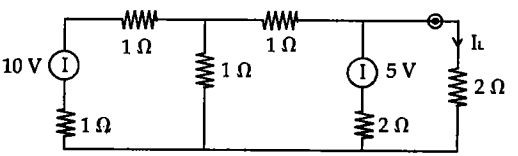



(b) Determine the current in Branch BD where galvanometer is connected in fig. **14**



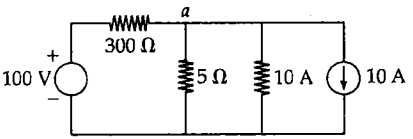

6. Attempt ***any two*** parts : **7x2=14**

(a) Draw the Thevenin's equivalent of the circuit given in and find the load current in 2Ω resistor fig.

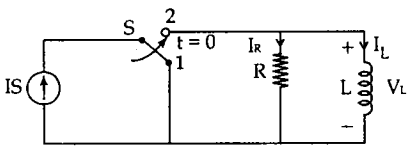



(b) Discuss the maximum power transfer theorem and prove maximum power will be $P = E^2/4R$.

(c) Determine current through 5Ω resistor using Norton theorem in fig.




7. (a) Determine the current through the Inductor L for $t \geq 0$ as a parallel RL circuit. The switch has been its position 1 for a long time and then moved to position 2 at $t = 0$ circuit shown in fig. **14**




(b) Explain the series resonance in the circuit also discuss the fig of merit. **14**

8. Attempt ***any two*** for writing short notes : **7x2=14**

(a) Hybrid parameters.

(b) Constant K-Type Low Pass Filter.

(c) T-type Attenuator

(d) Interconnection of two port Network.