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Total Number of Pages: 03

**B.TECH**  
**PEI31104**

**3<sup>rd</sup> Semester Regular Examination 2016-17**

**NETWORK THEORY**

**BRANCH(S): AEIE, EIE, IEE**

**Time: 3 Hours**

**Max Marks: 100**

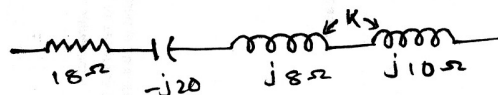
**Q.CODE: Y647**

**Answer Part-A which is compulsory and any four from Part-B.**  
**The figures in the right hand margin indicate marks.**

**Part – A (Answer all the questions)**

**Q1 Answer the following questions: (2 x 10)**

- State and explain reciprocity theorem
- State and explain Milliman's theorem
- For the series circuit find 'k' and place the dots such that circuit is in series resonance.



- The shape of the transient current in loss free L – C circuit when excited from AC source
- A two port network is defined as  
 $I_1 = 2V_1 + V_2$   
 $I_2 = 2V_1 + 3V_2$   
Find  $Z_{12}$
- Explain the presence of harmonic in 3 phase circuits.
- Explain how complex waves can be applied to RL & RLC circuits
- Define reduced incidence matrix.
- State the relation between tree branch and tree link.
- State and explain compensation theorem.

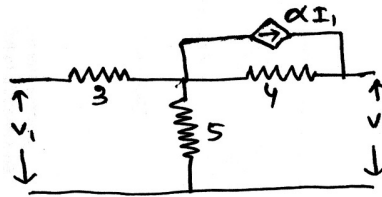
**Q2 Answer the following questions: (2 x 10)**

- A system has input unit step and transfer function  $T(s) = 1/(s^2 + 3s+5)$  find output of the system at steadystate
- What is the efficiency and power produced by the network at maximum power transfer condition.
- Which theorem obey laws of conservation of energy.
- Under what condition Norton theorem is applicable.
- What is the condition of symmetry in two port network to obtain H parameter
- What is the difference between incident graph and oriented graph.
- What could be the maximum number of branches in a graph with n number of nodes.
- Write the disadvantages of constant K filter.

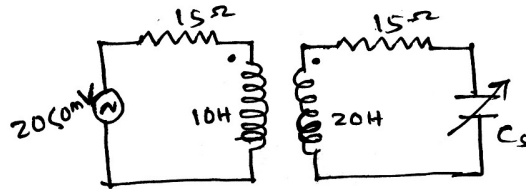
- i) Define coefficient of coupling.
- j) State and explain thevenin theorem.

**Part – B (Answer any four questions)**

- Q3 a)** A series RC Circuit with  $R = 10 \Omega$  and  $C = 4 \mu F$  as an initial charge of  $800 \mu C$  on the capacitor at that time the switch is closed applying a constant voltage of 100 volt. Find resulting current transient if the charge is
- (i) of same polarity as deposited by source
  - (ii) of opposite polarity
- b)** Find H parameter of given network **(5)**

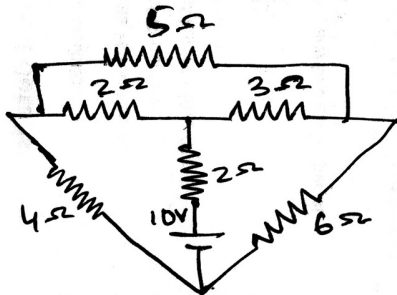


- Q4 a)** Find **(10)**
- (i) value of  $C_s$
  - (ii) input impedance
  - (iii) secondary current
  - (iv) voltage across the capacitor
- input to primary is 20 mV at a frequency of 1MHz and secondary is tune to this frequency



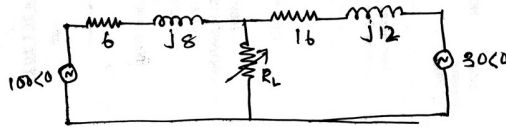
- b)** For a 2-port network express A B C D parameters in terms of Y parameter. **(5)**

- Q5 a)** Derive all the expression for a T section band elimination filter with cutoff frequency  $f_1$  &  $f_2$  and characteristics impedance. **(10)**
- b)** Draw the graph select a tree, write tieset and solve all branches current. **(5)**

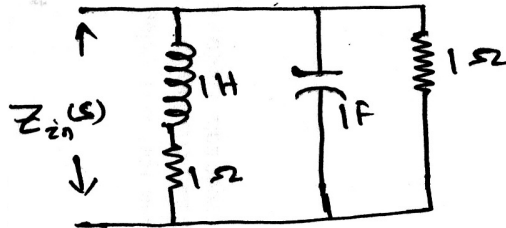


**Q6 a)** State and explain maximum power transfer theorem. **(10)**

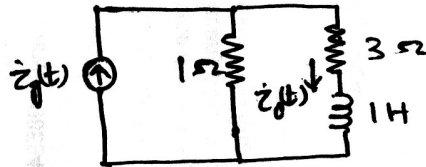
**b)** Find the value of  $R_L$  under maximum power condition. **(5)**



**Q7 a)** Find driving point impedance and draw pole – zero diagram. **(10)**



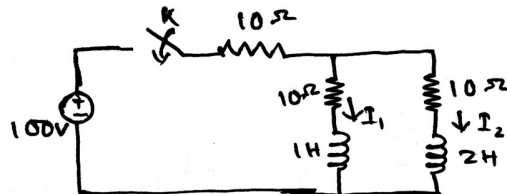
**b)** Use the fourier transform to find  $i_0(t)$  in the circuit. **(5)**  
 $i_0(t) = 20\text{sgn}(t)$  Amp.



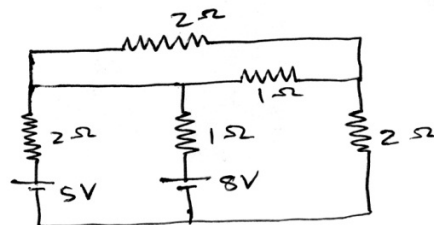
**Q8 a)** Write short note any two **(10)**

(i) Tellegen theorem (ii) Compensation theorem (iii) Band pass filter

**b)** Switch is closed  $t = 0$  with network previously unenergised find  $I_1(t)$  &  $I_2(t)$  **(5)**



**Q9 a)** Verify the Tellegens Theorem for the given network. **(10)**  
 $n=5$



**b)** Find the number of trees and number of cutsets. **(5)**

