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Total Number of Pages: 03

B.TECH
PET31102

3rd Semester Regular Examination 2016-17

NETWORK THEORY

BRANCH(S): ECE, ETC

Time: 3 Hours

Max Marks: 100

Q.CODE: Y649

Answer Part-A which is compulsory and any four from Part-B.

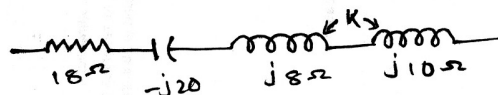
The figures in the right hand margin indicate marks.

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:

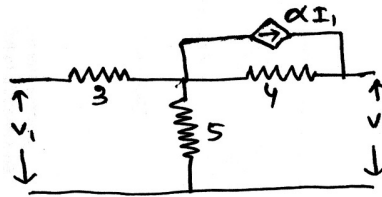
(2 x 10)

- 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.

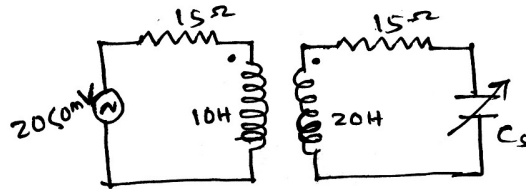
- i) Define coefficient of coupling.
- j) State and explain thevenin theorem.

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)**

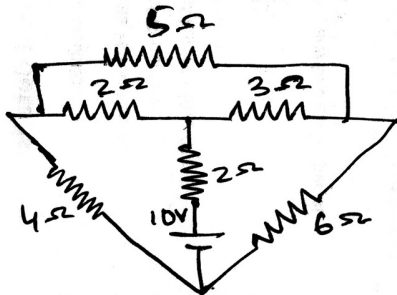


- Q4 a)** Find **(10)**
- (i) value of C_s
 - (ii) input impedance
 - (iii) secondary current
 - (iv) voltage across the capacitor
- input to primary is 20 mV at a frequency of 1MHz and secondary is tune to this frequency



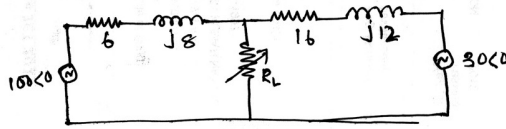
- b)** For a 2-port network express A B C D parameters in terms of Y parameter. **(5)**

- 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)**

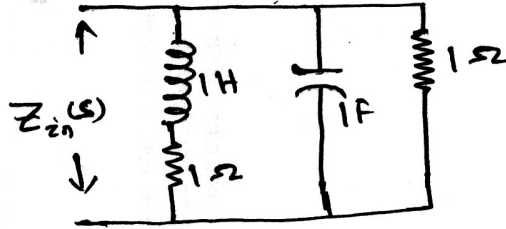


Q6 a) State and explain maximum power transfer theorem. **(10)**

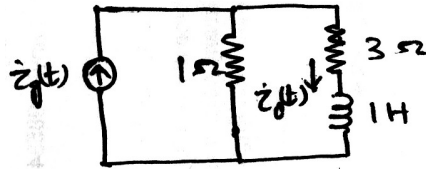
b) Find the value of R_L under maximum power condition. **(5)**



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

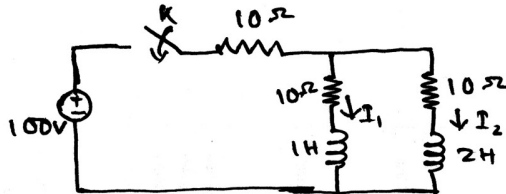


b) Use the fourier transform to find $i_0(t)$ in the circuit.
 $i_0(t) = 20\text{sgn}(t)$ Amp. **(5)**

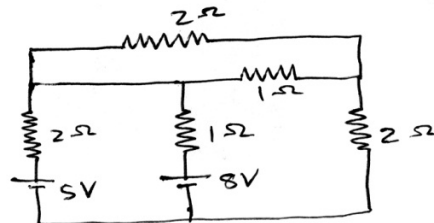


Q8 a) Write short note any two
 (i) Tellegen theorem (ii) Compensation theorem (iii) Band pass filter **(10)**

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.
 $n=5$ **(10)**



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

