Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Summer Examination-2019

Subject Name: Circuit Theory
Subject Code: 4TE03CIT1 Branch: B.Tech (Electrical)
Semester: 3 Date: 18/03/2019 Time: 2:30 To 5:30 Marks: 70

Instructions:

(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1 Attempt the following questions: (14)

a) Mesh analysis is applicable for
(a)Planar network (b) Non-Planar network (c) Both plant and non plant network (d) None of the above

b) Kirchhoff second law is based on law of conservation of
(a) energy (b) charge (c) flux (d) Momentums

c) To apply reciprocity theorem response to excitation ratio is
(a)ohms or mho (b) mho (c) ohm (d) None of the above

d) Super position theorem is not applicable for
(a) current calculations (b) voltage calculations (c) power calculations (d) None of the above

e) In an electric circuit, the dual of resistance is
(a) conductance (b) inductance (c) open circuit (d) short circuit

f) Maximum power transfer theorem finds application in
(a) power circuits (b) distribution circuits (c) communications circuits (d) both power and communication

g) What is an impulse Function?

h) Thevenins resistance R_{th} is found
(a) By removing voltage source (b) Between some open terminals (c) between any two terminal(d) All of the above

i) Steady state response is obtained from the transient response by substituting
(a) t=0 (b) $t = -\infty$ (c) t = 1 (d) $t = \infty$

j) A dependent source
(a) may be a current source or a voltage source (b) is always a voltage source (c) is always a current source (d) is neither a current source nor a voltage source.

k) Millman's theorem yield
(a) equivalent voltage & current source (b) equivalent impedance (c)equivalent resistance (d)All of the above

l) In a Series R-L circuit voltage across resistor and inductor are 3 V & 4 V respectively then what is applied voltage?
(a)7 V (b) 5 V (c) 4V (d)12 V

m) For a steady current inductor acts as

(a)short circuit (b) open circuit (c) voltage circuit (d) current circuit

n) If two resistor have same voltage drop in a series circuit it means
(a) they are equal value (b) they are connected in parallel (c) they are equal (d) They are unequal

Attempt any four questions from Q-2 to Q-8

Q-2 **Attempt all questions** **(14)**

(a) Explain the poles and zeros of the network function. State its important features. **(07)**

(b) Explain the terms (i) Non-Linear (ii) Uni-lateral (iii) Passive (iv) Reciprocal (v) Time variant (vi) Lumped parameter and (vii) Dual with reference to Network. **(07)**

Q-3 **Attempt all questions** **(14)**

(a) Find the Power delivered by the voltage source and the current in the 10Ω resistor for the circuit of Fig.1 **(07)**

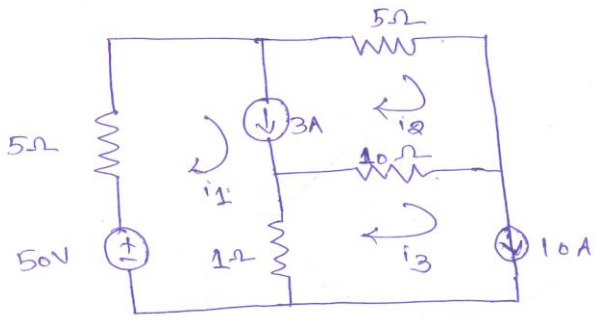

Fig - 1

(b) Using nodal analysis to find the voltage across 5Ω resistor in the network shown in fig.2 **(07)**

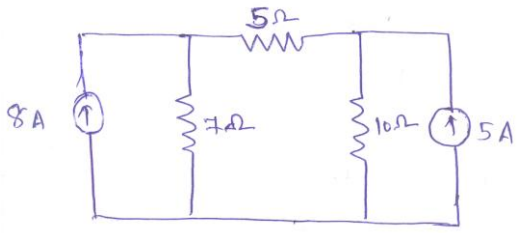

Fig. 2

Q-4 **Attempt all questions** **(14)**

(a) Explain following terms of graph in network terminology with suitable example. **(05)**
(i) Tree (ii) Twing (iii) Link (iv) Co-tree (v) Incidence Matrix

(b) For the graph shown in fig.3 write the incidence matrix, tie set matrix and f-cut set matrix. **(05)**

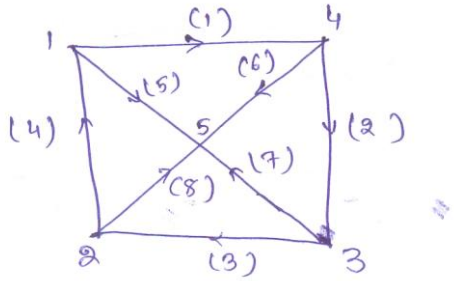

Fig - 3

(c) Write a short note on coefficient of coupling. **(04)**

Q-5 **Attempt all questions** **(14)**

(a) Find the step response for RLC series circuit **(05)**

(b) State maximum power transfer theorem and obtain proof of maximum power transfer theorem. **(05)**

(c) Explain source transformation. **(04)**

Q-6 **Attempt all questions** **(14)**

(a) Explain following in Brief: Ideal and Practical Energy source. **(05)**

(b) Find the Norton's equivalent circuit across a-b for the network shown in Fig 4. **(05)**

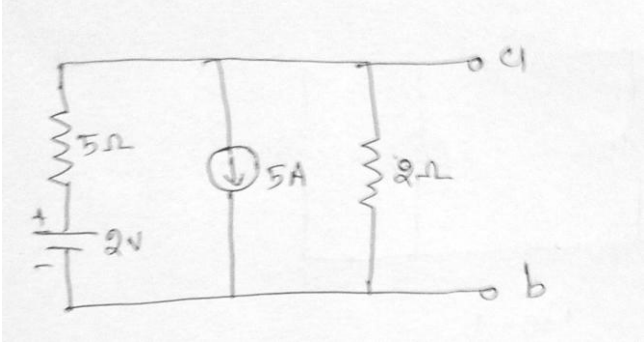

Fig.4

(c) Find the pole-zero plot of transform impedance of the network as shown in Fig.5 **(04)**

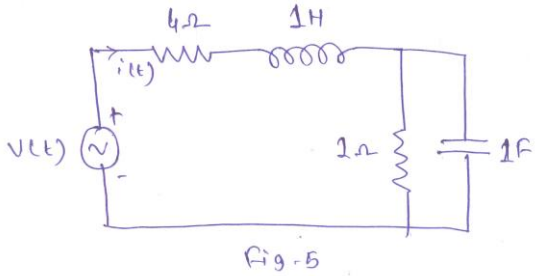

Fig-5

Q-7 **Attempt all questions** **(14)**

(a) For the network of Fig.6 find Z-parameter. **(07)**

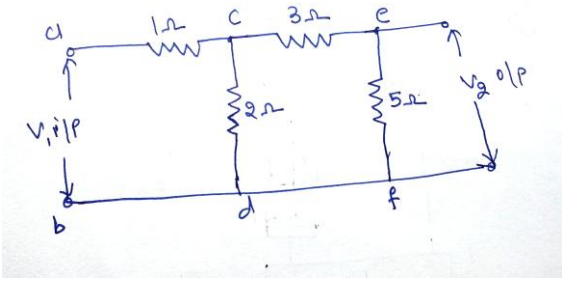

Fig.6

(b) Find the relation between Y parameter and Z- parameter & also find Vice-Versa. **(07)**

Q-8 **Attempt all questions** **(14)**

(a) In the given network of Fig.7 the switch k is opened at t=0. Solve for v, $\frac{dv}{dt}$ and d^2v/dt^2 at t= 0+ if I=10 A, R= 10Ω and L=1H. **(07)**

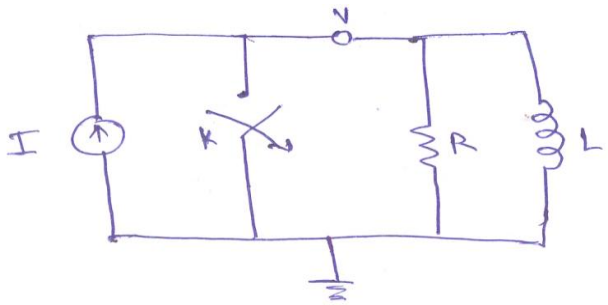

Fig -7

(b) For the network shown in Fig.8 the switch k is open for a long time and is closed at t = 0.Find $v_c(t)$. **(07)**

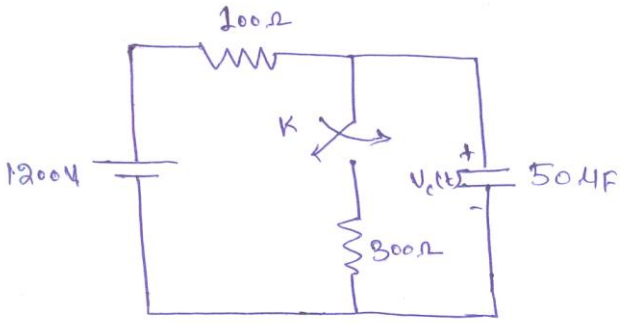

Fig -8