Register No.: …… Name: ……..

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

THIRD SEMESTERB.TECH DEGREE EXAMINATION (Regular), FEBRUARY 2022
ELECTRICAL AND ELECTRONICS ENGINEERING
(2020 SCHEME)

Course Code: **20EET201**

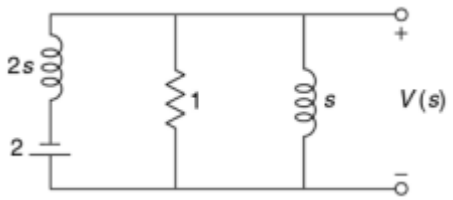
Course Name: **Circuits and Networks**

Max. Marks: **100** **Duration: 3 Hours**

PART A

(Answer all questions. Each question carries 3 marks)

1. State and explain Superposition theorem with suitable example.
2. State maximum power transfer theorem with its conditions and also derive equation for maximum power.
3. Obtain the time constant of a RL series circuit.
4. Obtain the expression for V(s) in the following network.



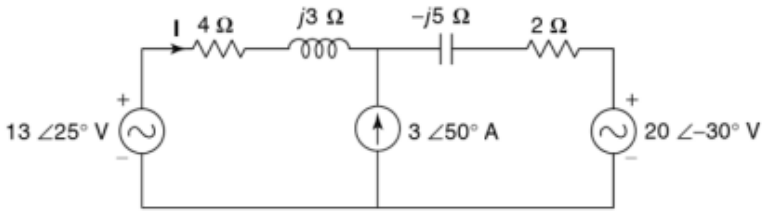
5. Define Transfer function. Explain the concept of poles and zeros in transfer function.
6. Explain the importance of coefficient of coupling in a magnetic circuit.
7. A balanced delta connected load of impedance (8-j6) Ω per phase is connected to a three phase, 230V, 50Hz supply. Calculate a) power factor b) line current.
8. Derive the equations of phase currents in an unbalanced delta connected load.
9. Write the conditions for a two-port network to be symmetrical in case of all parameters.
10. Draw two port π network and write the corresponding parameter representations.

PART B

(Answer one full question from each module, each question carries 14 marks)

MODULE I

11. a) Find the current I in given network by superposition principle.

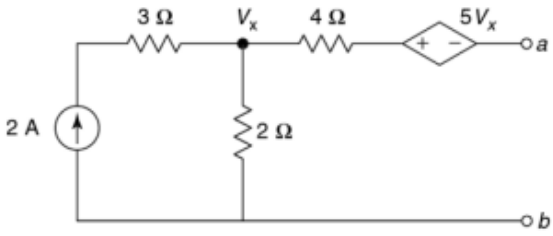


(9)

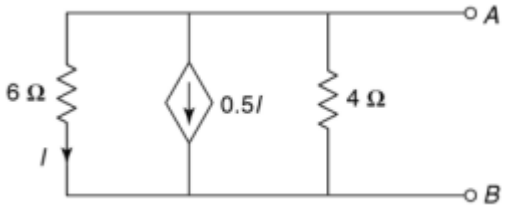
b) Distinguish between Thevenin's and Norton's theorems (5)

OR

12. a) Obtain the Thevenin's equivalent network for the given network diagram. (7)

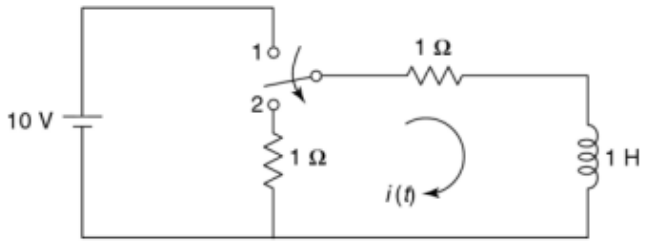


b) Find the Norton's equivalent to the left of the terminals A-B for the network given. (7)

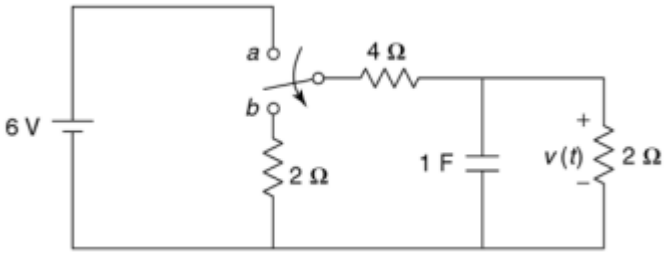


MODULE II

13. a) In the network given below, the switch is moved from position 1 to 2 at t = 0, steady state condition having been established in the position 1. Determine i(t) for t>0. (7)

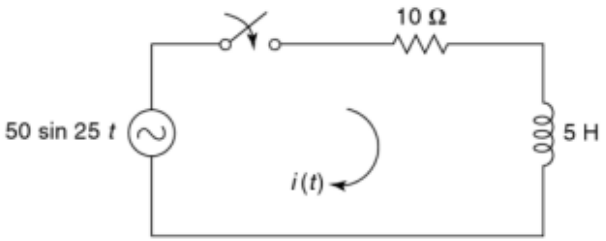


b) In the network given below, the switch is moved from position a to b at t = 0. Find v(t). (7)

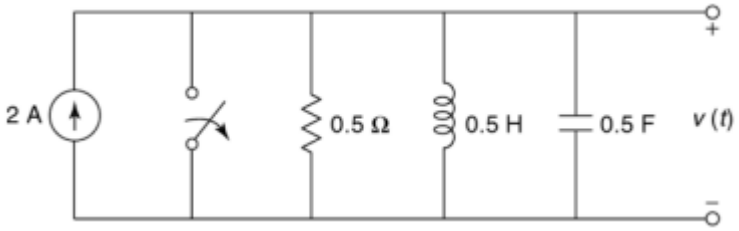


OR

14. a) Determine the current i(t) in the network given when the switch is closed at t = 0. (7)

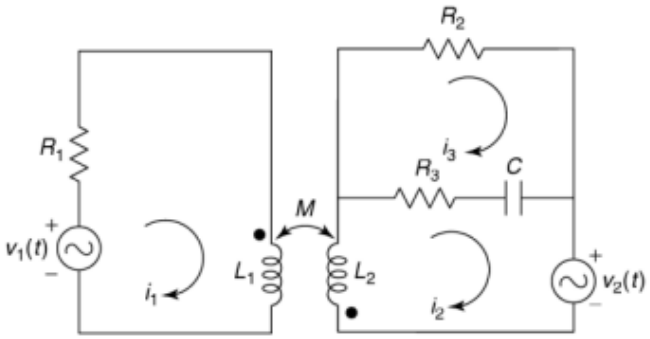


b) The switch in the given circuit is opened at time t = 0. Determine the voltage v(t) for t>0. (7)

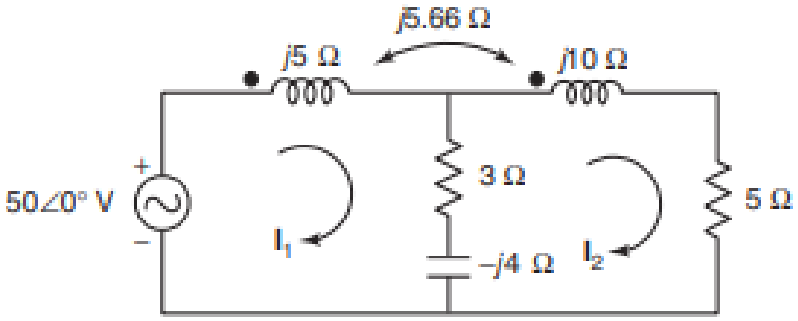


MODULE III

15. a) Write the KVL equations for the circuit given below. (7)

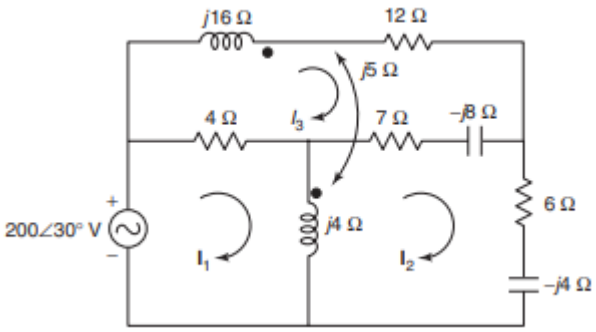


b) Write the mesh equations for network given below and solve I_1 and I_2 (7)



OR

16. a) Write the KVL equations for the circuit given below. (9)



b) Narrate the concept of dot convention in coupled circuits with an example. (5)

MODULE IV

17. a) A resistor and a capacitor are connected in series with a variable inductor. When the circuit is connected to a 230V, 50Hz supply, the maximum current obtained by varying the inductance is 2A. The voltage across the capacitor is 500V. Calculate the resistance, inductance and capacitance of the circuit. (5)

b) A three phase 400V 4-wire system given below has a star connected load with Za = (10+j0)Ω, Zb = (15+j10)Ω, Zc = (0+j5)Ω. Find the line currents and the current through the neutral. (9)

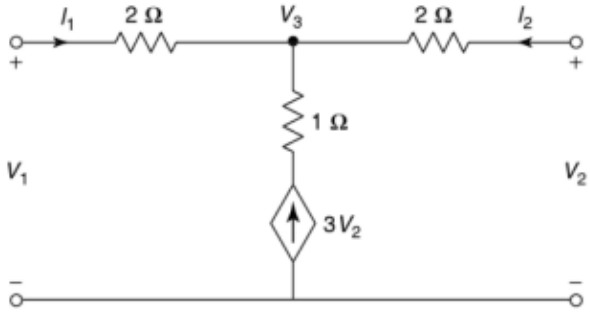
OR

18. a) Impedances Z_2 and Z_3 in parallel are connected in series with an impedance Z_1 across a 100V, 50Hz ac supply. Z_1 = (6.25+j1.25)Ω, Z_2 = 5Ω, Z_3 = (5 - jXc)Ω. Determine the value of capacitance of Xc such that the total current of the circuit will be in phase with the total voltage. (7)

b) A three phase, 4-wire, 208V CBA system is connected to a star connected load with $Z_A = 5\angle 0\ \Omega$, $Z_B = 5\angle 30\ \Omega$, $Z_C = 10\angle -60\ \Omega$. Obtain the phase currents and the current through neutral wire. (7)

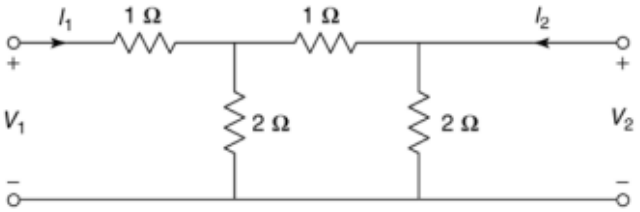
MODULE V

19. a) Find the Y parameters of the network given below.



(7)

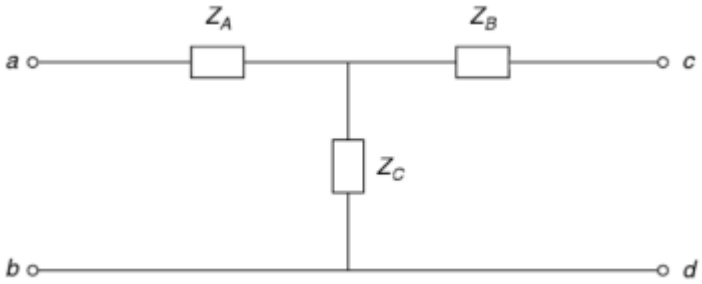
b) Obtain the ABCD parameters of the network given below.



(7)

OR

20. a) A network has two input terminals (a, b) and two output terminals (c, d) as shown in the figure given below. The input impedance with c and d open circuited is (250+j100)Ω and with c and d short circuited is (400+j300) Ω. The impedance across c and d with a and b open circuited is 200 Ω. Determine the equivalent T- network parameters. (9)



b) Derive the conditions for symmetry and reciprocity in a two port network for a ABCD parameters. (5)

****