Exam.Code:0927
Sub. Code: 6896

1078

B.E. (Electronics and Communication Engineering)
Third Semester
EE-309: Electrical Science

Time allowed: 3 Hours

Max. Marks: 50

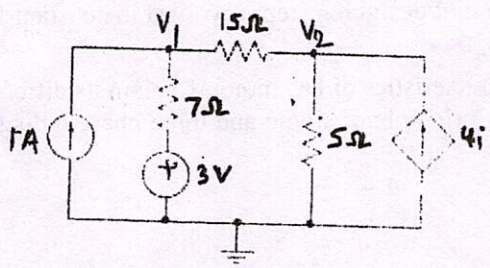
NOTE: *Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Part.*

x-x-x

I. (a) Give one important basis to choose between nodal and mesh analysis of a circuit. (1)
(b) A node where only two elements meet doesn't require a nodal equation. Why. (2)
(c) Why RC timers are better choice than RL timers? (2)
(d) How do you determine the current passing through independent voltage source? (2)
(e) What are the differences between supermesh and supernode. (2)
(f) A network has 5 branches and 2 independent loops. How many nodes are there in network? (1)

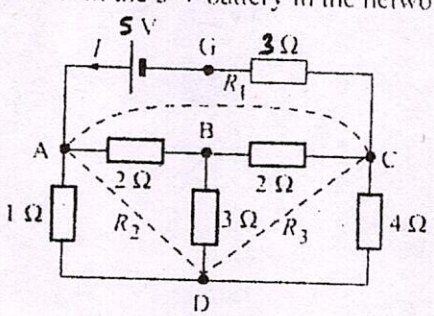
Part- A

II.(a) Use superposition theorem to obtain the voltage across each current source in the given circuit diagram. (5)

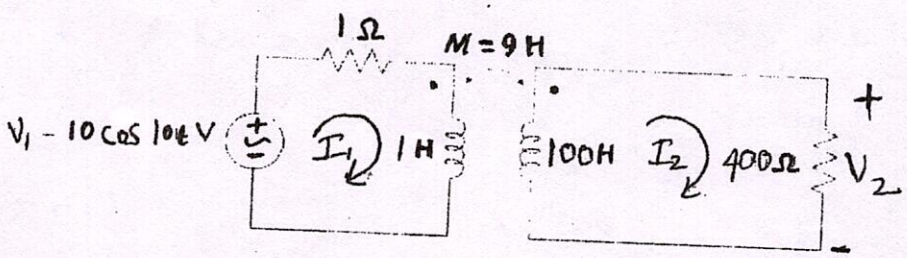


(b) What do you mean by duality principle? Explain with two examples. (5)

III. (a) Determine the current drawn from the 5-V battery in the network shown below. (5)



(b) For the circuit shown below, find the ratio of the output voltage across the 400Ω resistor to the Source voltage (5)



P.T.O.

IV. (a) What are the restrictions on pole-zero locations for any transfer function? Explain how location of poles and zeros affect the stability of network. (5)

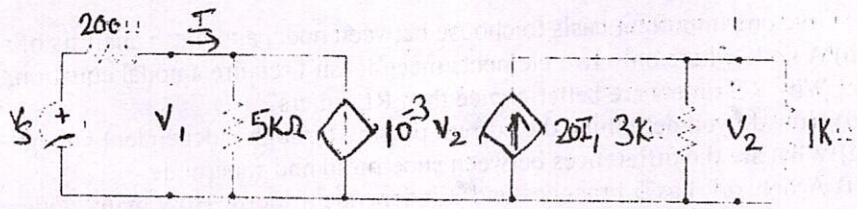
(b) The current transfer function is given by (5)

$$I(s) = \frac{5s+3}{(s+2)(s^2+5s+2)}$$

Obtain its time domain response.

Part-B

V. (a) Find y and z_{out} parameters for terminated two-port network shown below. (5)



(b) Derive relation between *y* and *T* parameters for any two port networks. (5)

VI. (a) What do you mean by characteristic impedance and propagation con tant of pure reactive network. What are their significances? (5)

(b) What are the different designing steps involved in constant-k and m-derived filters. (5)

VII. (a) What are the characteristics of DC motor. Explain its different types. (5)

(b) Explain working principle of single and three phase induction motors. Explain its torque-slip characteristics. (5)

x–x–x