KUMARAGURU
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Register Number: ……..

B.E DEGREE EXAMINATIONS: JUNE 2015

(Regulation 2009)

Second Semester

ELECTRICAL AND ELECTRONICS ENGINEERING

EEE101: Electric Circuit Analysis

Time: Three Hours **Maximum Marks: 100**

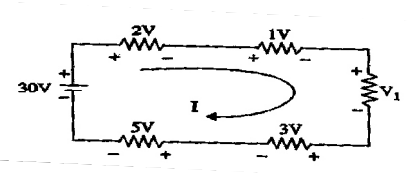
Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Kirchhoff's current law is applicable to only
   a) Closed loops in a network b) Electronic circuits
   c) Junction in a network d) Electric circuits
2. The operator j has a value of
   a) +1 b) -1
   c) √-1 d) √+1
3. Thevenin Resistance R_{th} is found
   a) Between any two 'open' terminals b) By short circuiting the given two terminals
   c) By removing voltage sources along with their internal resistances d) Between same open terminal as for V_{th}
4. The nodal analysis is primarily based on the application of
   a) KVL b) KCL
   c) Ohm's law d) both B and C
5. The Q factor of a 2- branched parallel circuit is given by the ratio
   a) I_C/I_L b) I/ I_C
   c) I/ I_L d) L/C
6. In a series R-L-C circuit resonance occurs when
   a) $R = X_L \sim X_C$ b) $X_L = X_C$
   c) $XL = 10 X_C$ or more d) net X > R
7. In terms of ABCD parameters, a two-port network is symmetrical if and only if
   a) A=B b) B=C
   c) C=D d) D = A
8. Two port Z parameter not exist for the circuit if
   a) $\Delta z = 0$ b) Δz
   c) $\Delta z = 1$ d) always exist
9. In the 2-wattmeter method of measuring 3-phase power, the two wattmeter indicate equal and opposite readings when load power factor angle is_____ degrees lagging
   a) 60 b) 0
   c) 30 d) 90
10. The method of symmetrical components is very useful for
    a) Solving unbalanced poly phase circuits b) Analyzing the performance of 3-phase electrical machinery
    c) Calculating currents resulting from unbalanced faults d) All of the above

PART B (10 x 2 = 20 Marks)

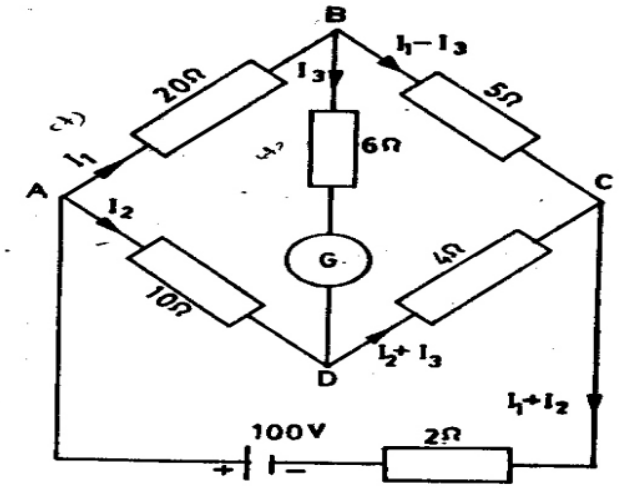
11. State Ohm's Law.
12. Determine the unknown voltage drop V_1



13. State maximum power transfer theorem.
14. Give the expression for Star-Delta conversion.
15. What is time constant for serial RL & RC circuit?
16. Define transient response.
17. What is a two port network?
18. What is transfer impedance?
19. Define positive sequence.
20. Write the voltage expression of a three phase sinusoidal voltage.

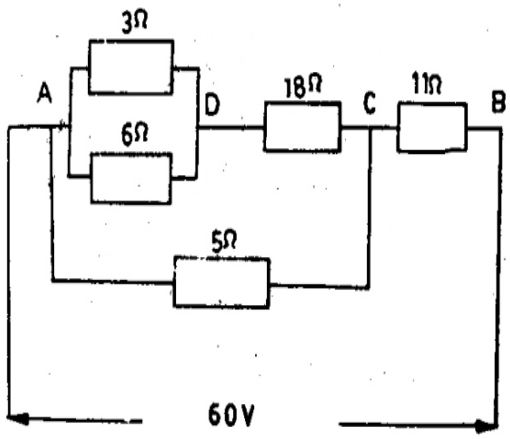
PART C (5 x 14 = 70 Marks)

21. a) A Wheatstone bridge ABCD is arranged as follows; AB=20Ω; BC= 5Ω; CD=4Ω; DA=10Ω. A galvanometer of 6Ω is connected between B&D. A 100V dc supply of 2Ω resistance is connected between A&C with a positive. Find the magnitude and direction of galvanometer current.



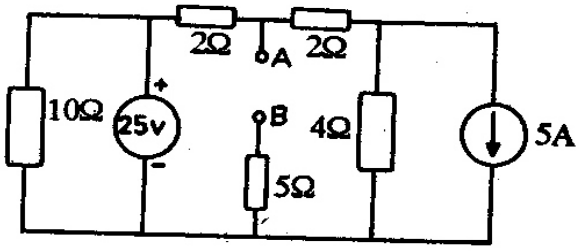
(OR)

b) i. Calculate the equivalent resistance of the circuit below. Find the current in each branch if total applied voltage is 60V. **(7)**



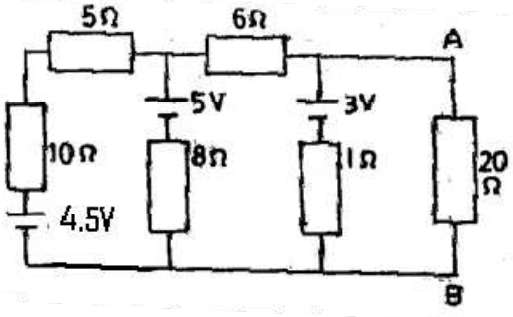
ii. A coil having a resistance of 5Ω and an inductance of 0.2H is connected in series with a variable capacitor across a 60V, 50HZ supply. Calculate the capacitance required to produce resonance and the corresponding values of a).the current b) the voltage across the coil and the capacitor c) the power factor. **(7)**

22. a) Find the Thevenins equivalent circuit, preserving terminals AB. Calculate the current through a 2Ω resistor connected across the terminal AB.

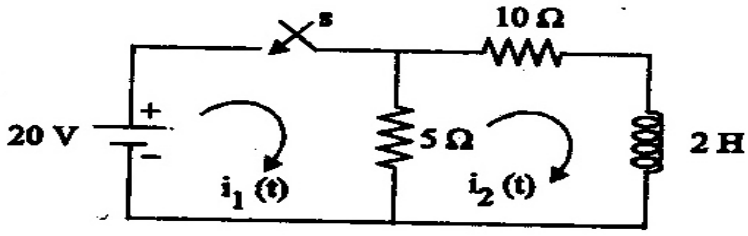


(OR)

b) Find out the voltage V_{AB} by applying Norton's theorem.

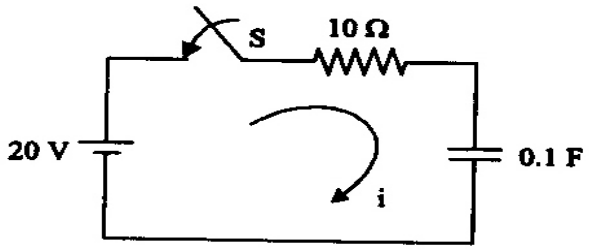


23. a) Determine the currents i_1 and i_2 when the switch is closed at t=0. Assume that the initial current through the indicator is zero.



(OR)

b) A series RC circuit consists of a resistor of 10Ω and a capacitor 0.1F as shown in figure. A constant voltage of 20V is applied to the circuit at t=0. Obtain the current equation. Determine voltage across the resistor and the capacitor.



24. a) Obtain the transfer function $V_2(s)/V_1(s)$ of the network shown in Fig. Find $V_2(t)$ when $V_1(t) = 10e^{-2t}V$ is shown in Fig 4.1.

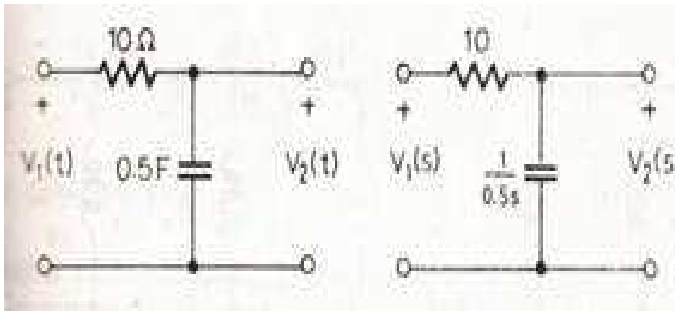


Fig.4.1

(OR)

b) Find the Z- parameter of the network drawn in Fig.4.2

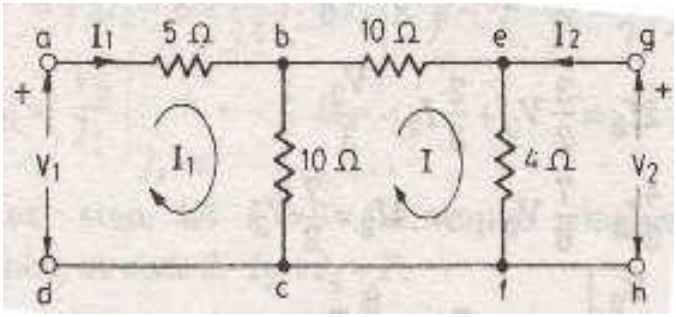


Fig.4.2

25. a) Describe two watt-meter method of measurement of power and power factor in three phase circuits.

(OR)

b) A system of unbalanced three phase voltages is given as 200∠0°, 120 ∠-60° and 240∠90°. Determine the three symmetrical components for the given system. Assume phase sequence RYB.

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