3238

BOARD DIPLOMA EXAMINATION, (C-09)

JUNE - 2019

DIPLOMA IN ELECTRONICS & COMMUNICATION ENGINEERING

CIRCUIT THEORY

THIRD SEMESTER EXAMINATION

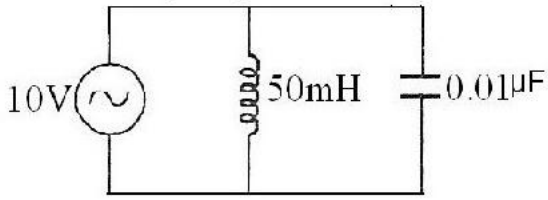
Time: 3 Hours **Total Marks: 80**

PART - A (10 x 3 = 30 Marks)

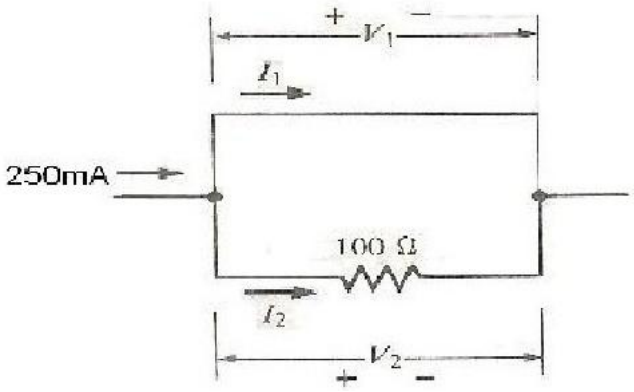
Note 1:Answer all questions and each question carries 3 marks

2:Answers should be brief and straight to the point and shall not exceed 5 simple sentences

1. Find the resonant frequency in the ideal parallel LC circuit shown below.



2. A sinusoidal voltage of 5 kHz frequency is applied across a 10mH inductor. Determine the inductive reactance.
3. State the difference between active and passive circuit elements.
4. Find the current I_1 and voltage V_1 in the figure shown below.



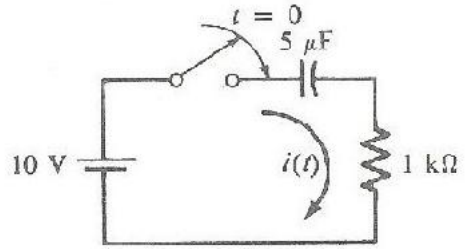
5. Define the following

   a) Driving point admittance

   b) Transfer admittance

6. List the advantages of Reciprocity theorem.
7. A constant current source develops a terminal voltage of 9V when a 500Ω resistor is connected across its terminals. What is its terminal voltage when the 500Ω resistor is replaced by a 1.5kΩ resistor.

8. For the circuit shown in figure, write the mathematical expression for the charging current i (t) after the switch is closed.



9. Write the expressions for the following parameters of low pass RC circuit

   i) Upper 3dB frequency ii) Rise time in terms of upper 3dB frequency.

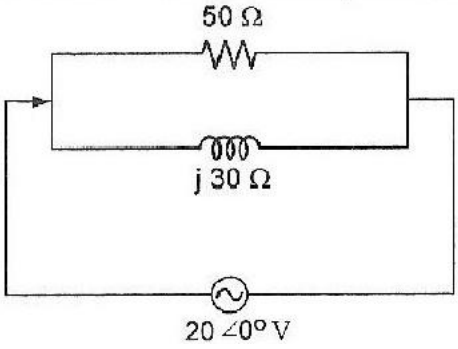
10. Define reflected impedance of a coupled circuit.

PART - B (5 x 10 = 50 Marks)

Note 1:Answer any five questions and each question carries 10 marks

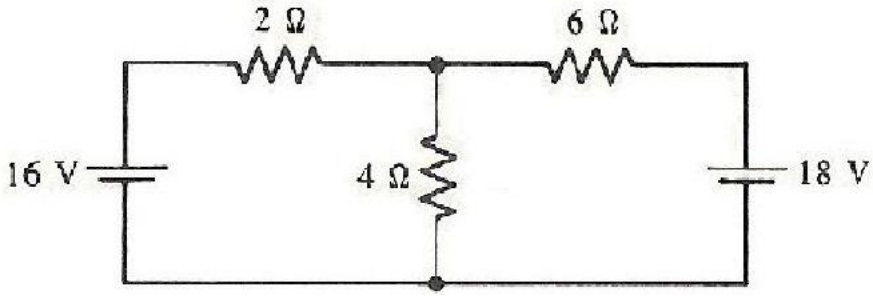
2:The answers should be comprehensive and the criteria for valuation is the content but not the length of the answer

11. For the circuit shown below, determine the total current, impedance and phase angle.

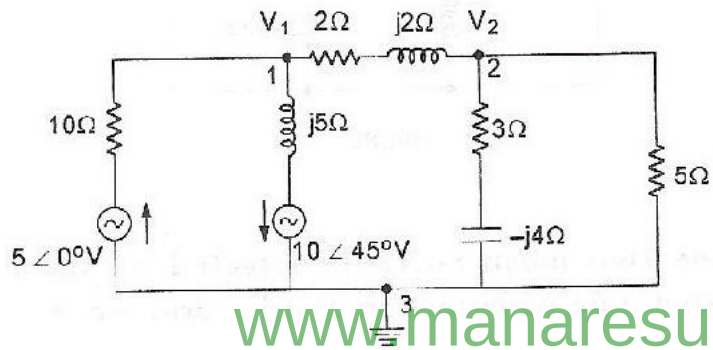


12. a) Distinguish between series and parallel resonance.
    b) Explain the effect of resistance on bandwidth of a series resonant circuit.

13. Using Mesh analysis find the current in each resistor shown in figure below.

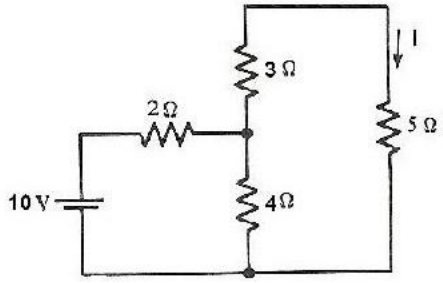


14. Write the node voltage equations for the network shown below and express them in matrix form.



15. a) Explain ideal voltage source and ideal current source. 4 M
    b) A constant current source develops a terminal voltage of 9V when a 500Ω resistor is connected across its terminals. What is its terminal voltage when the 500Ω resistor is replaced by a 1.5kΩ resistor? 6 M

16. a) Verify the reciprocity theorem in the circuit shown in figure below.



17. Find the equivalent inductance of two coupled coils with L_1=20mH and L_2=10mH and k=0.5 when connected in

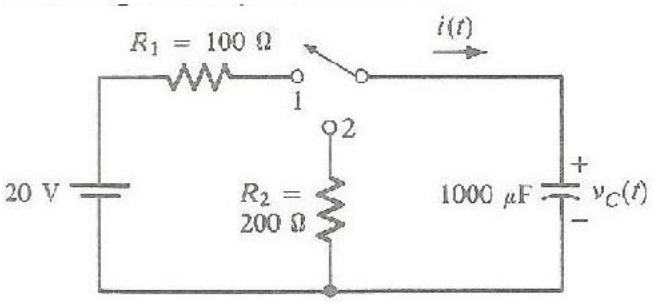
    a) Series aiding,

    b) Series opposing.

18. With reference to the circuit shown in figure

    a) Write the mathematical expression for i (t) and V_c (t) when the switch is placed in position 1.

    b) Write the mathematical expression for i (t) and V_c (t) when the switch is placed in position2.after having been in position 1 for 1s.



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