

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

QUESTION BANK

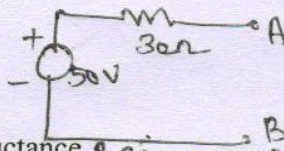
SUBJECT CODE : EE1152 SEM / YEAR : II / I

SUBJECT NAME : ELECTRIC CIRCUITS AND ELECTRON DEVICES

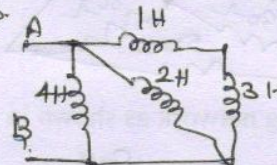
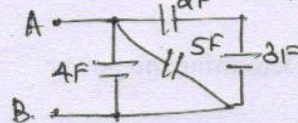
UNIT - 1  
CIRCUIT ANALYSIS TECHNIQUES

PART - A (2 Marks)

1. Explain star and delta connection of impedances.
2. State Superposition theorem.
3. State Thevenin's theorem.
4. State Norton's theorem.
5. State Maximum Power transfer theorem
6. State and explain KCL.
7. State and explain KVL.
8. Explain duality.
9. Determine the equivalent current source for the voltage source shown in figure.



10. Find total Inductance & CAPACITANCE

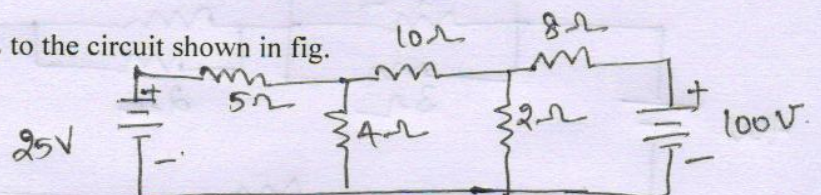


11. State voltage and current divider rule?
12. What are the limitations of thevenin theorem?
13. Find the star equivalent of the delta network.?

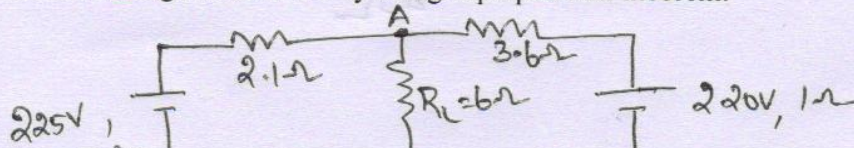


PART - B (16 Marks)

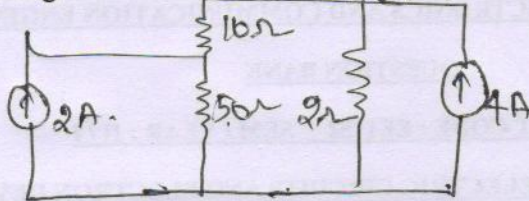
1. Apply KCL and KVL to the circuit shown in fig.



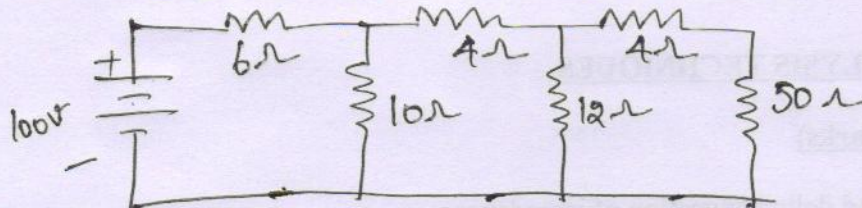
2. Find the current through branch AB by using superposition theorem.



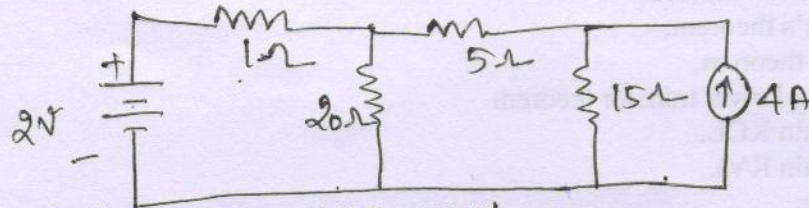
3. Find the current through  $50\Omega$  resistance using Superposition theorem.



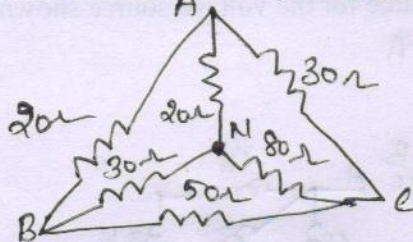
4. Find the current through  $10\Omega$  resistance using Norton's theorem.



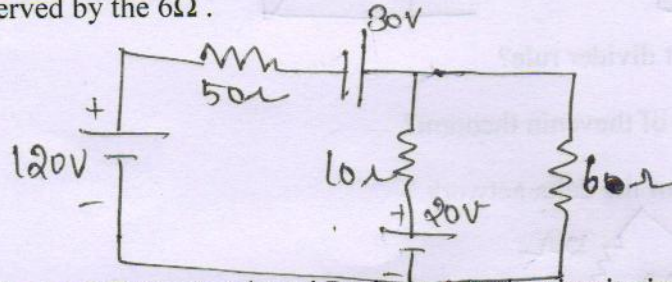
5. Find the Current (I) in  $20\Omega$  Resistance using Thevenin's theorem



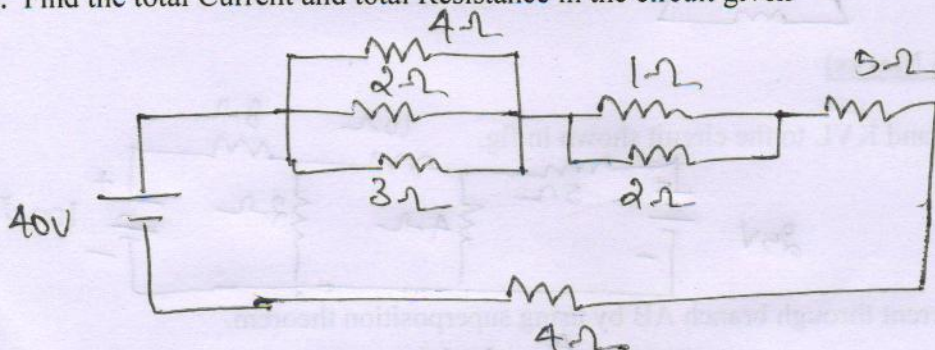
6. Find the resistance between A & B, A & C



7. Consider the following network as shown in figure. Determine the power observed by the  $6\Omega$ .



8. Find the total Current and total Resistance in the circuit given



## UNIT – II

### TRANSIENT RESPONSE AND RESONANCE IN RLC CIRCUITS

#### PART – A (2 Marks)

1. What is significance of initial conditions?
2. Write a note on initial conditions in basic circuit elements.
3. What is time constant?
4. Write a note on under damped, over damped and critically damped systems.
5. Define (i) rise time, (ii) time delay in respect of step response of second order system.
6. What do you mean by resonance?
7. What is Q-factor?
8. What is anti-resonance?
9. Find the value of Q-factor for an Inductor & Capacitor.

#### PART – B (16 Marks)

1. Derive an expression for step response of series R-L circuit.
2. Derive an expression for step response of series R-C circuit.
3. Explain about current decay in source free series R-L circuit.
4. Explain the step response of RLC circuit.
5. Find the expression for the current in a series RLC circuit fed by a D.C. voltage of 20v with  $R=8\Omega$ ,  $L=5H$ ,  $C=1/8F$ . Assume the initial conditions to be zero.
6. Explain Series Resonance.
7. A series RLC circuit consists of  $R=50\ \Omega$ ,  $L=0.05H$  and  $C=0.05\mu F$ . Calculate the frequency of resonance. A variable frequency sinusoidal voltage of value 50v is applied to the circuit. Find the frequency at which voltage across L & C is maximum. Also calculate voltages across L & C at frequency of resonance. Find maximum current in the circuit.
8. Briefly explain the parallel resonance.
9. A resistor & capacitor are in series with a variable inductor. When the circuit is connected to 200v, 50Hz supply, the maximum current obtained by varying the inductance is 0.314A. the voltage across capacitor, when the current in the circuit is maximum is 800v. find the values of series circuit elements.

**UNIT-III**  
**SEMICONDUCTOR DIODES**

**PART – A (2 Marks)**

1. What is charged particle? Define the unit of the charge.
2. What are the applications of CRO?
  3. What is valance band?
  4. What is covalent band?
  5. What is forbidden band?
  6. Explain semiconductor types?
  7. Define energy level and energy band.
  8. What is Fermi level?
  9. What is a semiconductor?
  10. What is meant by electron –hole pair?
  11. What is p-type semiconductor?
  12. What is doping?
  13. What is hole current /electron current?
  14. Define law of mass of action
  15. What is drift current?
  16. What is diffusion current?
  17. What is forward and reverse resistance of a diode?
  18. What is cut in voltage of a diode?
  19. What is switching characteristics of diode?
  20. What is Zener break down voltage?
  21. Give the expression for transition capacitance of a diode (CT ).
  22. What are applications for zener diode?

**PART – B (16 Marks)**

1. Explain the theory of PN junction and explain how it acts as diode?
2. Derive the diode equation of the diode
3. Explain and derive the current components and switching characteristics of diode?
4. Derive the expression for transition and diffusing capacitance.
5. Explain the Zener diode and it's breakdown mechanism?

**UNIT – IV**  
**TRANSISTORS**

**PART – A (2 Marks)**

1. Define Transistor
2. Define transistor action
3. Define delay time
4. Define rise time and fall time.
5. Define turn on and turn off time
6. Define power transistors.
7. Define current amplification factor in CC transistor.
8. What are the values of input resistance in CB, CE & CC configuration?
9. What are the advantages of FET?
10. What is a bias? What is the need for biasing?
11. What do you understand by DC and AC load line?
12. What is meant by operating point Q?
13. What are all the factors that affect the stability of the operating point?
14. Define Stability factor S.
15. Why voltage divider bias is commonly used in amplifier circuits?
16. How FET is known as voltage variable resistor?
17. How self bias circuit is used as constant current source?
18. What is thermal runaway?
19. Why self-bias technique is not used in enhancement type MOSFET?
20. What are handling precautions for MOSFET?
21. In which region the JFET act as a simple resistor and why?
22. Why FET is called as voltage controlled device?
23. Define the channel width of JFET.
24. Define Base spreading resistance.
25. Write the advantages of N channel MOSFET over P channel MOSFET
26. Write the characteristics of JFET
27. What is pinch off voltage?

**PART – B (16 Marks)**

1. Explain the NPN and PNP transistor action.

2. Explain the operation of BJT and its types?
3. Write comparisons of CC, CE, and CB configuration?
4. Explain the breakdown in transistor.
5. Explain the transistor switching times.
6. Explain the operation of JFET
7. Derive MOSFET and explain its enhancement?

**UNIT – V**  
**SPECIAL SEMICONDUCTOR DEVICES**

**PART – A (2 Marks)**

1. What is tunnel diode?
2. What is valley voltage of tunnel diode?
3. What is varactor diode?
4. What are the applications of varactor diode?
5. What are the applications of tunnel diode?
6. What are the applications of PIN diode?
7. What is photodiode?
8. What is phototransistor?
9. What are photovoltaic sensors?
10. What are the types of display devices?
11. What are the advantages of LED?
12. What is forward break over voltage?
13. Define holding current.
14. Define latching
15. What is the turn OFF mechanism used for SCR?
16. What is forward break over voltage and reverse break over voltage?
17. Give the application of LASER?
18. What is TRIAC?
19. What is DIAC?
20. What is UJT?
21. What are the different regions in characteristics of UJT?

**PART – B (16 Marks)**

1. Describe the operation of zener diode and explain its characteristics.

2. Explain the tunneling phenomenon.
3. Write short notes on varactor diode and PIN diode.
4. Explain the laser action for laser diode.
5. Describe the operation of LED and LCD.
6. Explain the operation and characteristics of SCR.
7. Explain the operation and characteristics of TRIAC.
8. Explain the operation and characteristics of DIAC.

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