SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR
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QUESTION BANK (DESCRIPTIVE)

Subject with Code : Basic Electrical and Electronics Engineering (16EE207)

Course & Branch: B.Tech - CSE **Year & Sem:** II-B.Tech & I-Sem

Regulation: R16

PART-A

UNIT –I

Introduction to DC & AC circuits

1. (a) Define and Expain about ohms law. 5M

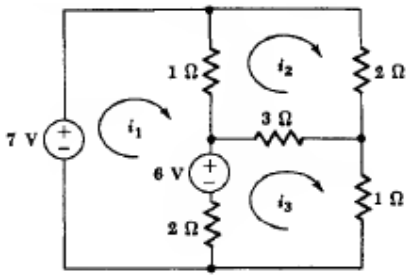
   (b) Explain about passive elements in detail. 5M

2. Three resistances of values 2Ω,3Ω and 5Ω are connected in series across 20V DC supply. Calculate i) Equivalent resistance of the circuit. ii) The total current of the circuit. iii) The voltage drop across each resistor. iv) The power dissipated in each resistor. 5M

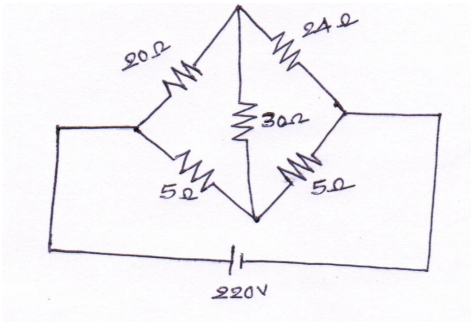
3. Define and Expain about Energy sources in detail. 10M

4 (a) State and prove krichhoff law's with an example 5M

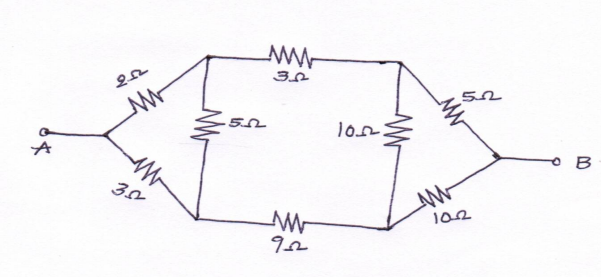
(b)In the circuit shown below find i_1, i_2, i_3 by using Kirchhoff's laws? 5M



5.Find the current delivered by the source for the circuit shown in figure. 10M



6. Find the voltage to be applied across AB in order to drive a current of 5A into the circuit. 10M



7.(a)Explain about basic circuit components in detail 6M

(b)Explain about KVL. 4M

8.Explain the following 10M

(a)Resistive networks

(b)Inductive networks

9. Explain the following 10M

(a)Resistive networks

(b)Capacitive networks

10.(a) Define RMS value, average value, form factor and peak factor. 4M

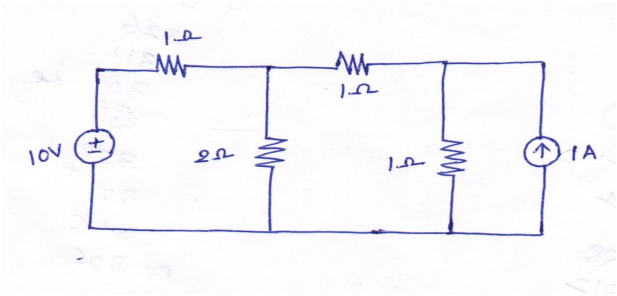
(b) Show the form factor of the sine current is 1.11./ Find form factor of the sine current. 6M

UNIT –II

Network theorems & Twoport networks

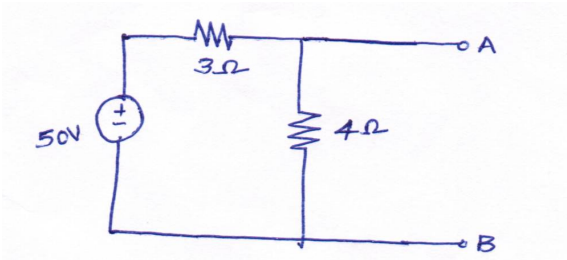
1(a).State super position theorem 2M

(b)Calculate the current in 2Ω resistor in the fig. using super position theorem. 8M



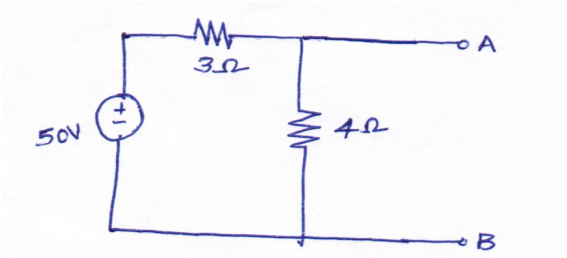
2(a).State Thevenins theorem 2M

(b) Find Thevinins equivalent circuit across AB for the circuit shown in below. 8M

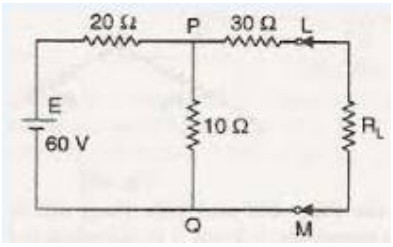


3(a).State Nortons theorem 2M

(b) Find Nortons equivalent circuit across AB for the circuit shown in below. 8M



4.Determine the maximum power delivered to the load in the circuit shown in fig. 10M

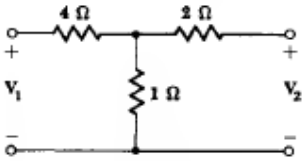


5.State and prove Reciprocity theorem with an example. 10M

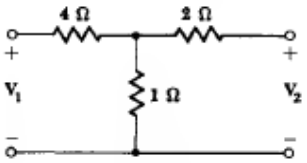
6. (a) Define and explain about Impedance parameters. 5M

(b)Define and explain about Y- parameters 5M

7.Find the Open circuit parameters for the circuit shown in fig. 10M



8.Find the Short circuit parameters for the circuit shown in fig. 10M



9.The given ABCD parameters are A=2,B=0.9,C=1.2,D=0.5 find Y- parameters. 10M

10.The given Y-parameters are Y_{11}=0.5,Y_{12}=Y_{21}=0.6,Y_{22}=0.9 find impedanace parameters 10M

UNIT –III

DC &AC Machines

1.(a)Explain about principle of operation of DCMotors in detail. 5M

(b)Calculate the value of Torque established by the armature of a 4-pole motor having 774conductors,2 paths in parallel,24mwb flux per pole when the total armature current is 50A. 5M

2.A 220Vshunt motor takes a total current of 80A and runs at 800 r.p.m .Shunt field resistance and armature resistance are 50Ω and 0.1Ω respectively.If iron and friction losses amount to 1600W.find(i)Copper losses(ii)Armature torque(iii)Shaft torque(iv)Efficiency. 10M

3.(a)Derive Torque eqution of dc motor. 5M

(b)The counter emf of Shunt motor is 227 volts the field resistance is 160Ω and field current 1.5A if the line current is 36.5A find the armature resistance also find armature current when the motor is stationary. 5M

4.(a)Explain about constructional details of dc motor. 6M

(b)A 6 pole lap wound shunt motor has 500 conductors ,the armature and shunt field resistances are 0.05 Ω and 25 Ω respectively find the speed of the motor if it takes 120A from dc supply of 100V flux per pole is 20mwb 4M

5. A 230Vshunt motor takes a total current of 70A and runs at 900 r.p.m .Shunt field resistance and armature resistance are 40Ω and 0.2Ω respectively.If iron and friction lossesamount to 1700W.find(i)Copper losses(ii)Armature torque(iii)Shaft torque(iv)Efficiency. 10M

6. a) Derive EMF equation of a transformer. 5M

b) A 100KVA, 11000V/400V, 50Hz transformer has 40 secondary turns. Calculate the number of primary turns and primary and secondary currents. 5M

7(a)Explain constructional details of transformer. 5M

(b) A 20KVA, 2000V/200V, 50Hz transformer has 66 secondary turns. Calculate the number of primary turns and primary and secondary currents.Neglect losses. 5M

8. a) Explain OC and SC test of a single phase transformer. 5M

(b)A Single phase 2200/250V,50Hz transformer has a net core area of 36cm^2 and a maximum flux density of 6wb/m^2.Calculate the number of turns of primary and secondary. 5M

9(a)Explain principle of operation of transformer. 5M

(b)An ideal transformer has 1000turns on its primary and 500 turns on its secondary the driving voltage of primary side is 100V and the load resistance is 5 Ω,calculate V_2,$I_1$and I_2 5M

10.(a)Explain principle of operation of transformer 5M

(b) Derive EMF equation of a transformer. 5M

PART-B

UNIT –IV
SEMICONDUCTOR DEVICES

1. a) Distinguish between conductors, semiconductors and insulators. 5M

b) Draw the atomic structure of a semiconductor and explain why an intrinsic semiconductor is relatively a poor conductor of electricity. 5M

2. Discuss the conduction properties of semiconductors and explain the process of electron hole Pair generation and recombination. 10M

3. Distinguish between intrinsic and extrinsic semiconductors and explain the process of conduction In each of them. 10M

4. a) What is Doping? Describe P-and N-type semiconductors? 5M

b) Explain the behavior of PN junction diode. 5M

5. Describe the working of a PN junction diode when it is connected in forward bias and reverse bias.Draw VI Characteristics of PN Junction Diode. 10M

6. a) Write notes on Diode Specifications and Diode Applications. 6M

   b) Explain Drift and Diffusion currents in a PN Junction Diode. 4M

7. a) With neat diagram, explain the working principle of Half Wave Rectifier. Draw its input and Output waveforms. 5M

   b) Derive the expression for Ripple factor and Efficiency of Half Wave Rectifier. 5M

8. a) With neat diagram, explain the working principle of Full Wave Rectifier. Draw its input and Output waveforms. 5M

   b) Derive the expression for Ripple factor and Efficiency of Full Wave Rectifier. 5M

9. a) Draw the circuit diagram of a Bridge Rectifier and explain its operation with input and output waveforms. 5M

   b) Discuss the operation of half wave rectifier with capacitor filter. 5M

10. a) Discuss Zener Diode breakdown mechanism. Draw the Zener diode in its reverse bias and explain its Volt-Ampere characteristics. 5M

UNIT –V

BJT and FETs

1. a) Describe in detail the working of an NPN bipolar junction transistor. Why is it called Bipolar? 4M

   b) Explain with the help of diagrams various types of circuit configurations, which can be obtained from a bipolar junction transistor. 6M

2. a) Draw the circuit diagram for a common base circuit arrangement and plot its input and Output characteristics. Show the different regions of the output characteristics and explain their occurrence. 5M

   b) Discuss with neat diagrams, the Common Emitter Configration and its characteristics. 5M

3. a) Explain the functioning of Common Collector Configuration of BJT.State why this arrangement is also called an emitter follower circuit. 5M

   b) Compare the characteritcs of BJT CB, CE and CC transistor configurations. 5M

4. a) Derive the relationship between α and β of BJT configurations. 5M

   b) What is the purpose of bias in a transistor circuit? Explain the Q point and DC load line

in BJT. 5M

5. a) With neat circuit diagram and equations, explain Fixed Bias circuit of BJT. 5M

b) Describe the Voltage Divider Bias Network of BJT with diagram and equations. 5M

6. a) Describe the constructional features of a Junction Field Effect Transistor. What is the Difference between a P type and N type JFET? Draw the cross sectional view and show the Symbolic representation of each type of the transistor. 5M

b) Explain in detail the theory of operation of n-channel JFET. 5M

7. a) Discuss the transfer and output characteristics of n-channel JFET with diagrams. 5M

b) Compare BJT and JFET with its properties. 5M

8. a) Explain the different configurations of JFET with neat diagrams. 6M

b) Discuss the use of JFET as a switch. 4M

9. a) Explain with diagrams, the construction, working and characteristics of N channel Depletion MOSFET. 8M

b) Mention the applications of MOSFET. 2M

10. a) With neat diagram, discuss N-channel Enhancement MOSFET. 5M

b) For a voltage divider biasing using BJT, $R_C = 1k\Omega$, $R_E = 2k\Omega$, $R_1 = 10k\Omega$, $R_2 = 5k\Omega$, and $V_{CE} = 10V$. Find the coordinates of the extremities of the load line and the Q-point. Assume Silicon Transistor. 5M

UNIT –VI

Oscillators and Op-Amps

1. a) What is an oscillator and how the oscillators are classified? Write Barkhausen criteria for Oscillator operation. 5M

b) Explain the block diagram representation of an oscillator circuit. 5M

2. a) With neat diagram, explain the operation of LC tuned transistor oscillator. 5M

b) Discuss the operation of Hartley oscillator with diagram. 5M

3. a) Describe the working principle of Colpitts Oscillator with neat diagram. 5M

b) Mention the types of RC oscillators. Explain RC phase shift oscillator with diagram. 5M

4. a) Compare RC and LC oscillators. 5M

b) Explain Wein bridge oscillator with diagram. 5M

5. a) What is an operational amplifier? With diagram, explain single input and dual input

Op amps. 5M

b) Discuss the Characteritics of an ideal operational amplifier. 5M

6. a) Draw an inverting amplifier of operational amplifier and derive its closed loop gain. 5M

b) Determine the closed loop gain of a non inverting operational amplifier and draw its diagram. 5M

7. a) If R_f = 45kΩ and R_2=3kΩ in the non inverting op amp, compute (i) A_{VC} and (ii) output Voltage if the input voltage is 5mV. What is the magnitude of the feedback voltage at the Non inverting point? 5M

b) Discuss about voltage follower with neat diagram. 5M

8. a) With neat diagram, explain Summing Amplifier. 5M

b) Derive the expression for output voltage of a differential amplifier. 5M

9. a) Describe Integrator amplifier of op amp with diagram. 5M

b) Explain Differential Amplifier with neat diagram. 5M

10.a) In the inverting amplifier of op amp circuit, the input resistance is R_i = 12kΩ and the feedback resistance is R_f = 300kΩ. Determinne the closed loop gain (i) as a dimension-less unit and (ii) in dB. 4M

b) In the summing amplifier circuit of op amp, the applied input voltage signals and their resistors are (i) 1mV with 0.5kΩ {ii) 3mV with 1.5kΩ and (iii) 5mV with 3kΩ. If R_f = 12kΩ, calculate (i) individual closed loop gains and (ii) output voltage. What is the output voltage if the closed loop gain is unity? 6M