Code.No: RR12302

RR

SET-1

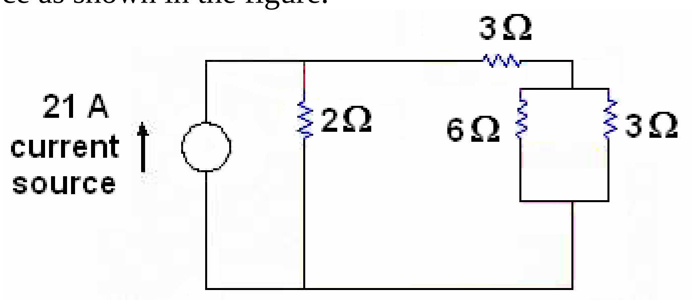
I B.TECH – EXAMINATIONS, DECEMBER - 2010
ELECTRICAL AND ELECTRONICS ENGINEERING
(BIO – TECHNOLOGY)

Time: 3hours **Max.Marks:80**

Answer any FIVE questions
All questions carry equal marks
- - -

1.a) Name the different types of elements that constitute an electric circuit.

b) A 20V source with an internal resistance of 2Ω is connected to a load resistance of 8Ω. Find the load current. Verify your result by transforming the voltage source into current source as shown in the figure.



c) In the above circuit, calculate the current through 6 Ω resistor. [4+4+8]

2.a) Does the induction motor have any similarities with the transformer. Compare the similarities and differences between them.

b) A 20h.p, 400V, 50HZ, 3-phase induction motor has an efficiency of 80% and working at 0.7 p.f. The motor is connected to 400 volts, 3-phase supply calculate the current drawn by the motor from the mains. [8+8]

3.a)i) Find the resistively of intrinsic silicon at 300 ^{0}K. It is given the n_i at 300 ^{0}K in silicon is 1.5 x 10^{10}/Cm^3, $\mu_p = 500 cm^2 / V - S$, μ_n = 1300-Cm^2 /V - S.

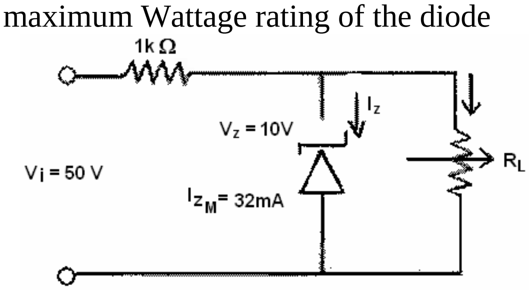
ii) If an acceptor impurity is added to the extent of 1 impurity atom in 2×10^8 silicon atoms, find it's resistively.

iii) If a donor impurity is added to the extent of 1 impurity atom in 5×10^7 silicon atoms, find it's resistively.

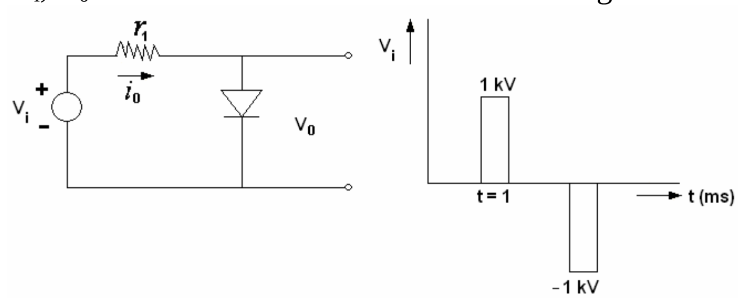
b) Prove that the concentration of free electron in an intrinsic semiconductor is given by $n = N_c e^{-(E_c - E_f)/KT}$ [12+4]

4. For the network shown in the figure determine the range of R_L and I_L that will result in V_{RL} being maintained at 10 V:

a) Determine the maximum Wattage rating of the diode



b) The reverse saturation current of the diode is 1 μA. Its peak inverse Voltage is 500V. Find r_i, V_0 that PIV is not exceeded as shown in figure. [16]



5.a) Derive the expression for:
i) Average current
ii) DC output voltage
iii) RMS current,
iv) RMS voltage across the load,
v) Rectifier efficiency
vi) Regulation for full wave rectifier whose input a sine wave.

b) Prove that the regulation of both half wave and full wave rectifier is given by % regulation$=\frac{R_f}{R_L}\times 100$. [10+6]

6.a) With the help of block diagrams, explain the four different feed back topologies.

b) Draw the circuit of a voltage series feedback amplifier with BJT. What is the effect of this feedback as R_i and R_0? [6+10]

7.a) Draw the circuit diagram of wien bridge oscillator using BJT. Show that the gain of the amplifier must be at least 3 for the oscillations to occur.

b) For the fixed-bias Ge transistor, n-p-n type, the junction voltages at saturation and cutoff one in active region, may be assumed to zero. This circuit operates properly over the temperature range -50 ^{0}C to 75 ^{0}C and to just start malfunctioning at these extremes. The various circuit specifications are: V_{CC} = 4.5v, V_{BB} = 3 V, h_{FE} = 40 at -50 ^{0}C, and h_{fe} = 60 at 75 ^{0}C, I_{CBO} = 4 μA at 25 ^{0}C and doubles every 10 ^{0}C. Collector current is 10 μA. Design the values of R_{c1}, R_1 and R_2. [8+8]

8.a) Explain how a shift register is used as a Ring counter. Draw the O/P waveform from each flip-flop of a 3-stage unit.

b) Prove that if $w'x+yz=0$, then $wx+y'\left(w'+z'\right)=wx+xz+x'z'+w'y'z$

c) Represent the given negative numbers in sign-magnitude, 1'S and 2'S complement representation in 12-bit format:
i) -64
ii) -512. [6+6+4]

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Code.No: RR12302 | RR | SET-2

I B.TECH – EXAMINATIONS, DECEMBER - 2010
ELECTRICAL AND ELECTRONICS ENGINEERING
(BIO – TECHNOLOGY)

Time: 3hours | **Max.Marks:80**

Answer any FIVE questions
All questions carry equal marks
- - -

1.a)i) Find the resistively of intrinsic silicon at 300 ^{0}K. It is given the n_i at 300 ^{0}K in silicon is 1.5 x 10^{10}/Cm^3, $\mu_p = 500\, cm^2 / V - S$, μ_n = 1300-Cm^2 /V - S.

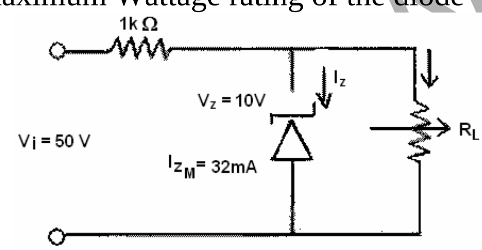
ii) If an acceptor impurity is added to the extent of 1 impurity atom in 2×10^8 silicon atoms, find it's resistively.

iii) If a donor impurity is added to the extent of 1 impurity atom in 5×10^7 silicon atoms, find it's resistively.

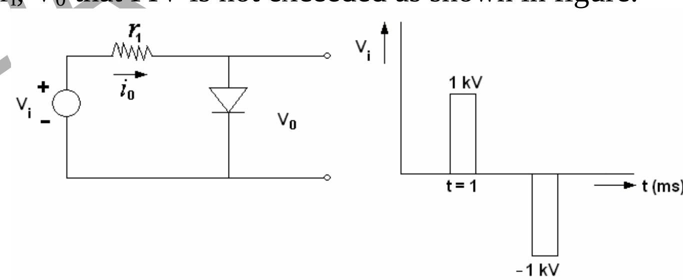
b) Prove that the concentration of free electron in an intrinsic semiconductor is given by $n = N_c e^{-(E_c - E_f)/KT}$ [12+4]

2. For the network shown in the figure determine the range of R_L and I_L that will result in V_{RL} being maintained at 10 V:

a) Determine the maximum Wattage rating of the diode



b) The reverse saturation current of the diode is 1 μA. Its peak inverse Voltage is 500V. Find r_i, V_0 that PIV is not exceeded as shown in figure. [16]



3.a) Derive the expression for:

i) Average current
ii) DC output voltage
iii) RMS current,
iv) RMS voltage across the load,
v) Rectifier efficiency
vi) Regulation for full wave rectifier whose input a sine wave.

b) Prove that the regulation of both half wave and full wave rectifier is given by % regulation $= \frac{R_f}{R_L} \times 100$. [10+6]

4.a) With the help of block diagrams, explain the four different feed back topologies.

b) Draw the circuit of a voltage series feedback amplifier with BJT. What is the effect of this feedback as R_i and R_0? [6+10]

5.a) Draw the circuit diagram of wien bridge oscillator using BJT. Show that the gain of the amplifier must be at least 3 for the oscillations to occur.

b) For the fixed-bias Ge transistor, n-p-n type, the junction voltages at saturation and cutoff one in active region, may be assumed to zero. This circuit operates properly over the temperature range -50 ^{0}C to 75 ^{0}C and to just start malfunctioning at these extremes. The various circuit specifications are: V_{CC} = 4.5v, V_{BB} = 3 V, h_{FE} = 40 at -50 ^{0}C, and h_{fe} = 60 at 75 ^{0}C, I_{CBO} = 4 μ A at 25 ^{0}C and doubles every 10 ^{0}C. Collector current is 10 μ A. Design the values of R_{c1}, R_1 and R_2. [8+8]

6.a) Explain how a shift register is used as a Ring counter. Draw the O/P waveform from each flip-flop of a 3-stage unit.

b) Prove that if $w'x + yz = 0$, then $wx + y'(w' + z') = wx + xz + x'z' + w'y'z$

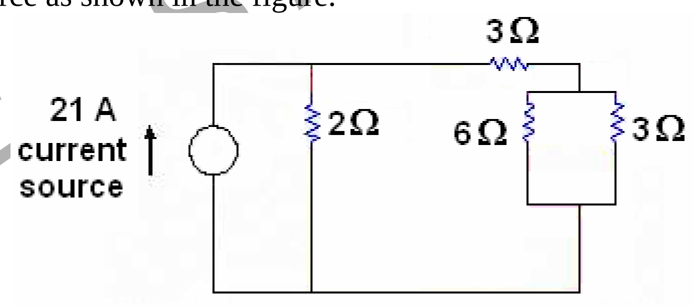
c) Represent the given negative numbers in sign-magnitude, 1'S and 2'S complement representation in 12-bit format:

i) -64

ii) -512. [6+6+4]

7.a) Name the different types of elements that constitute an electric circuit.

b) A 20V source with an internal resistance of 2Ω is connected to a load resistance of 8Ω. Find the load current. Verify your result by transforming the voltage source into current source as shown in the figure.



c) In the above circuit, calculate the current through 6 Ω resistor. [4+4+8]

8.a) Does the induction motor have any similarities with the transformer. Compare the similarities and differences between them.

b) A 20h.p, 400V, 50HZ, 3-phase induction motor has an efficiency of 80% and working at 0.7 p.f. The motor is connected to 400 volts, 3-phase supply calculate the current drawn by the motor from the mains. [8+8]

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Code.No: RR12302 | RR | SET-3

I B.TECH – EXAMINATIONS, DECEMBER - 2010
ELECTRICAL AND ELECTRONICS ENGINEERING
(BIO – TECHNOLOGY)

Time: 3hours **Max.Marks:80**

Answer any FIVE questions
All questions carry equal marks
- - -

1.a) Derive the expression for:
i) Average current ii) DC output voltage
iii) RMS current, iv) RMS voltage across the load,
v) Rectifier efficiency
vi) Regulation for full wave rectifier whose input a sine wave.

b) Prove that the regulation of both half wave and full wave rectifier is given by % regulation $= \frac{R_f}{R_L} \times 100$. [10+6]

2.a) With the help of block diagrams, explain the four different feed back topologies.

b) Draw the circuit of a voltage series feedback amplifier with BJT. What is the effect of this feedback as R_i and R_0? [6+10]

3.a) Draw the circuit diagram of wien bridge oscillator using BJT. Show that the gain of the amplifier must be at least 3 for the oscillations to occur.

b) For the fixed-bias Ge transistor, n-p-n type, the junction voltages at saturation and cutoff one in active region, may be assumed to zero. This circuit operates properly over the temperature range -50 ^{0}C to 75 ^{0}C and to just start malfunctioning at these extremes. The various circuit specifications are: V_{CC} = 4.5v, V_{BB} = 3 V, h_{FE} = 40 at -50 ^{0}C, and h_{fe} = 60 at 75 ^{0}C, I_{CBO} = 4 μ A at 25 ^{0}C and doubles every 10 ^{0}C. Collector current is 10 μ A. Design the values of R_{c1}, R_1 and R_2. [8+8]

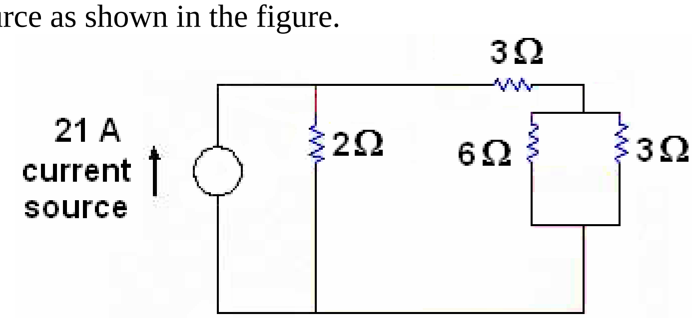
4.a) Explain how a shift register is used as a Ring counter. Draw the O/P waveform from each flip-flop of a 3-stage unit.

b) Prove that if $w'x + yz = 0$, then $wx + y'(w' + z') = wx + xz + x'z' + w'y'z$

c) Represent the given negative numbers in sign-magnitude, 1'S and 2'S complement representation in 12-bit format:
i) -64 ii) -512. [6+6+4]

5.a) Name the different types of elements that constitute an electric circuit.

b) A 20V source with an internal resistance of 2Ω is connected to a load resistance of 8Ω. Find the load current. Verify your result by transforming the voltage source into current source as shown in the figure.



c) In the above circuit, calculate the current through 6 Ω resistor. [4+4+8]

Code.No: RR12302 | RR | SET-3

6.a) Does the induction motor have any similarities with the transformer. Compare the similarities and differences between them.

b) A 20h.p, 400V, 50HZ, 3-phase induction motor has an efficiency of 80% and working at 0.7 p.f. The motor is connected to 400 volts, 3-phase supply calculate the current drawn by the motor from the mains. [8+8]

7.a)i) Find the resistively of intrinsic silicon at 300 ^{0}K. It is given the n_i at 300 ^{0}K in silicon is 1.5 x 10^{10}/Cm^3, $\mu_p = 500 cm^2/V-S$, μ_n = 1300-Cm^2 /V - S.

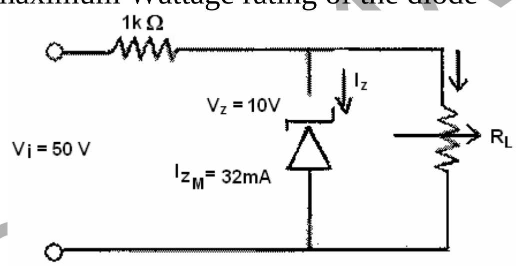
ii) If an acceptor impurity is added to the extent of 1 impurity atom in 2×10^8 silicon atoms, find it's resistively.

iii) If a donor impurity is added to the extent of 1 impurity atom in 5×10^7 silicon atoms, find it's resistively.

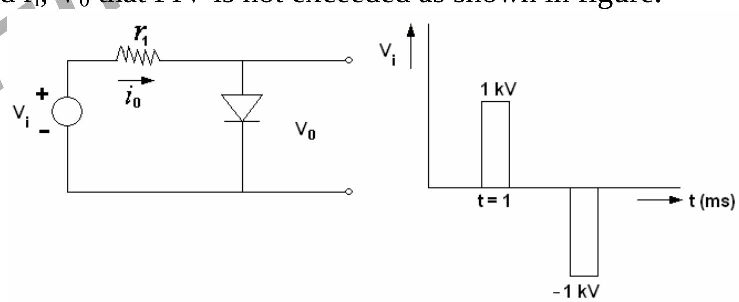
b) Prove that the concentration of free electron in an intrinsic semiconductor is given by $n = N_c e^{-(E_c-E_f)/KT}$ [12+4]

8. For the network shown in the figure determine the range of R_L and I_L that will result in V_{RL} being maintained at 10 V:

a) Determine the maximum Wattage rating of the diode



b) The reverse saturation current of the diode is 1 μA. Its peak inverse Voltage is 500V. Find r_i, V_0 that PIV is not exceeded as shown in figure. [16]



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Code.No: RR12302 | RR | SET-4

I B.TECH – EXAMINATIONS, DECEMBER - 2010
ELECTRICAL AND ELECTRONICS ENGINEERING
(BIO – TECHNOLOGY)

Time: 3hours **Max.Marks:80**

Answer any FIVE questions
All questions carry equal marks
- - -

1.a) Draw the circuit diagram of wien bridge oscillator using BJT. Show that the gain of the amplifier must be at least 3 for the oscillations to occur.

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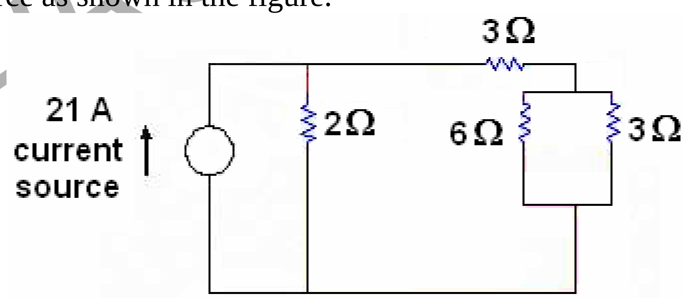
c) Represent the given negative numbers in sign-magnitude, 1'S and 2'S complement representation in 12-bit format:
i) -64
ii) -512. [6+6+4]

3.a) Name the different types of elements that constitute an electric circuit.

b) A 20V source with an internal resistance of 2Ω is connected to a load resistance of 8Ω. Find the load current. Verify your result by transforming the voltage source into current source as shown in the figure.



c) In the above circuit, calculate the current through 6 Ω resistor. [4+4+8]

4.a) Does the induction motor have any similarities with the transformer. Compare the similarities and differences between them.

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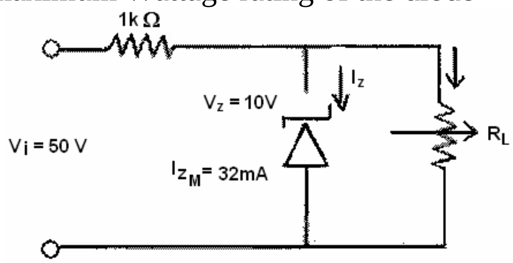

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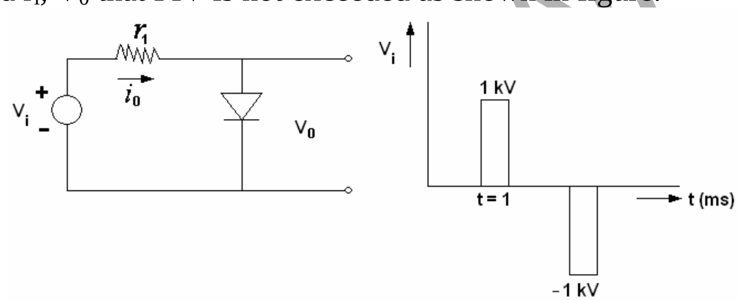

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b) Prove that the regulation of both half wave and full wave rectifier is given by % regulation $=\dfrac{R_f}{R_L}\times100$. [10+6]

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