



I Semester B.Sc. Examination, October/November 2012

(Semester Scheme) (NS) (2011-12 and onwards)

ELECTRONICS (Paper – I)

Basic Electronics

Time : 3 Hours

Max. Marks : 70

Instruction : Answer **any five** questions from Part **A**, **four** questions from Part **B** and **five** sub division from Part **C**.

PART – A

Answer **any five** questions :

(8×5=40)

1. a) Write the expression for effective resistance when Resistor R_1 and R_2 are connected in
 - 1) Series
 - 2) Parallel.
- b) Derive an expression for charging of capacitor through a resistor using a dc circuit and define Time Constant. (2+6)
2. a) State and explain how to apply superposition theorem to a resistive network.
- b) Define frequency and RMS value of a.c. signal. (6+2)
3. a) Derive the expression for Ripple Factor and efficiency of Full Wave Rectifier.
- b) What is a filter ? Name the different types of filters used in rectifier circuits. (6+2)

P.T.O.



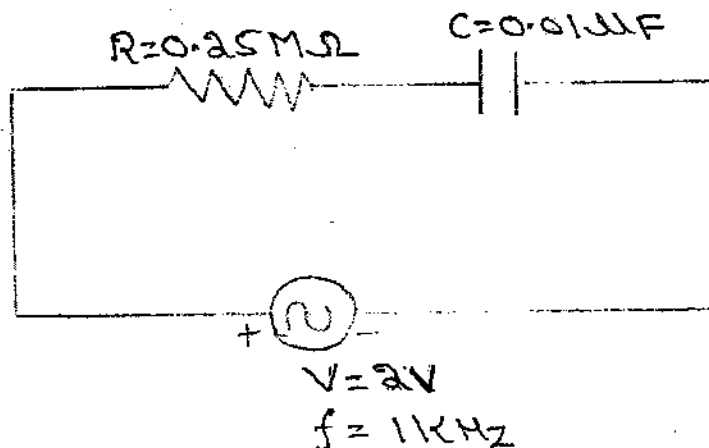
4. a) Explain the formation of P type semiconductor with neat diagram.
b) Explain the process of zener breakdown and avalanche breakdown in a diode. (4+4)
5. a) Explain the working of an npn transistor with relevant diagram.
b) Explain the working of zener diode as line regulator. (4+4)
6. a) Explain the procedure to draw the input and output characteristics curve for a transistor in CE mode.
b) Define ' α ' and ' β ' of a Transistor. (6+2)
7. a) Explain the working of a CE amplifier and draw its frequency response curve.
b) Draw the circuit of CC amplifier and mention its applications. (6+2)
8. a) Explain the self complementing property of Excess-3 code.
b) With an example explain steps to convert
 - I. Gray code to Binary
 - II. Binary to Gray code.
 (2+6)

PART - B

Answer any four questions :

(4×5=20)

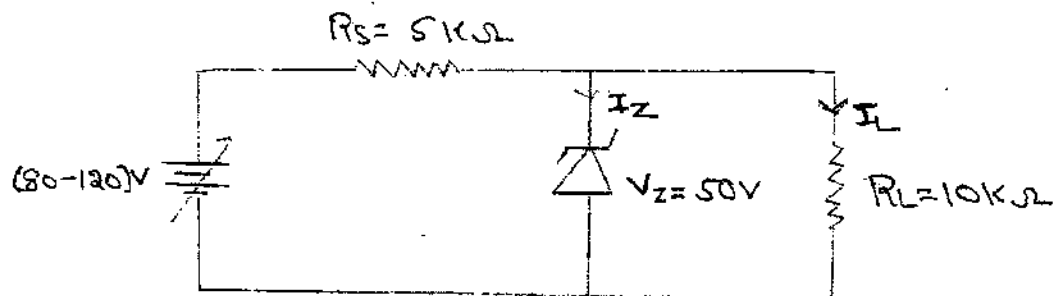
9. For the given R-C circuit, calculate the
 - 1) Current flowing in the circuit and
 - 2) Voltage drop across R.





10. For the given zener regulator circuit, calculate maximum and minimum values of zener diode current.

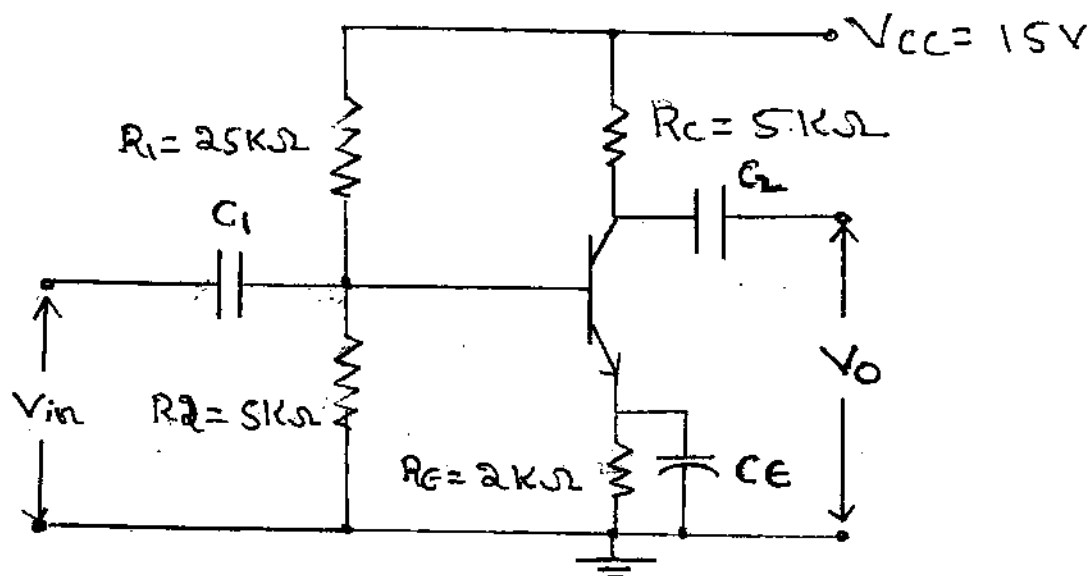
5



11. Calculate the dc biasing voltage V_{CE} and collector current for the given circuit.

Given : $V_{BE} = 0.7 V$ and $\beta = 200$

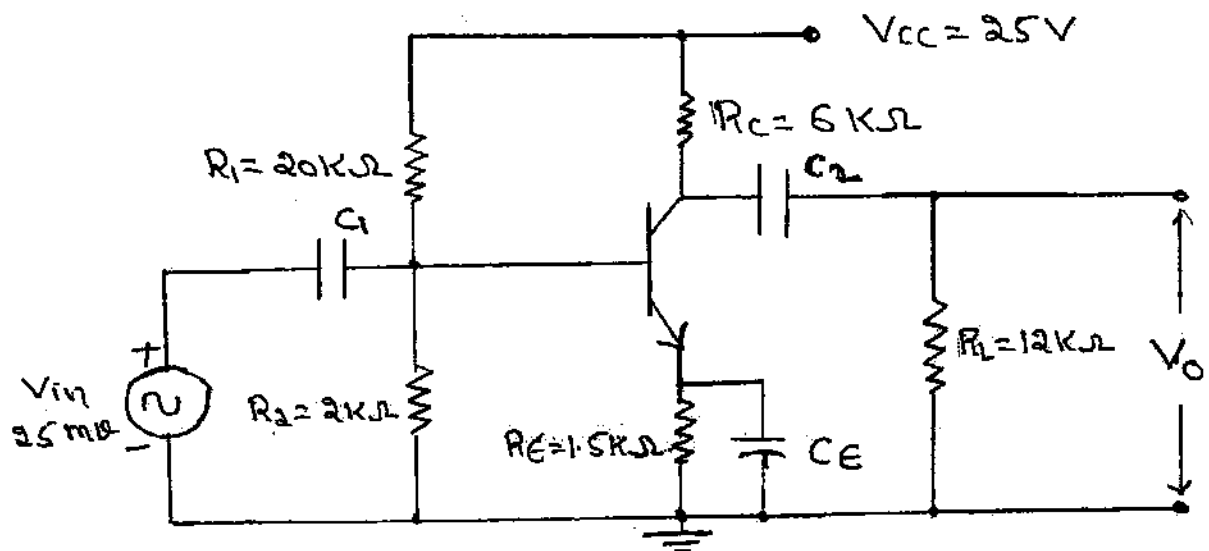
5





12. For the circuit shown below calculate the value of input impedance, power gain, voltage gain and output impedance

Given : $\beta = 80$ and $r'_e = 25\Omega$.



13. Convert the following :

- $(25.75)_{10} = ()_2$
- $(1011011.1011)_2 = ()_{10}$
- $(10110111.1111)_2 = ()_{16}$

14. Subtract the following by 2's complement method.

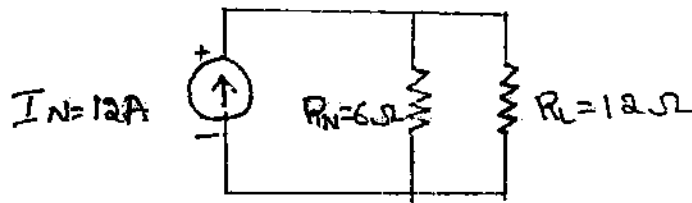
- $38_{(10)}$ from $84_{(10)}$
- $64_{(16)}$ from $16_{(16)}$

PART - C

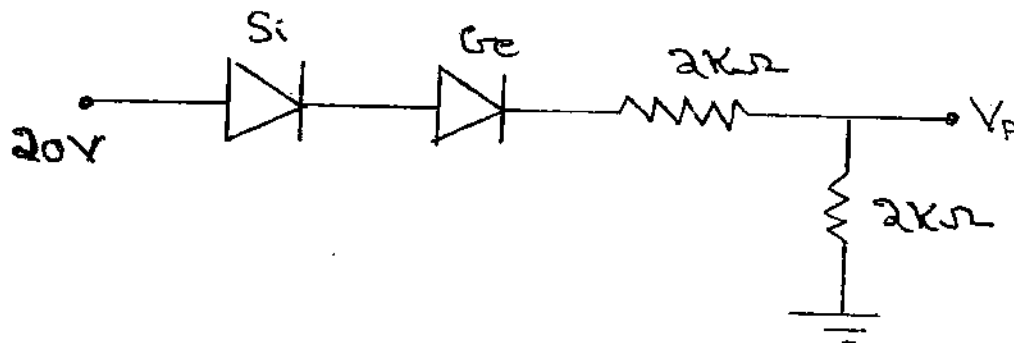
Answer any five subdivisions :

(5×2=10)

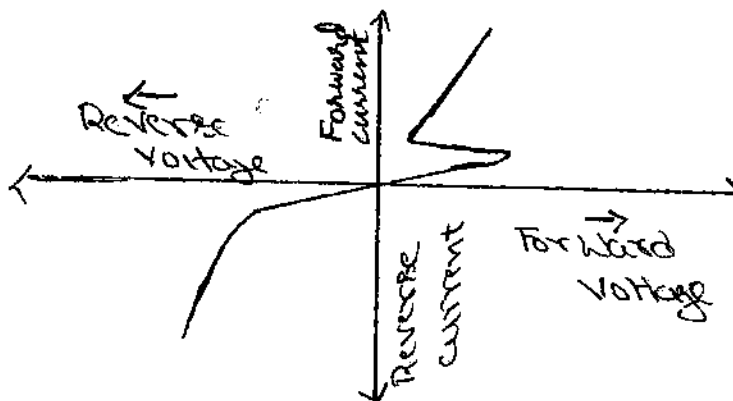
15. a) Explain why capacitor blocks dc and allows ac. 2
- b) Draw Thevenivis' equivalent circuit for the given network. 2



- c) Determine the magnitude of V_A in the circuit. 2



- d) Identify the circuit element and draw the symbol of the element. 2





e) Is transistor a current control device ? Justify your answer.

2

f) C.C. amplifier is also called as an emitter follower. Justify.

2

g) Complete the series.

79 F H _____ H _____ H _____ H _____ H

2



I Semester B.Sc. Examination, October/November 2012
(Semester Scheme) (NS) (Prior to 2011-12)
ELECTRONICS (Paper – I)
Basic Electronics

Time : 3 Hours

Max. Marks : 60

Instruction : Answer *any five* questions from Part A, *four* questions from Part B and *five* sub divisions from Part C.

PART – A

Answer **any five** questions :

(5×6=30)

1. a) Define the terms frequency and rms value of an alternating voltage.
b) Derive expressions for current and impedance of a series RC circuit connected to an ac source. **(2+4)**
2. a) State Kirchhoff's voltage and current law.
b) With the help of circuit diagrams explain the steps to Thevenize a resistive network. **(2+4)**
3. a) What is a rectifier ?
b) Draw the circuit diagram of a full wave rectifier and explain its working. Sketch its input and output waveforms. **(1+5)**
4. a) Explain how the process of avalanche and zener break down occur in a diode.
b) What is a varactor diode ? Mention its applications. **(4+2)**



I Semester B.Sc. Examination, October/November 2012
(Semester Scheme) (NS) (Prior to 2011-12)
ELECTRONICS (Paper – I)
Basic Electronics

Time : 3 Hours

Max. Marks : 60

Instruction : Answer **any five** questions from Part A, **four** questions from Part B and **five** sub divisions from Part C.

PART – A

Answer **any five** questions :

(5×6=30)

1. a) Define the terms frequency and rms value of an alternating voltage.
b) Derive expressions for current and impedance of a series RC circuit connected to an ac source. **(2+4)**
2. a) State Kirchhoff's voltage and current law.
b) With the help of circuit diagrams explain the steps to Thevenize a resistive network. **(2+4)**
3. a) What is a rectifier ?
b) Draw the circuit diagram of a full wave rectifier and explain its working. Sketch its input and output waveforms. **(1+5)**
4. a) Explain how the process of avalanche and zener break down occur in a diode.
b) What is a varactor diode ? Mention its applications. **(4+2)**



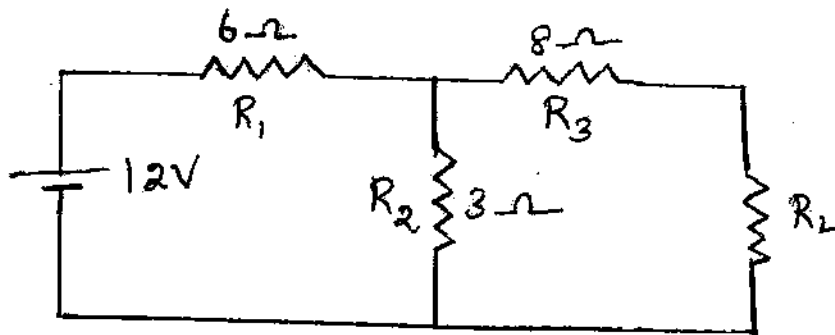
5. a) Why is transistor called so ?
b) With a proper biasing arrangement explain the operation of an NPN transistor. (2+4)
6. a) Define the terms DC load line and Q point related to a transistor.
b) Explain the operation of transistor as a switch. (2+4)
7. a) Mention the classification of amplifiers based on
i) Coupling and
ii) Transistor configuration.
b) Draw and explain the frequency response curve of a C.E. amplifier. (2+4)
8. a) What is an Excess-3 code ? Explain with example.
b) Explain the steps to convert a decimal number into a binary number with an example. Consider the integral and fractional parts of decimal number. (2+4)

PART – B

Answer any four questions :

(4×5=20)

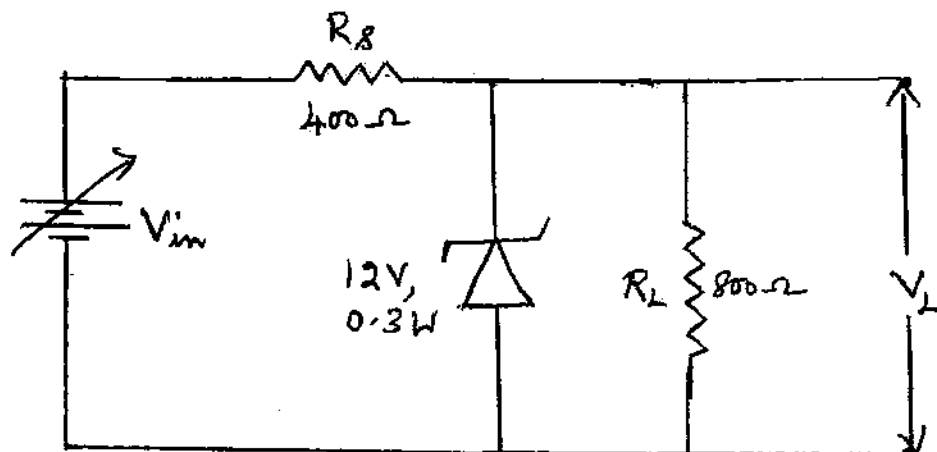
9. Determine the value of R_L in the circuit shown below so that it receives the maximum power. Calculate the maximum power delivered to the load. 5





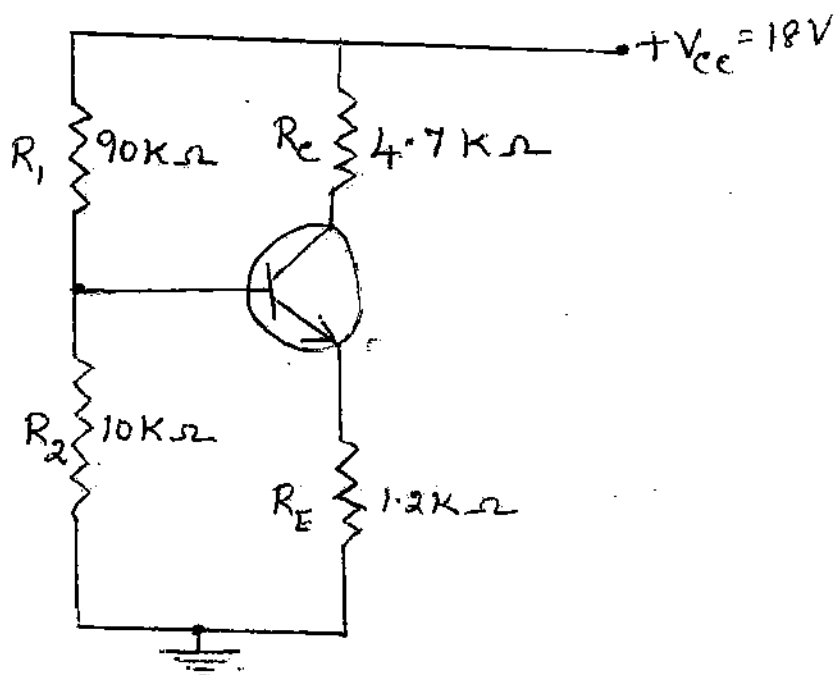
10. Find the input voltage variation range for the given circuit to act as a voltage regulator.

5



11. Determine I_{CQ} and V_{CEQ} for the voltage divider bias circuit shown. Given $V_{BE} = 0.7V$ and $\beta = 120$.

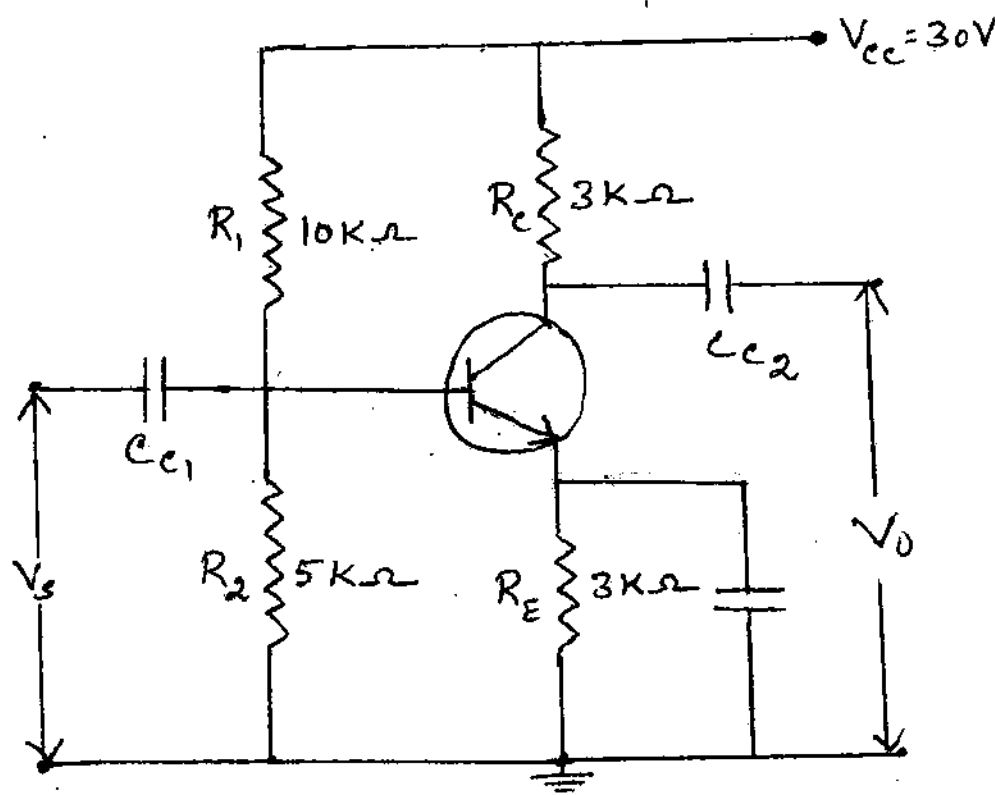
5





12. For the amplifier circuit shown determine the voltage gain and z_i . Given $\beta = 50$ and $V_{BE} = 0.7V$.

5



13. a) Convert $50.765_{(10)}$ into binary and hexa decimal.

b) Convert $B6E_{(16)}$ into decimal.

(4+1)

14. a) Subtract $46_{(10)}$ from $58_{(16)}$ using 2's complement method and express the result in hexa decimal.

b) Perform the following mathematical operation $5C_{(16)} + 2D_{(16)}$.

(3+2)



PART - C

Answer any five sub divisions :

(5×2=10)

15. a) What are active components ? Give two examples. 2

b) The instantaneous voltage and current through a component is given by

$$v = 400 \sin(150 t + 90^\circ)$$

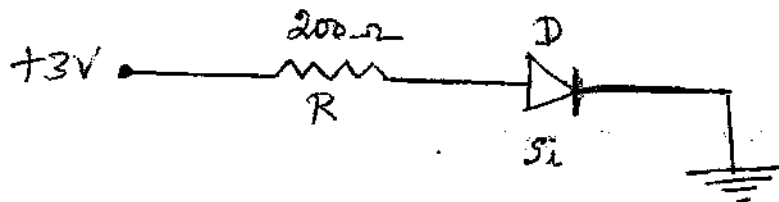
$$i = 4 \sin (150 t)$$

Identify the component and calculate its value. 2

c) What is the voltage across R ? If

i) Diode is in good condition

ii) Diode is open. 2



d) Under what biasing conditions are the following diodes normally operated ? 2

i) Zener diode

ii) Photo diode.

e) Why is transistor called bipolar ? 2

f) Mention the characteristic features of a CC amplifier which make it a useful circuit. 2

g) Mention the invalid codes in BCD code system. 2



I Semester B.Sc. Examination, October/November 2012
(Semester Scheme) (O.S)
ELECTRONICS (Paper – I)
Electronics Fundamentals

Time : 3 Hours

Max. Marks : 60

Instruction : Answer **any five** questions from Part A, **any four** questions from Part B and **any five** sub divisions from Part C.

PART – A

Answer **any five** questions :

(5×6=30)

1. a) Explain the color code for carbon resistor giving their values, tolerance and rating.
b) Obtain an expression for the energy stored in a capacitor. **(3+3)**
2. a) Draw the labelled block diagram of CRO.
b) What is an ideal voltage source ? How do you convert a current source into a voltage source ? **(3+3)**
3. Derive an expression for the growth of current in a series RL circuit excited by a DC voltage source. Represent it graphically. **6**
4. a) Define the following terms in a sinusoidal wave
 - 1) Time Period
 - 2) Peak value
 - 3) rms value
 - 4) Power factor.b) Give the expressions for Inductive Reactance and Capacitive Reactance. **(4+2)**
5. a) What is meant by electrical resonance ?
b) Obtain an expression for the resonant frequency of series RLC circuit. What happens to the resonant frequency when the value of R is changed ? **(2+4)**

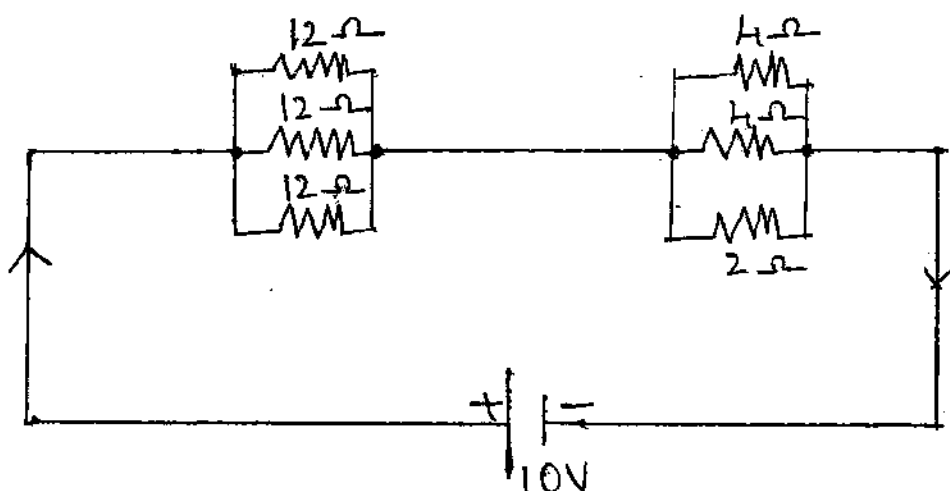


6. a) State and explain Kirchoff's Current Law.
b) Derive the relations to convert a T-resistive network into an equivalent π -resistive network. (2+4)
7. State and explain the following theorems with respect to a dc resistive network.
a) Thevenin's theorem
b) Reciprocity theorem. (3+3)
8. a) Explain the formation of depletion layer in a pn junction diode. What happens to the depletion layer under forward and reverse bias ?
b) Mention the application of a zener diode. (4+2)

PART – B

Answer **any four** questions. **Each** question carries **five** marks. (4×5=20)

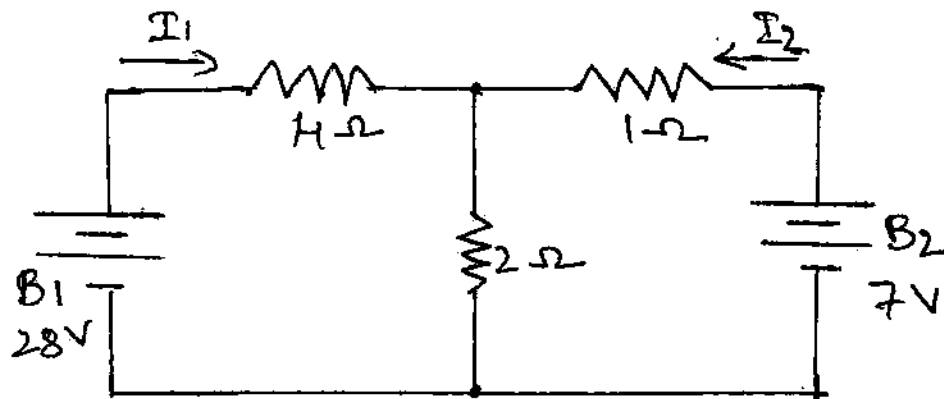
9. In the following circuit determine the current flowing through 2Ω resistor. 5





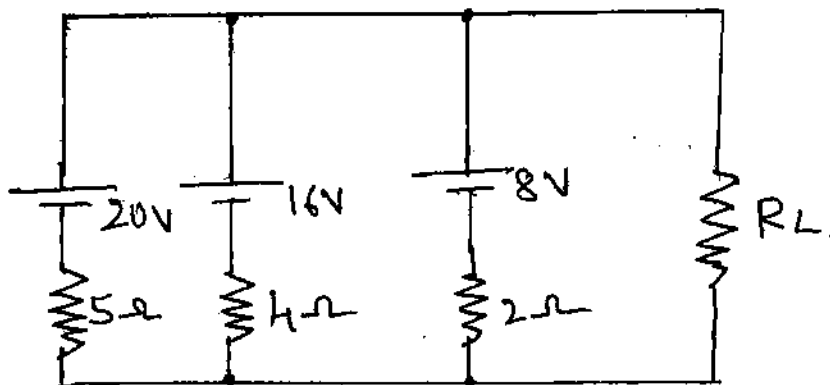
10. Find the branch currents I_1 and I_2 using node voltage method.

5



11. For the given network find the current through and voltage across the load R_L using Millman's theorem.

5
www.onlinebu.com



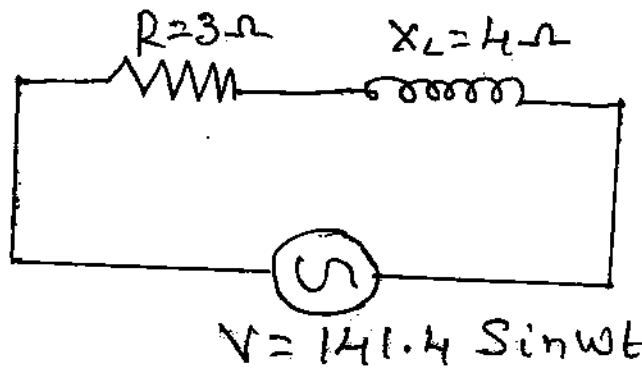
12. A parallel resonant circuit consists of $R = 50\Omega$, $L = 50\mu\text{H}$ and $C = 200\text{pF}$ calculate the
- Resonant frequency
 - Impedance at resonance
 - Band width
 - Quality factor.

5



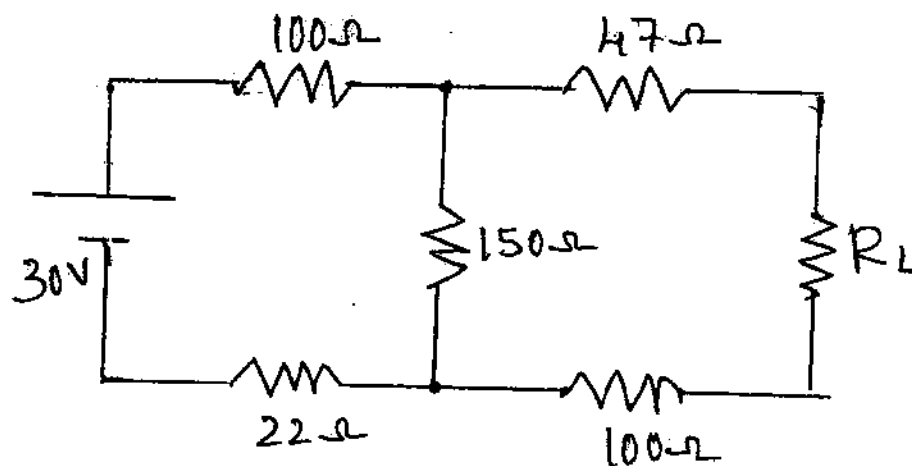
13. In the given circuit find the current, impedance and phase angle.

5



14. Determine value of R_L for maximum power transfer in the following circuit. Also calculate the maximum power delivered to the load.

5



PART - C

Answer **any five** sub divisions :

(5×2=10)

15. a) Can we use oscilloscope to measure current ? Justify. 2
- b) Intrinsic semiconductor behaves as an insulator at room temperature. Explain. 2

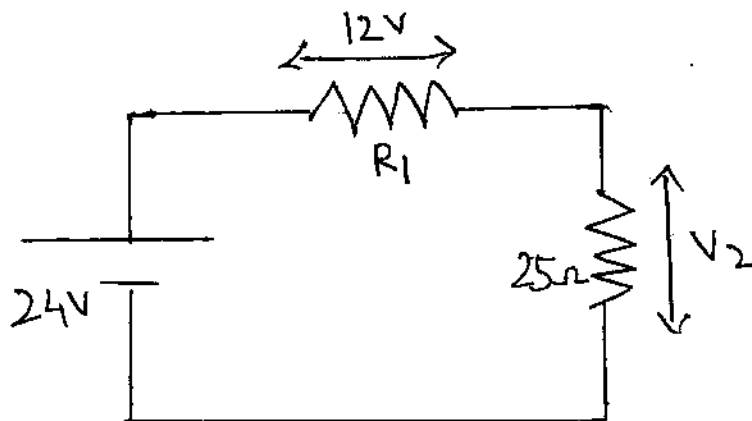


c) What is the difference between Thevenin's resistance and Norton resistance ?

2

d) For the circuit shown below, find the value of R_1 and V_2 .

2



e) Electrolytic capacitors must be connected with proper polarity. Why ?

2

f) Write the equivalent circuit for an ideal p-n junction diode.

2

g) Why voltmeter should always be connected in parallel across an element ?

2
