**Basic Electrical and Electronics Engineering - BE3251**

**UNIT I ELECTRICAL CIRCUITS and MEASURMENTS**

**PART-A**

1. What is meant by charge?

Charge is an electrical property of the atomic particles which matter

consists. The charge of an electron is so small. Charge in motion represents

current. The unit of charge is coulomb.

2. What is meant by Current?

The flow of free electrons in a conductor is called current. Unit is

ampere (A). I =Q/t

3. What is meant by Voltage?

The poterntial difference between two points is called as voltage. Unit

is Volts (V). V=W/Q , W=work done in joules & Q = charge in coulombs

4. State Ohm’s Law.

The potential difference across any two ends of a conductor is directly

proportional to the current flowing between the two ends provided the

temperature of the conductor remains constant.

5. State Krichoff’s Voltage Law

KVL states that the algebraic sum of voltages in a closed path is

zero.

6. State Krichoff’s current Law.

KCL states that the algebraic sum of currents in a node is zero.

7. Give short notes on resistor.

It is a property of a substance3 which opposes the flow of electrons. It is

denoted by R and its unit is Ohm

8. Distinguish between a Branch and a node of a circuit.

A pair of network which connects the various points of the network is

called branch A point at which two or more elements are joined together is

called node.

9. Distinguish between a mesh and a loop of a circuit.

A mesh is a loop that does not contain other loops. All meshes are loop,

but all loops are

not meshes. A loop is any closed path of branches

10.Write down the formula for a star connected network is converted into a

delta network?

RA=( R1 R2)/( R1 +R2+ R3) RB=( R1 R3)/( R1 +R2+ R3) RC=(

R2 R3)/( R1 +R2+ R3)

**UNIT II ELECTRICAL MACHINES**

1. What is an electric generator?

An electrical machine, which converts mechanical energy into electrical

Energy, is called as electric generator.

2. What is an electric motor?

An electrical machine, which converts electrical energy into mechanical

Energy, is called as electric motor.

3. What is meant by magnetic flux?

The magnetic lines of force existing around a magnet is called magnetic

flux. It’s unit is Weber.

4. State faraday’s law of electromagnetic induction.

Whenever a conductor cuts the magnetic lines of force an emf is

induced in it.

5. State Fleming’s Right hand rule.

If three fingers of right hand, namely thumb, index finger and middle

finger are outstretched so that everyone of them is at right angles with the

remaining two, and the index finger is made to point in the direction of lines

of flux, thumb in the direction of the relative motion of the conductor and the

middle finger gives the direction of the induced emf in the conductor.

6.What is the use of commutator?

A device is used in a dc generator to convert the alternating emf into

unidirectional emf is called commutator.

7.What is the function yoke?

It serves the purpose of outermost cover of the dc machine. So that

the insulating material get protected from harmful atmospheric elements like

moisture, dust and various gases like SO2, acidic fumes etc.

It provides mechanical support to the poles.

8.What is the choice of material for the following?

1.Yoke 2.pole 3.Field winding 4.Armature winding

1.Yoke:

It is prepared by using cast iron because it is cheapest.

2.Pole:

It is made up of cast iron or cast steel.

3.Field winding:

It is made up of aluminium or copper.

4.Armatuer winding:

It is made up of cast iron or cast steel.

9.What is the function of brush?

To collect current from commutator and make it available to the stationary

external

circuit.

10.Write down the emf equation for d.c generator.

Where

P = number of poles

Z = Total number of conductors

A = number of parallel paths

Ф = flux per pole

N = speed in rpm

11.What are all the two types of excitation? i. Separate excitation

When the field winding is supplied from external, separate dc supply

i.e. Excitation of field winding is separate then the generator is called

separately excited generator.

ii. Self excitation

When the field winding is supplied from the armature of the

generator itself then it is called as self-excitation.

12.Give the types of DC generator.

1.Self excited generator

* Series Generator
* Shunt Generator Compound Generator
* Long shunt compound generator Short shunt compound generator
* Cumulative and differential compound Generator

2. Separatelyexcited generator

**UNIT III SEMICONDUCTOR DEVICES AND APPLICATIONS**

**SEMICONDUCTOR DEVICES AND APPLICATIONS**

1) Define Transistor

Transistor consists of two junctions formed by sand witching either P-type

or N-type semiconductor between a pair of opposite types.

2). Write the current amplification factor for a CB transistor.

α = Change in Collector Current / at constant VCB Change in emitter

current

3) Write the formula for input resistance in a CB transistor Input resistance =

Change in base - emitter voltage /

Change in emitter current/at constant VCB

4). Write the current amplification factor for a CE transistor. b = Change in

Collector Current /

Change in base current at constant VCE

5). Define transistor action.

A transistor consists of 2 coupled PN junctions. The base is a common

region to both junctions and makes a coupling between them. Since the base

regions are smaller, a significant interaction between junctions will be available.

This is called transistor actions.

6).Define delay time

It is defined as the time required for the current to rise from 0 to 10% of its

maximum value.

7). Define rise time

It is the time required for the current to rise from 0 to 90 percentage of the

maximum

value.

8). Define turn-on time

It is the time required for the current to rise from 0 to 90 percentage of the

maximum value ton = td + tr

9).Define fall time

It is the time required for the Collector current to fall from 90 to 10

percentage of Ics.

10).Define Storage time

It is the time required to fall from 100 to 90 percent of Ics.

11).Define turn-off time

It is the time required to fall from 100 to 90 percent of Ics. Toff=ts+tr

**UNIT IV DIGITAL ELECTRONICS DIGITAL ELECTRONICS**

1).Define logic gates?

Logic gates are electronic circuits that operate on one or more input signals

to produce an output signal. Electrical signals such as voltages or currents exist

throughout a digital system in either of two recognizable values. Voltage-

operated circuits respond to two separate voltage levels that represent a binary

variable equal to logic 1 or logic 0.

2).Define duality property.

Duality property states that every algebraic expression deducible from the

postulates of Boolean algebra remains valid if the operators and identity elements

are interchanged. If the dual of an algebraic expression is desired, we simply

interchange OR and AND operators and replace 1's by 0's and 0's by 1's.

3).Find the complement of the functions F1 = x'yz' + x'y'z and F2 = x(y'z' +

yz). By applying De Morgan's theorem as many times as necessary.

F1' = (x'yz' + x'y'z)' = (x'yz')'(x'y'z)' = (x + y' + z)(x + y +z')

F2' = [x(y'z' + yz)]' = x' + (y'z' + yz)'

= x' + (y'z')'(yz)'

= x' + (y + z)(y' + z')

4).Find the complements of the functions F1 = x'yz' + x'y'z and F2 = x(y'z' +

yz). by taking their duals and complementing each literal.

F1 = x'yz' + x'y'z

The dual of F1 is (x' + y + z')(x' + y' + z)

Complementing each literal: (x + y' + z)(x + y + z')

F2 = x(y'z' + yz).

The dual of F2 is x + (y' + z')(y + z).

Complement of each literal: x' + (y + z)(y' + z')

9).State De Morgan's theorem.

De Morgan suggested two theorems that form important part of Boolean

algebra. They are,

1) The complement of a product is equal to the sum of the complements. (AB)' =

A' + B'

2) The complement of a sum term is equal to the product of the complements. (A

+ B)' = A'B'

10).Reduce A.A'C

A.A'C = 0.c [A.A' = 1]

= 0

12. Reduce A'B'C' + A'BC' + A'BC

A'B'C' + A'BC' + A'BC = A'C'(B' + B) + A'B'C

= A'C' + A'BC [A + A' = 1]

= A'(C' + BC)

= A'(C' + B) [A + A'B = A + B]

13.) Reduce AB + (AC)' + AB'C(AB + C)

AB + (AC)' + AB'C(AB + C) = AB + (AC)' + AAB'BC + AB'CC

= AB + (AC)' + AB'CC [A.A' = 0]

= AB + (AC)' + AB'C [A.A = 1]

= AB + A' + C' =AB'C [(AB)' = A' + B']

= A' + B + C' + AB'C [A + AB' = A + B]

= A' + B'C + B + C' [A + A'B = A + B]

= A' + B + C' + B'C

=A' + B + C' + B'

=A' + C' + 1

= 1 [A + 1 =1]

14. Simplify the following expression Y = (A + B)(A + C' )(B' + C' )

Y = (A + B)(A + C' )(B' + C' )

= (AA' + AC +A'B +BC )(B' + C') [A.A' = 0]

= (AC + A'B + BC)(B' + C' )

= AB'C + ACC' + A'BB' + A'BC' + BB'C + BCC'

= AB'C + A'BC'

15).Simplify the following using De Morgan's theorem [((AB)'C)'' D]'

[((AB)'C)'' D]' = ((AB)'C)'' + D' [(AB)' = A' + B']

= (AB)' C + D'

= (A' + B' )C + D'

**UNIT V FUNDAMENTALS OF COMMUNICATION ENGINEERING**

1. What do you mean by radio communication?

Ans. The process sending audio signal from a source to distant destination using

carrier wave is called radio communication.

2. Explain communication system with the help of block diagram?

Source destination

3.Wite name of sub units of radio communication system?

i. Transmitters

ii. Transmission Channel

iii. Receiver

4 What do you understand by modulation?

Ans. The process of varying one of the characteristics of a high frequency wave

ai accordance with the instantaneous value of a low frequency signal is called

modulation.

5 What is modulating wave?

Ans. Low frequency signal is called modulating wave.

6 What is carrier wave?

Ans. High frequency wave is called carrier wave.

7 What are different types of modulation?

Ans. i. Amplitude modulation (AM)

ii. Frequency Modulation (FM)

iii. Phase modulation (PM)

8 Give the definition of Amplitude modulation (AM)?

Ans . Amplitude modulation (AM) is a technique used in electronic

communication, most commonly for transmitting information via a radio carrier

wave. AM works by varying the strength of the transmitted signal in relation to

the information being sent.

9 Give the definition of Frequency Modulation (FM).

Ans. Frequency modulation (FM) conveys information over a carrier wave by

varying its instantaneous frequency in accordance with the frequency of the

carrier wave.

10 What is modulation index?

Ans. Modulation index of amplitude modulation is defined as the ratio of the

amplitude of the modulating wave to the amplitude of the carrier wave

11 what are the disadvantages of AM?

i. Smaller operating range

ii. Poor audio Quality

iii. Low Efficiency

iv.Reception noisy