Victoria University of Bangladesh

Department of Computer Science & Engineering

Name: Ashit Kumar (Abir)

Student ID: 222122011.

Final Assessment

Program: B. Sc. in (CSE)

Semester: Spring-2024

Batch: 22nd (Evening)

Course Code: 425 (CSE)

Course Title: Electrical & Electronics Devices

Answer to the question no: 1(a)

1. (a) Ans: The basic devices of Electronics

1. Resistors. Resistors are the basic all electronics components.

2. Capacitor: The capacitor has two terminals.

3. Transistor.

4. Switches.

5. Diodes.

6. Motors.

7. Potentiometer.

P.t.o.

Answer to the question no: 1 (b)

1. (b) Ans: The difference between Electrical & Electronic Devices:

Electrical Device	Electronic Device
An electrical device utilizes electrical energy for basic operations like heating or mechanical work.	An electronics device employs electronic circuits to process and control information using semiconductor components like transistors and integrated circuits.
Electrical devices, like heaters and motors, are employed for tasks requiring basic energy conversion.	Eletronics devices, such as computers and smart phones are used for information Processing, communication, and automation in daily life.
Heaters, fan, motors	Computers, smartphones, television.
Contains passive components only.	Contains active components only.
Conductors are used for the flow of electricity.	Semiconductors are used for the flow of electrons.

Answer to the question no: 1. (c)

1. (c) Ans: Describe Reverse Bias: Reverse bias refers to the application of an external voltage accross a semiconductor diode so that the positive terminal of the battery is linked to the n-side and the negative terminal is attached to the p-side of the diode.

Reverse Bias: ($V_D < 0V$)

positive polarity of the external bias V_D is connected to n-type and negative terminal is connected to p-type.

The number of removed positive and negative ions will increase in the depletion region causing widening the depletion region which creates a great barrier for the majority carrier to overcome, effectively reducing the majority carrier flow to zero and hence the current due to majority carrier $I_{majority} = 0$

The minority carriers which travels down the potential barrier remain unaffected and give a small current called the reverse saturation current denoted as I_s.

Describe Forward Biar: Forward biar meaning is that the current flows in the forward direction due the voltage applied in the forward direction. In forward biar, the p-type (anode) of the semiconductor is connected to the positive end and the n-type (cathode) is connected to the negative end of the battery.

Forward Biar: ($V_D > 0V$)

#Positive polarity of the external biar V_D is connected to p-type and negative terminal is connected to n-type.

External biar V_D exerts a force on the mobile carriers to move them towards the junction. At the boundary they recombine with ions and reduce the width of the depletion region.

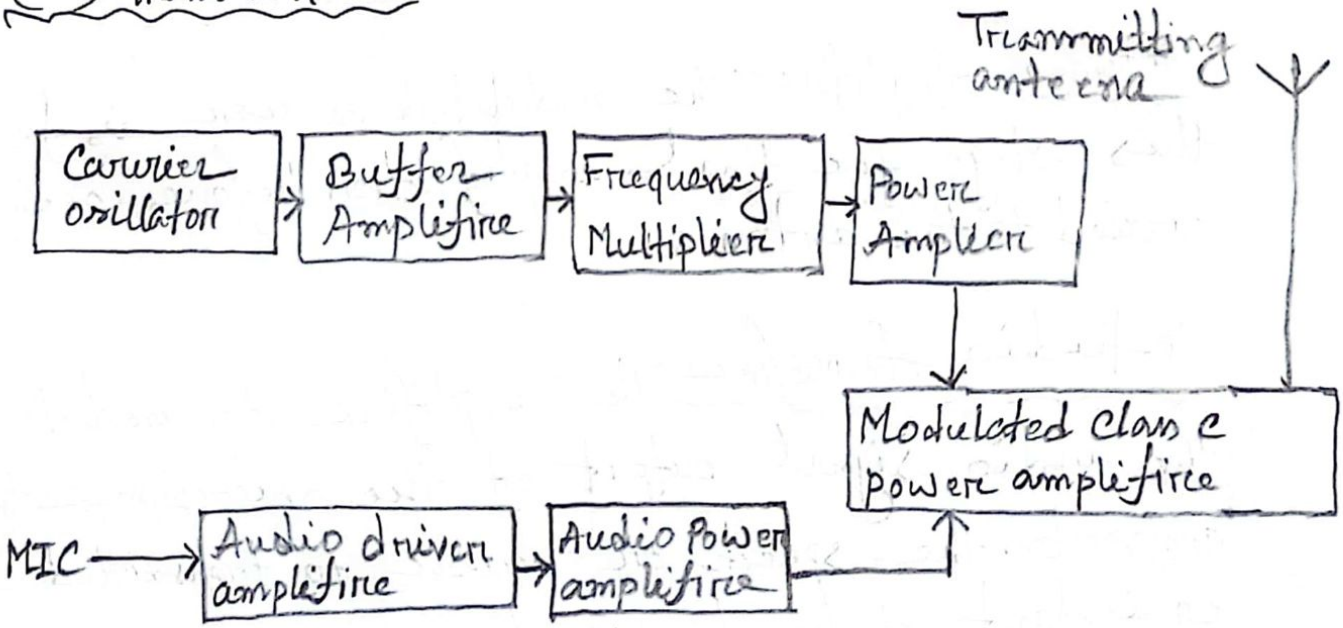
#The depletion region will continue to decrease in width as the voltage is increased further and a heavy flood of electrons will move from n-side to p-side giving the Imajority an exponential rise from p-side to n-side.

#The minority carrier flow will not be affected by this because the conduction level is determined by the limited number of impurities in the material

Answer to the question no: 2 (a)

2. (a) Ans: (AM) Transmitter: Amplitude modulated (AM) transmitter. Fig gives the block diagram of amplitude modulated radio transmitter. It consists of two sections (i) Audio Frequency (AF) section and (ii) radio Frequency (RF) section. (AF) Division: The (AF) section of the transmitter generates the modulating wave (Signal)

(AM) Transmitter:



#Carrier Oscillator: A oscillator is used operate the transmitted at a desirable fixed radio frequency (RF). The power output of the oscillator, being not sufficiently large, is amplified in several stage to the desirable,

But

#Buffer Amplifire: This amplifire isolates the osillate from the succeeding stage, so that the variation of coupling and antenna loading do not influence the osillator frequency.

#Frequency Multiplier: Oscillator cannot generate very high carrier frequencies. To obtain such frequencies, the frequency multiplier is used to multiply the frequency of oscillator output signal to the required value.

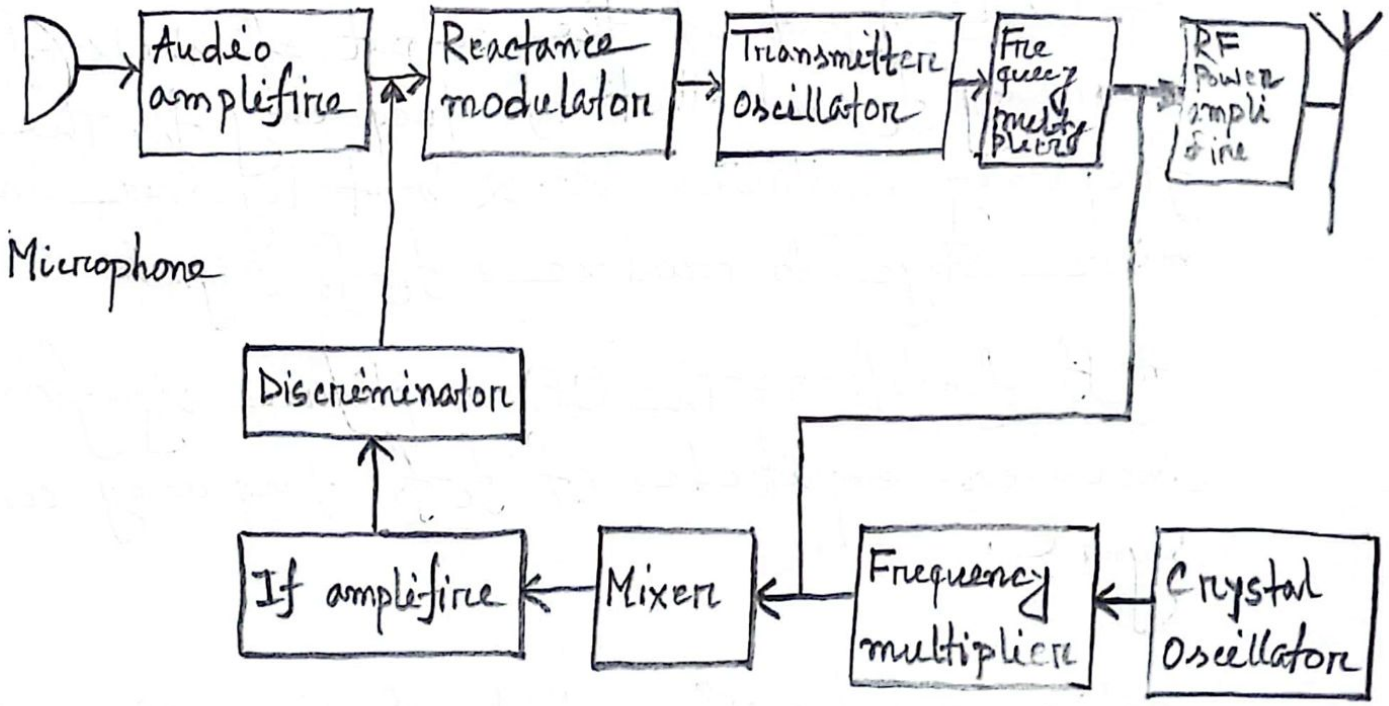
#Power Amplifire: The modulated carrier is fed to this stage for final amplification before being carried to the antenna.

#Audio Amplifire: The amplifire is used to amplify the audio signal output of the microphone that converts the speech or music to transmitted into equivalent electrical signal.

Answer to the question no: 2 (b)

2.(b) Ans: (FM) Transmitter: The (FM) transmitter is a single transistor circuit. In the telecommunication, the frequency modulation (FM) transfers the information by varying the frequency of the carrier wave according to the message signal.

(FM) Transmitter:



Audio Amplifire: It amplifies the audio signal from the microphone which converts the sound into equivalent electrical signal.

#Reactance Modulator: This transforms the audio amplitude changes into frequency changes of the transmitter Oscillator.

#Transmitter Oscillator: An (RF) oscillator is used here to generate the desirable oscillations.

#Frequency Multiplier: A number of frequency multipliers are used in this stage to raise the frequency to the required value.

#Mixer: A part of the output of block of frequency f_c and that of frequency f_o. The frequency multiplier block beat together in the mixer stage to produce a $f_c - f_o$ signal.

#If Amplifire: The (IF) amplifire significantly increases amplitude of $f_c - f_o$ frequency component signal.

#Discriminator: The output of the (IF) amplifier is applied to a phase discriminator which gives a zero (DC) output voltage if the frequency of its input signal to which it is tuned remains constant.