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Assignment: Electronics
Module: 2nd B tech (E)
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Q1: (a) Explain Rectifier with half wave and full wave rectification?

Ans: **Rectifier:**

An electrical device which converts an alternating current into a direct one by allowing a current to flow throught it in one direction only.

- **Half wave:**

Half wave rectifier is a type of rectifier that rectifies only one half cycle of the waveform i-e either pacitive or negative cycle. It is nothing more than a single p-n junction diode connected in series to the load resistor. To rectify the signal these rectifiers used in the AM radios.

- **Full wave:**

Full wave rectifier is a type of rectifier which converts alternating current voltage into pulsating direct current voltage

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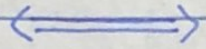
during both half cycles of applied input voltage. This rectifier acts a heart of circuitry which allows the sensors to attach to the RCX in either polarity.



Q2: (b) Differentiate between intrinsic and extrinsic semiconductor?

Ans: 1) The factor that generates a key difference between intrinsic and extrinsic semiconductor is that the intrinsic semiconductors are said to be pure and thus no impurity concentration is present in it. As against, extrinsic semiconductors are said to be impure as an impurity is doped in order to form it.

2) Due to its pure form, intrinsic semiconductor possess low conductivity. While extrinsic semiconductors exhibit comparatively better conductivity than the intrinsic semiconductor.

3) There is an almost equal concentration of electrons and holes are present in case of an intrinsic semiconductor. on the contrary, the concentration of electron and holes depends on the

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type of extrinsic semiconductor.

4) The conductivity of an intrinsic semiconductor truly relies on the temperature. on the contrary, the conductivity of the extrinsic semiconductor depends on temperature as well as impurity concentration.

5) Intrinsic semiconductor does not hold any further classification whereas extrinsic semiconductor are classified as p and n type semiconductors.

Q2:(a) What is transistor? Differentiate between BJT and FET.

Ans: **Transistor:**

The transistor is a semiconductor device which transfers a weak signal from low resistance circuit to high resistance circuit.

BJT	FET
1) BJTs are current-controlled. They require a biasing current to the base terminal for operation.	1 FETs are voltage-controlled. They only require voltage applied to the gate to turn the FET either on or off.

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2) BJTs offer smaller input impedances meaning they draw more current from the power circuit feeding it which can cause loading of the circuit.

3) BJTs offer greater gain at the output than FETs.

4) BJTs are larger in size and therefore take up more physical space than FETs normally.

5) BJTs are less popular and less widely used.

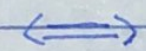
They do not require a biasing current for operation.

2 FETs offer greater input impedance than BJTs. This means that they practically draw no current and therefore do not load down the power circuit that's feeding it.

3 The gain (or transconductance) of FETs are smaller than for BJTs.

4 FETs can be manufactured much smaller than BJTs. This is especially important for integrated circuits that are composed up of many transistors.

5 FETs are definetly more popular and widely used in commercial circuits today than BJTs.



Q2: (b) Differentiate between Inverting and non inverting amplifier?

Ans: **Inverting Amplifiers:** This is a basic

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Op-Amp where the terminal with minus sign is provided with the feedback from the output of it. Therefore the feedback is provided for this terminal of the amplifier it is known as inverting amplifier.

- **Non-Inverting Amplifier:** The basic op-amp where the output of it and the input are in phase with each other this type of amplifiers are known as non-inverting amplifiers.

Q3:(a) Differentiate between Active and saturation region of transistor?

Ans: **Active region:** This is also called as linear region. A transistor while in this region, acts better as an amplifier. This region lies between saturation and cutoff. The transistor operates in active region when the emitter junction is for forward biased and collector junction is reverse biased.

Saturation region: This is the region in which transistor tends

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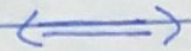
to behave as a closed switch. The transistor has the effect of its collector and Emitter being shorted. The collector and Emitter currents are maximum in this mode of operation.



Q3:(b) Differentiate between NPN and PNP transistor?

Ans:

PNP	NPN
1) If the base is at a lower voltage than the emitter, current flows from ~~ether~~ emitter to base.	1 If the base is at a higher voltage than the emitter, current flows from collector to emitter.
2) Small amount of current also flows from emitter to base.	2 Small amount of current also flows from base to emitter.
3) Emitter is heavily p-doped compared to collector. So, emitter and collector are not interchangeable.	3 Emitter is heavily N-doped compared to collector. So emitter and collector are not interchangeable.
4) The base width is small compared to the minority carrier diffusion length. If the base is much larger, then this will	4 The base width is small compared to the minority carrier diffusion length. If the base is much larger then this will behave like back to back diodes.

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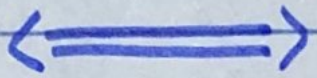
behave like back to back diodes.

5) Voltage at base controls amount of current flow through transistor (emitter to collector).

5 Voltage at base controls amount of current flow through transistor (collector to emitter).



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