

## Assignment

Course title: Applied chemistry

Instructor:

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## Part (A)

1: The bio methane is produced by the  
of biomass. Anaerobic oxidation

- a- Aerobic oxidation
- b- Anaerobic oxidation
- c- Fermentation.
- d- Rectification.

2- Bio gas is compressed and used as fuel in vehicles

- a- Motor fuel
- b- Fuel in vehicles
- c- Dog feed
- d- Cow feed.

3- The Bio methanol is used as the agricultural  
Fertilizers.

- a- Bio ethanol.
- b- Bio ethane.
- c- Bio methanol
- d- Digestate.

4- Bio diesel is produced by the Trans esterification of the vegetable oil.

- a- Fermentation
- b- distillation.
- c- Trans esterification.
- d- Rectification.

5- Fuel cell is an electrochemical device that converts the chemical energy into the Electrical energy

- a- Electrical energy
- b- Mechanical energy
- c- Static energy
- d- Frictional energy.

6- From cathode Hydrogen gas is bubbled in hydrogen oxygen cell.

- a- Hydrogen
- b- Oxygen
- c- Nitrogen
- d- Chlorine.

7- A module in a solar panel refers to parallel arrangement of solar cell.

- a- Series arrangement of solar cell
- b- Parallel arrangement of solar cell
- c- Series and Parallel arrangement of solar cell
- d- None of the above.

8- The efficiency of the solar cell is about 15%.

- a- 25%
- b- 15%
- c- 40%
- d- 60%

9- The current density of a photo voltaic cell ranges from.

40-50 mA/cm<sup>2</sup>

- a- 10-20 mA/cm<sup>2</sup>
- b- 40-50 mA/cm<sup>2</sup>
- c- 20-40 mA/cm<sup>2</sup>
- d- 60-100 mA/cm<sup>2</sup>

10- Solar energy is radiated by cloud and earth as: long wave energy.

- a- long wave energy.
- b- Short wave energy
- c- medial wave energy
- d- extreme wave energy



## Part (B)

Q2. (b) Differentiate between N-type and P-type. Part (B)

Ans-

N-type semi-conductors

P-type semi-conductors

1- In these the impurity of some pentavalent element like P, As, Sb, Bi etc is mixed

In these the impurity of some trivalent element like B, Al, In, Ga etc. is mixed.

2- In these the impurity atom donates one electron, hence these are known as donor type semiconductors.

In these the impurity atom can accept one electron, hence these are known as acceptor type semiconductors.

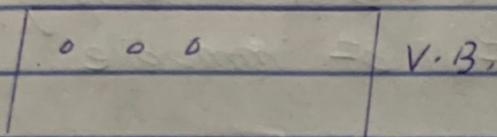
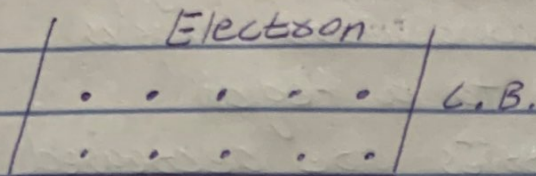
3- In these the electrons are majority current carriers and holes are minority current carriers i.e. the electron density is more than hole density  $n_n \gg n_p$

In these the holes are majority current carriers and electrons are minority current carriers i.e.  $n_p \gg n_n$ .

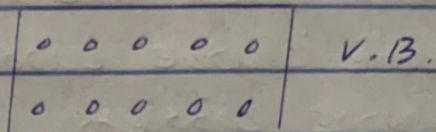
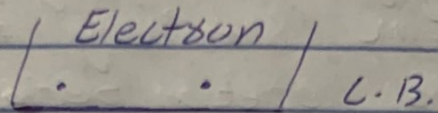
4- In these there is majority of negative particles (electrons) and

In these there is majority of positive particles (holes) and

hence are known as N-type semiconductors.



hence are known as P-type semiconductors



holes

5. In these the donor energy level is close to the conduction band and far away from valence band.

In these the acceptor energy level is close to the valence band and far away from conduction band.



Q3- Role of depletion region in semi-conductor material.

b- Solar panel you will suggest to use in Peshawar area Mono or poly? Provide your answer with example and proof

Ans:

Part A

Generally depletion refers to reduction or decrease in quantity of something. For example

oil depletion refers to decrease in oil production from a particular oil well, region or geographic area over a given time. Similarly in semi-conductor physics the depletion region refers to a region where flow of charge carriers are decreased over a given time and finally result in empty mobile charge carriers or full of immobile charge carriers.

The P-type semiconductor is formed by adding trivalent impurities to the pure or intrinsic semiconductor while n-type semiconductor is formed by adding pentavalent impurities to the pure or intrinsic semiconductor.

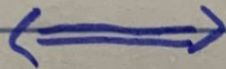
## Part B

Generally poly crystalline is used mostly here. Because it's cheaper and loses less power due to temperature, at least that's what most installers say. In KPK where irradiation levels are lower, mono crystalline is preferred.

The type of solar module you select depend on the geographic area, how much yield per year you wish to generate and cost

Mostly poly crystalline is sold and installed in Pakistan.

Poly crystalline. They are cheaper than mono crystalline by about 1000 to 15000 Rupees. Pakistan generally receives good sun and has peak sun hours of more than 5 hours so poly crystalline don't do too bad. For better performance, mono crystalline can be installed which will generate greater yield.



Q2-(a) Driving ~~sol~~ force in converting solar energy into Electrical energy is considered important. Discuss?

Part (A)

Ans: When the intensity of light is enough to remove the valence electron from a solar cell which made of semiconductor material. When the electron get out from his outer shell by solar light called photon which hit the semiconductor material (solar cell)

The flow the current through pn-junction. When the light intensity is much enough as silicon 0.7 germanium 0.3 volt for pn-junction the barrier will break the

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current will flow in forward bias.

Thus the solar energy is converted to electrical energy by a semiconductor device.