
Course Details

Course Title: Applied Chemistry Module: 2nd
Instructor: _____ Total Marks: 30

Student Details

Name: Syed Daniyal Shah Student ID: 15863

Part A (Objective Type)

10 Marks

1. The bio methane is produced by the ____Anaerobic oxidation____ of biomass.
a) Aerobic oxidation
b) Anaerobic oxidation ✓
c) Fermentation
d) Rectification

2. Bio gas is compressed and used as ____Fuels in vehicles____
a) Motor fuel
b) Fuels in vehicles ✓
c) Dog feed
d) Cow feed

3. The __Digestate__ is used as the agricultural fertilizer.
a) Bio ethanol
b) Bio ethane
c) Bio methanol
d) Digestate ✓

4. Bio diesel is produced by the ____Transesterification____ of the vegetable oil.
a) Fermentation
b) Distillation
c) Transesterification ✓

d) Rectification

5. Fuels 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 _____Oxygen_____ gas is bubbled in hydrogen-oxygen cell.
- Hydrogen
 - Oxygen ✓
 - Nitrogen
 - Chlorine
7. A module in a solar panel refers to series and parallel arrangement of solar cells.
- Series arrangement of solar cells.
 - Parallel arrangement of solar cells.
 - Series and parallel arrangement of solar cells. ✓
 - None of the above.
8. The efficiency of the solar cell is about 15%
- 25 %
 - 15 % ✓
 - 40 %
 - 60 %
9. The current density of a photo voltaic cell ranges from 40 - 50 mA/cm
- 10 – 20 mA/cm²
 - 40 – 50 mA/cm² ✓
 - 20 – 40 mA/cm²
 - 60 – 100 mA/cm²
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10. Solar energy is radiated by clouds and earth as long wave energy
- long wave energy ✓
 - short wave energy
 - medial wave energy
 - extreme wave energy

Part B (Subjective Type)

20 marks

Q. 2 a. Driving Force in converting Solar Energy into Electrical Energy is considered important Discuss. (5)

Answer:

Photovoltaic is the driving force in converting solar Energy into Electrical Energy. Photovoltaics are known as the best method for generating electric power by using solar cells to convert energy from the sun into a flow of electrons. The Photovoltaic effect refers to photons of light exciting electrons into a higher state of energy, allowing them to act as charge carriers for an electric current.

Photovoltaic and solar-thermal panels generate free electricity by converting sunlight into electricity or transferring the sun's heat to heating and ventilation systems. The use of solar panels to generate energy provides many benefits, which include reductions in the costs associated with generating electricity.

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Q 2 b. Differentiate between N-type and P-type. (5)

Answer:

Basically there are 2 types of Semi-conductors which are as follows:

SEMI-CONDUCTORS

↳ **INTRINSIC SEMI-CONDUCTOR** ↳ **EXTRINSIC SEMI-CONDUCTOR**

1. Intrinsic Semi-conductor:
When we have a semi-conductor in pure form that is without doping, then it is called an Intrinsic semi-conductor.

2. Extrinsic Semi-conductor:
When a semi-conductor is doped with some impurities, then it is known as Extrinsic semi-conductor.

Now, this Extrinsic semi-conductor has 2 more types:

EXTRINSIC SEMI-CONDUCTOR

↳ **N-TYPE** ↳ **P-TYPE**

1. N-TYPE :

When we use a pentavalent impurity for doping then we get a N-type semi-conductor. Example of Pentavalent impurity are Phosphorus or Arsenic.

2. P-TYPE :

When we use trivalent impurities for doping then we get a p-type semi-conductor. Example of Trivalent impurities are Aluminium or Boron.

A semi-conductor has 4 valence electrons in its outermost orbit. A pentavalent valent element has 5 electrons in their outermost orbit and a trivalent element has 3 electrons in its outermost orbit. When a semi-conductor is doped with a pentavalent impurity then 4 electrons of semi-conductor form 4 covalent bonds with 4 electrons of the pentavalent impurity but 1 electron of impurity is left as it is. Due to which this doped semi-conductor has 1 free electron so it is called N-type semi-conductor. Same with trivalent impurity but difference is that one hole is created here since impurity has only 3 electrons so that type of semi-conductor is called P-type semi-conductor.

To sum it up, I would say that N-type semi-conductor has electrons and P-type semi-conductor has holes.

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Q.3 a. Role of depletion region in semi-conductor material. (5)

Answer:

The depletion region is also called as depletion zone, depletion layer, space charge region, or space charge layer. The depletion region acts like a wall between P-type and N-type semi-conductor and prevents further flow of free electrons and holes.

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

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Answer:

I would suggest using Mono or Monocrystalline Solar panels in Peshawar because of their widely-known efficient nature. The solar cells in the Mono solar ~~cells~~^{panels} are more efficient because they are cut from a single source of silicon. The solar cells in the Poly solar panels are blended from multiple silicon sources and are slightly less efficient.

Some well-known benefits of Mono-Solar panel are as follows:

- 1) Monocrystalline solar panels have the highest efficiency rates since they are made out of the highest grade silicon.
- 2) Mono solar panels are space-efficient. Since these solar panels yield the highest power outputs, they also require the least amount of space compared to any other types.
- 3) Mono solar panels have a long lifespan. Most solar panels' manufacturers put a 25 year warranty on their mono solar panels. Due to the high-quality silicon used, it is very likely that the solar panel will last much longer than their 25-year warranty life.
- 4) Mono solar panels tend to be more efficient in warm weather. With all solar cells, electricity production falls as temperature goes up. However, this degradation of output is less severe in monocrystalline panels than polycrystalline solar panels.

So, keeping the temperature, weather changes, income of an average household and day to day loadshedding in view, the installation of Mono solar panels in Peshawar would be the most efficient choice.