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Assignment	Applied	Chemistry

Part A (objective Type)



- 1) The bio methane is produced by the Aerobic oxidation of biomass.
- 2) Bio gas is compressed and used as motor fuel.
- 3) The Bio methanol is used as the agricultural fertilizer.
- 4) Bio diesel is produced by the trans esterification of the vegetable oil.
- 5) Fuels cell is an electrochemical device that converts the chemical energy into the Electrical energy.
- 6) From cathode Hydrogen gas is bubbled in Hydrogen oxygen cell.
- 7) A module in a solar panel refers to series and parallel arrangement of solar cells.
- 8) The efficiency of the solar cell is about 15%.
- 9) The current density of a photo voltaic cell ranges from 40-50 mA/cm².
- 10) Solar energy is radiated by clouds and earth as long wave energy.

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Q^{2b}) Differentiate between N-type and P-type.

Ans) N-Type Semiconductor:

- It is an extrinsic semiconductor which is obtained by doping the impurity pentavalent impurity atoms such as antimony, phosphorous, arsenic etc. to the pure germanium or silicon semiconductor.
- The impurity atoms added, provide extra electrons in the structure, and are called donor atoms.
- The electrons are majority charge carriers and holes are minority charge carriers.

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P-type Semiconductor

- It is an extrinsic semiconductor which is obtained by doping trivalent impurity atoms such as boron, gallium, indium etc. to the pure germanium or silicon semiconductor.
- The impurity atoms added, create vacancies of electrons (i.e., holes) in the structure and are called acceptor atoms.
- The holes are majority charge carriers and electrons are minority carriers.

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Q³a) Role of depletion region in semi-conductor material.

Ans) The depletion region, also called depletion layer, depletion zone, junction region, space charge region or space charge layer, is an insulating region within a conductive, doped semiconductor material where the mobile charge carriers have been diffused away, or have been forced away by an electric field.

The only elements left in the depletion region are ionized donor or acceptor impurities.

The depletion region is so named because it is formed from a conducting region by removal of all free charge carriers, leaving none to carry a current. Understanding the depletion region is key

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to explaining modern semiconductor electronics: diodes, bipolar junction transistors, field-effect transistors, and variable capacitance diodes all rely on depletion region phenomena.

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Q³ b) Solar panel you will suggest to use in Peshawar Area Mono or poly? provide your answer with example and proof.

Ans) Generally poly crystalline is used mostly here. Because its 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 depends on the geographic area, how much yield per year you wish to generate and cost.

Mostly poly crystalline is sold and installed in Pakistan.

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Poly crystalline. They are cheaper than mono crystalline by about 7000 to 1500 Rupees. Pakistan generally received 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.

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Q²a) Driving Force in converting Solar Energy into electrical energy is considered important.

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 energy) The flow the current through p-n junction. when the light intensity is much enough as silicon 0.7 germanium 0.3 volt for p-n junction the barrier will break the current will flowing forward bias.

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