

Assignment - 2

- Q. 1 Define principle of MHD generator , Anaerobic digestion of Biomass , Fuel cell .
- Q. Describe the basic principle of operation of MHD generator . Enumerate any 3 major advantages and Limitations of MHD generating plants .

Ans Magneto Hydrodynamics (MHD)

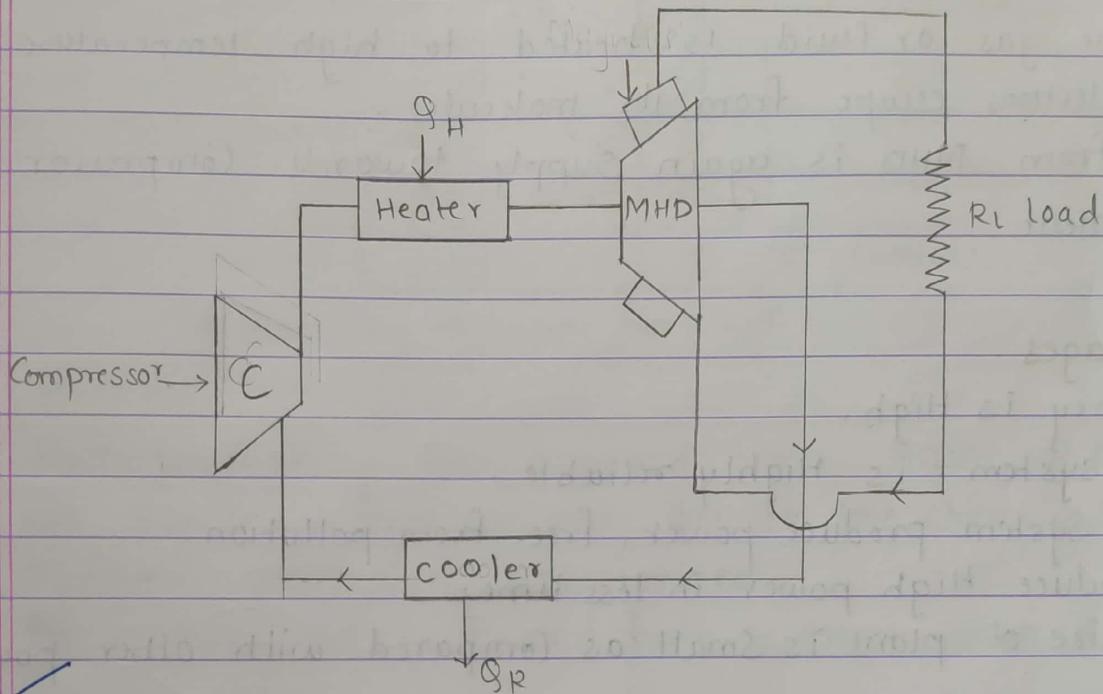


Fig : Magneto Hydro Dynamics

Working.

- 1.) In MHD Consists of flow of Conducting fuel in the presence of magnetic and electric field .
- 2.) The fluid used may be gas at high temperature or liquid like sodium or potassium .
- 3.) Heat Energy Supplied by fuel is directly Converted into Electrical Energy Without using Electric generator .
- 4.) The Working principle of MHD is based on Faraday's law of Electromagnetic induction .

S - Transpiration

- 5.) These law States that an electrical Conductor moving through a magnetic Conductor Field Experiences a Retarding force as well as induced and Electric field & Current.
- 6.) To generate Electrical Energy through MHD , Compressed gas or liquid is passed with a high velocity through a powerful Magnetic field which generates Electrical potential in the gas or fluid.
- 7.) When the gas or fluid is heated to high temperature the other electrons escape from its molecules.
- 8.) Fluid from MHD is again Supply towards Compressor by cooling Arrangement.

Advantages.

1. Efficiency is High.
2. MHD system is Highly reliable .
3. These System produce power , free from pollution
4. It produce High power in less time.
5. The Size of plant is small as compared with other power plant.

Disadvantage.

1. Very large magnets are required which are costly .
2. Very large operating temperature is required.
3. The System having high friction and heat transfer.



principle and operation of fuel cell.

- Alkaline fuel cell (AFC)

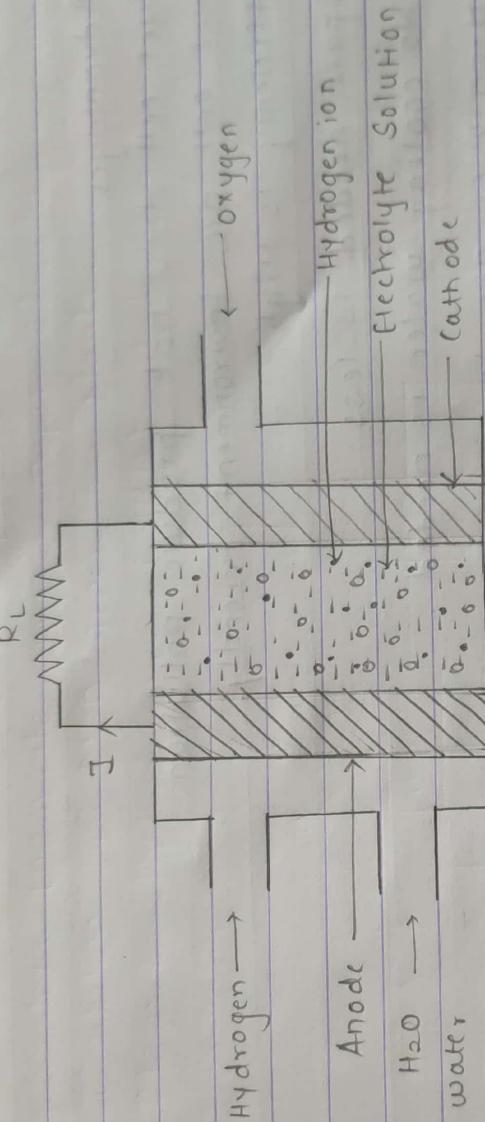
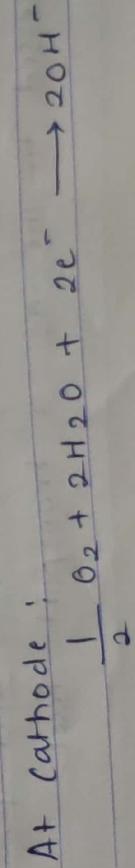
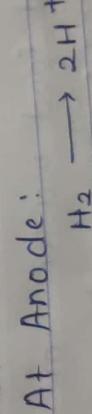


Fig: Alkaline Fuel cell

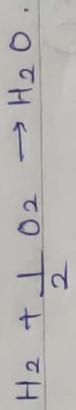
Working.

1. Hydrogen atoms are supplied from Anode & oxygen atoms are supplied from cathode due to the chemical reaction hydrogen atoms are get ionized.
2. An electrons gets generated from hydrogen atom & it has positive charge.
3. oxygen atom picks these electrons and travel towards anode through Electrolyte solution.
4. At anode it combine with hydrogen ions.
It use potassium hydroxide & sodium hydroxide as an electrolyte solution.

chemical reaction.



At Electrolyte :



Advantages .

1. Fuel cell does not produce pollution
2. Fuel cell are environment friendly.
3. Efficiency is High .
4. Space needed is less .
5. No cooling water is needed .
6. Power losses are less .

Disadvantages .

1. High Initial cost
2. Low Service life

Applications .

1. Domestic use
2. It is used for marine application .
3. It is used for automobile vehicles .

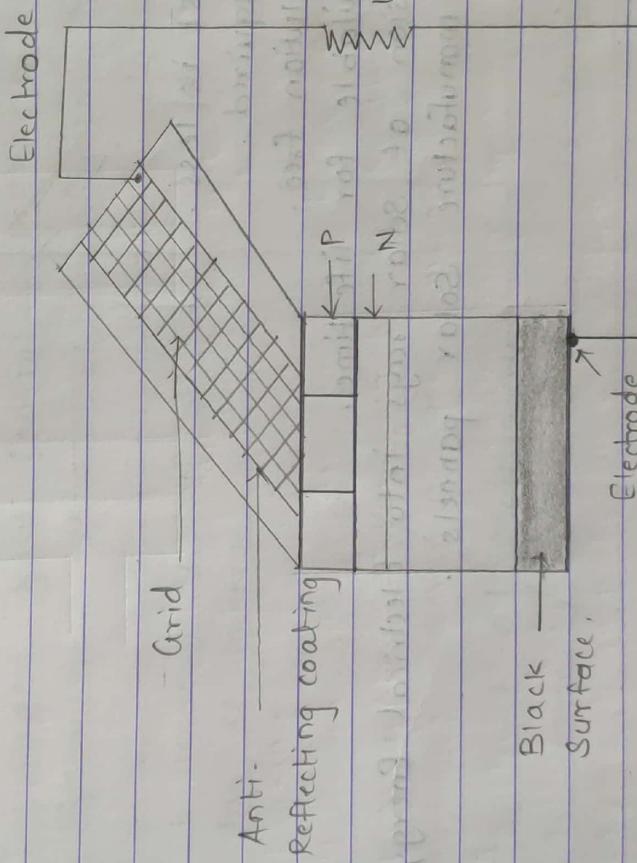
Anaerobic digestion of Biomass .

- Here microbes break down the solid biomass into methane and CO_2 .
- Green crops , manures , sewage and food waste are used as a biomass biogas is burnt to generate heat and power .
- It can process to use as a transport fuel .

2) Enumerate atleast 5 Application of Solar P-V cell Energy.
Discuss in detail any one of them with a Neat sketch.
(Explain Mechanism of photoconduction in a p-v cell with a simple sketch. State atleast 4 limitations of solar Energy)

(Explain functions of Solar / p-v cell / photovoltaic cell with a neat sketch.)

Ans p-v cell / solar cell / photovoltaic cell.



Working Fig : PV cell

1. PV cell works on the principle of photovoltaic effect
2. Photovoltaic effect is, if photon of solar rays has energy greater than band gap then the electrons are emitted & this flow of electrons creates current electrical
3. Solar cell is a semiconductor device which converts the radiation energy or solar energy into Electrical Energy by photovoltaic effect.

4. They are made from Semiconductor, polycrystalline, Silicon.
5. PV cell use one or more solar modules to Convert Solar Energy into Electrical Energy.
6. PV cell is crystalline Silicon.
7. PV module is large no. of cells are connected in Series and parallel.
8. PV array is modules connected in series and parallel for maximum output.

Advantages,

1. Maintenance cost is less.
2. No fuel is required.
3. Energy is pollution free.
4. Energy is available for life time.
5. Direct conversion of Solar rays into Electrical Energy.
6. It is easy to manufacture Solar panels.

Disadvantage,

1. Capacity is less.
2. Efficiency is less.
3. For High Capacity large no. of solar modules are required.
4. Space required is large.
5. Solar Energy is unreliable.

Applications,

1. It is used for Construction of P.V house / p.v power system.
2. It is used for street lighting / road lighting.
3. It is used local Applications like Home, School, colleges & Hospitals.

Compare the Relative characteristics of HAWT & VAWT in wind power.

(How windmills are classified? Show with a flow chart. Explain briefly about vertical wind mill with a neat sketch.)

HAWT

It needed yaw Control Mechanism.

It needed support at the top of tower.

Overall Cost is large.

The Cost of Maintenance is large.

Design of HAWT structure is complex and difficult.

Efficiency is greater than 50%.

VAWT

1. It does not need yaw Control Mechanism.

2. It does not need any support at top of the tower.

3. over all cost is less.

4. The Cost is maintenance is less.

5. Design VAWT structure is easy.

6. Efficiency is less than 50%.

Vertical Axis Wind Turbine (VAWT)

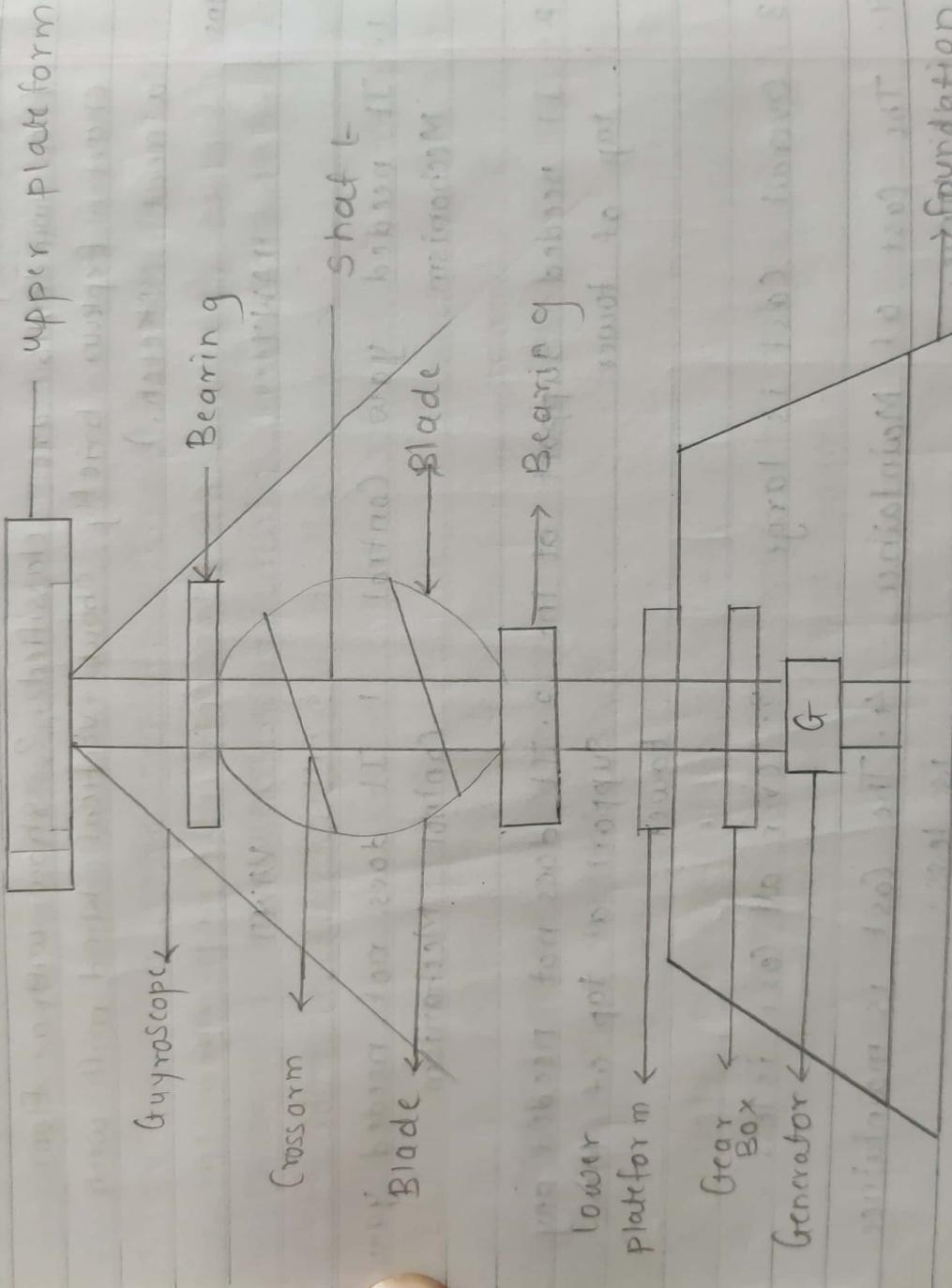


Fig: Vertical Axis Wind Turbine (VAWT)

Working.

1. It consist of upper platform, lower platform, Bearing, Guyroscopic, shaft, crossarm, blade, gear box, generator and foundation.
2. Axis of shaft is vertical hence it is called as vertical axis wind turbine.
3. The wind is converted into Mechanical Energy.
4. This Mechanical Energy transmitted by generator.
5. Generator Converts Mechanical Energy into Electrical Energy or Electricity.

6. Gyroscope are used for direction of the wind and control the rotation.
 7. The gear box arrangement is made for to control the speed of turbine.
- # Advantages.
1. No need of pitch angle change for wind direction change
 2. Turbine blades are vertical hence no need of yaw mechanism.
 3. They can be build at location where high structures are not allowed.
 4. It is pollution free.
 5. No need of fuel.
 6. Wind is available in free of cost.
 7. Wind is available in very huge amount.
- # Disadvantages.
1. Gyroscope are needed for wind direction.
 2. Efficiency is only upto 50% as compared with horizontal axis wind turbine.
 3. Low starting torque and require more energy to start the turbine.
 4. It is very difficult to design wind mill and blades of turbines.
 5. Velocity of wind changes from 0 to ∞ .
 6. Some times velocity of wind is insufficient.
 7. Installation cost is very high.
 8. Electricity transmission cost is high.

Application.

1. It is used to generate electricity.
2. Small Wind mills are used to pump water.

5) Define Solar Energy. What is flat plate collector? Describe its Components with Suitable sketch.

(Explain Hot water system by using flat plate collector).

→ • Solar Energy.

The earth is essentially a huge solar energy collector receiving large quantities of this energy which manifests itself in various forms, such as plants, heated air masses causing wind and evaporation of the oceans resulting as rain which can form rivers.

• Flat plate collector:

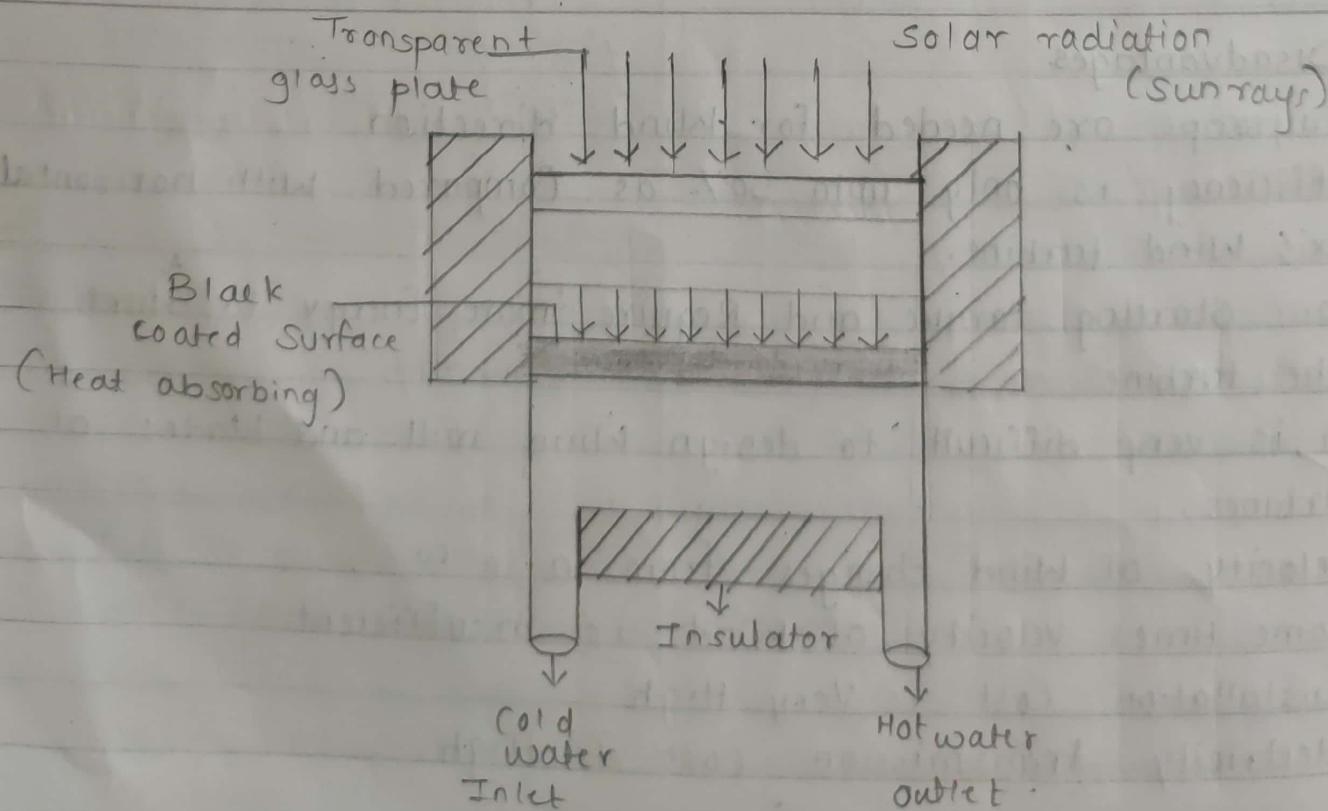


Fig : Flat plate collector.

Working.

1. Flat plate collector. Consists of transparent glass, Black coated plate surface which is absorber plate, Inlet and outlet of Water Insulation.
2. Solar rays incident on a glass plate.
3. Solar rays Energy is trapped by black Coated Surface Which absorbal plate.
4. Absorbal plate is made up of metal like Copper, steel, Aluminium.
5. Water tubes are fitted in the absorbal plate.
6. Water tubes are made from the material like Copper.
7. Cold Water Enters into a tube and water gets heated by the heat from tube.
8. Hot water is collected in storage tank.
9. Storage tank is collected and made up from insulating material.
10. There is circulation of Water from inlet to outlet.

Advantages.

1. No fuel is Required.
2. Maintenance and Construction Cost is less.
3. It is pollution free.
4. Efficiency is High for local application.

1. It is unreliable.
2. Efficiency is less in rainy Season and Winter season or dependent on climate.
3. Safety precaution is needed.

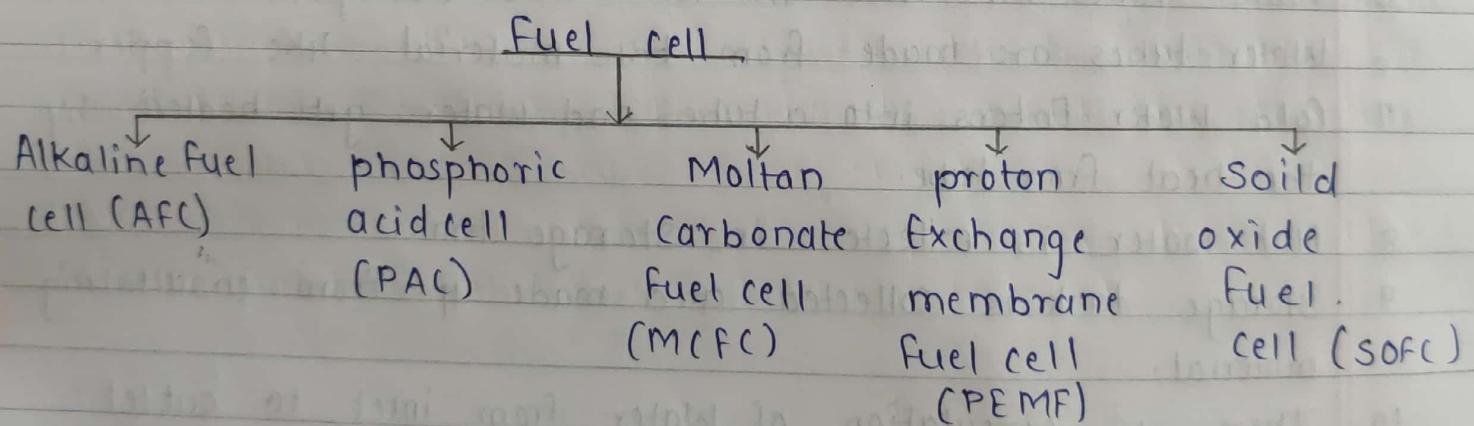
Application.

1. It is used for heating water in home, hospitals, schools, collages, Hostels and small scale industries.

6) Give classification of fuel cell using flow chart. What are the advantages and disadvantages of a fuel state any four of it each.

7) Explain Fuel cell.

→ classification of fuel cell



Alkaline fuel cell,

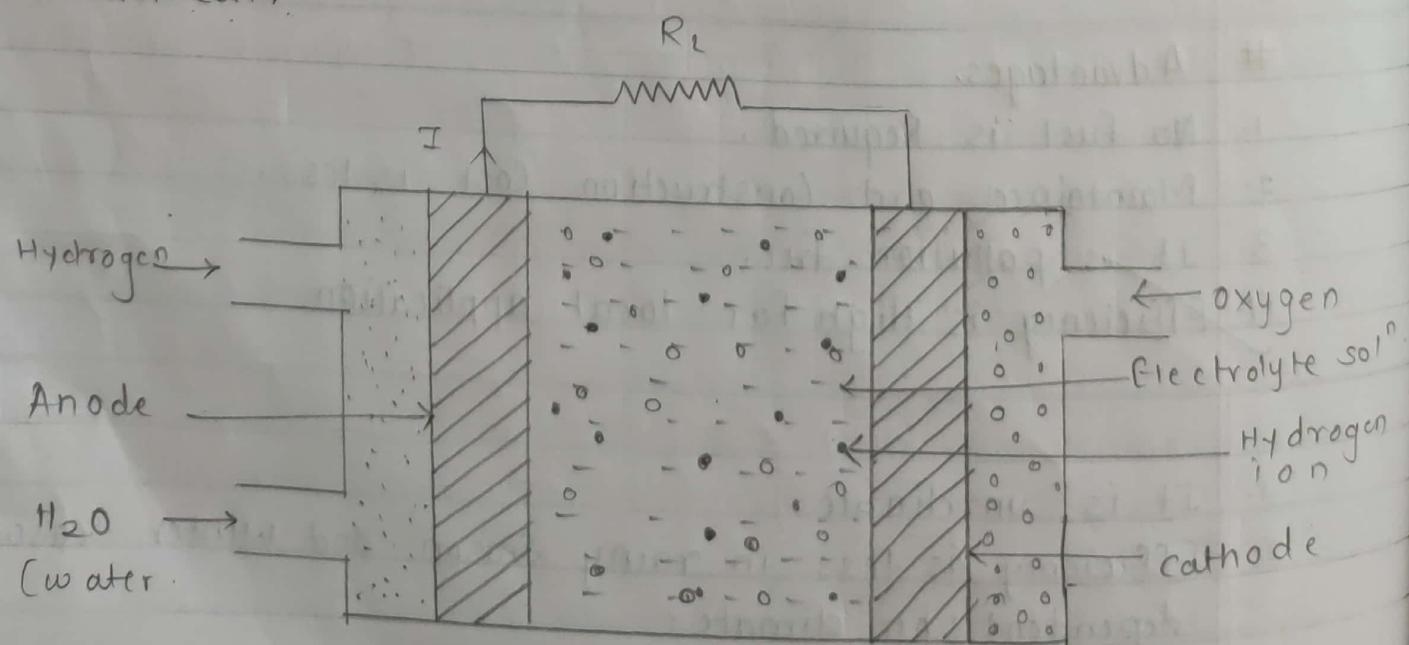
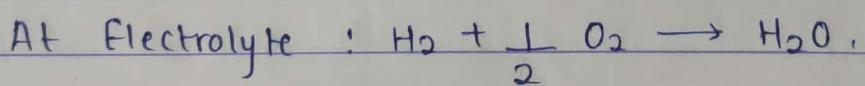
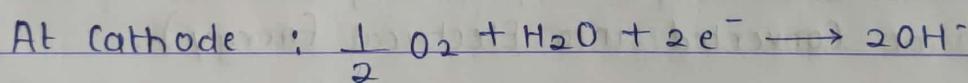
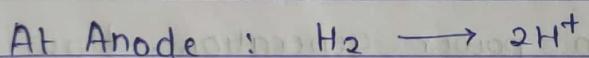


Fig: Alkaline Fuel cell

Working.

1. Hydrogen atom are supplied from Anode & oxygen atom are supplied from cathode due to chemical reaction hydrogen atoms are get ionized.
2. An electrons gets generated from hydrogen atom and it has positive charge.
3. Oxygen atom picks these electrons and travel towards anode through Electrolyte Solution.
4. At anode it Combines with hydrogen ions.
5. It use potassium hydroxide & Sodium hydroxide as an electrolyte solution.

Chemical Reaction.



Advantages.

1. Fuel cell does not produce pollution.
2. Fuel cell are Environment friendly.
3. Efficiency is High.
4. Space needed is less.
5. No cooling water is needed.
6. power losses are less.

Disadvantage.

1. High initial cost.
2. low service life.

Applications.

1. Domestic use.
2. It is used for marine application.
3. It is used for automobile vehicles.

8) What are the most favourable sites for installing Wind turbines?

What Range of Winds Speed is Considered favorable for Wind power generation? Explain briefly about the function of Horizontal windmills with Neat sketch.

(What are Wind Farms. Explain power generation. How wind Energy can be converted into Electrical Energy).

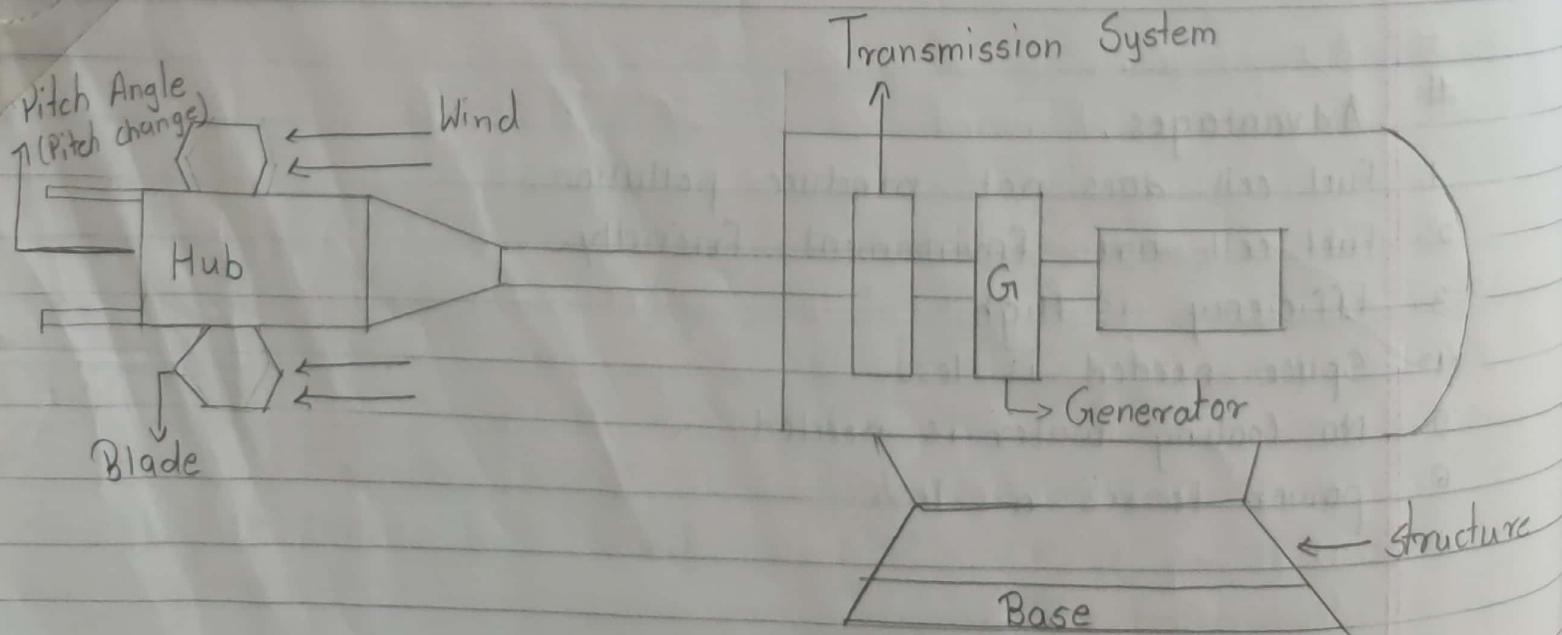


Fig : HAWT / Wind Power Plant

Basic Components of Wind power Generation

1. In Horizontal Axis Wind Turbine axis of shaft is horizontal.
2. It consists of Wind turbine, transmission System, Generator, pitch change, Structure & Base, Hub.
3. Wind flows over the blades of turbine and turbine starts rotating.
4. Speed of turbine depends on velocity of wind.
5. Turbine shaft is connected to transmission system.
6. Generator converts Mechanical Energy into Electrical Energy.
7. Whole Arrangement is supported on a rigid body structure.
8. Transmission System is connected to generator.
9. Capacity of these power plant is 0.5 MW to 3MW.

Advantages.

1. It is pollution free.
2. No Need of fuel.
3. Wind is available free of cost.
4. Wind is available in very large amount.

Disadvantages.

4. It is very difficult to design Wind mills.
2. Velocity of Wind changes from zero to infinity.
3. Maintenance cost is High.
4. Installation cost is High.

Applications.

1. It is used to generate Electricity.
2. Small Wind mills are used to pump water.

9) Write short note on Solar Energy, Tidal Energy, Biogas.

(Explain production of Biogas from Biomass with diagrams, working, advantages)

→ Solar Energy : (Sun Energy)

1) solar Energy is a renewable Energy Source

2) Sun is the Source of all form of Energy available on the Earth.

3) The Earth Receives this radiant Energy from the Sun in the form of electromagnetic waves.

4) Solar Energy is used through photosynthesis by plants

5) By using Solar Energy electricity can be generated.

6) It is available in large amount.

Application of Solar Energy.

1) Solar cooker

2) Solar dryer for agriculture purpose.

3) Solar water heater.

4) Solar p.v cell.

5) Solar green house.

Biogas plant.

Construction: 1) It consist of inlet tank, outlet tank, inlet pipe, outlet pipe.

2) It consist of metallic gas holder with gas outlet.

3) All plant his build up on storage concrete foundation.

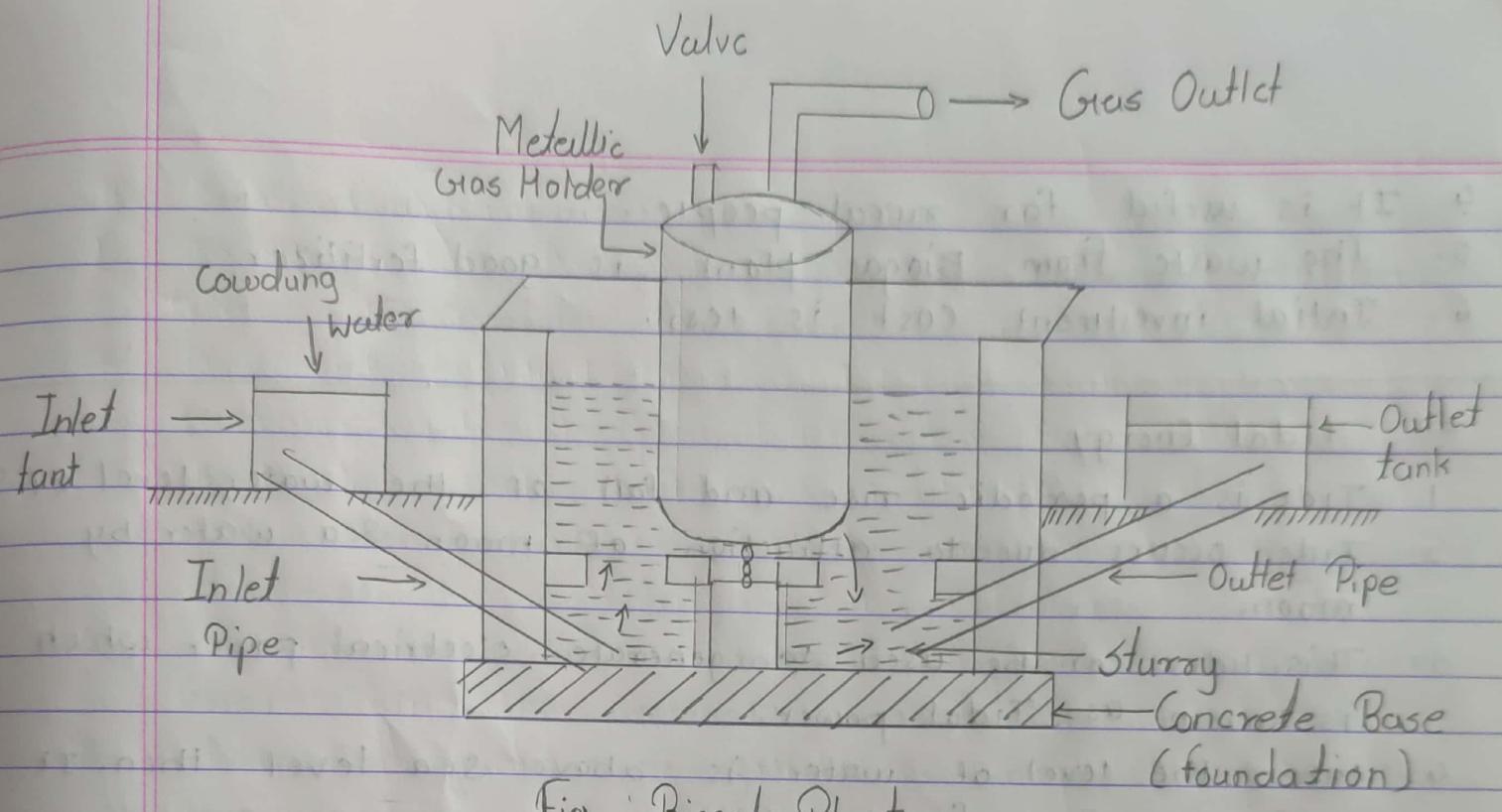


Fig : Biogas Plant

Working.

1. At the start inlet tank is fill up with mixture of organic matter and water in the ratio 1:1.
2. All the Air is removed from gas holder.
3. Inlet tank is supplied with organic matter as required daily, weekly or till the tank is full.
4. It takes 4 to 8 weeks for generation of bacteria & methane gas.
5. After somedays combustible gas is produced that is called Biogass.
6. At starting the Biogas cannot burn smoothly.
7. Depending upon organic matter and time Biogass is produced.

Advantages.

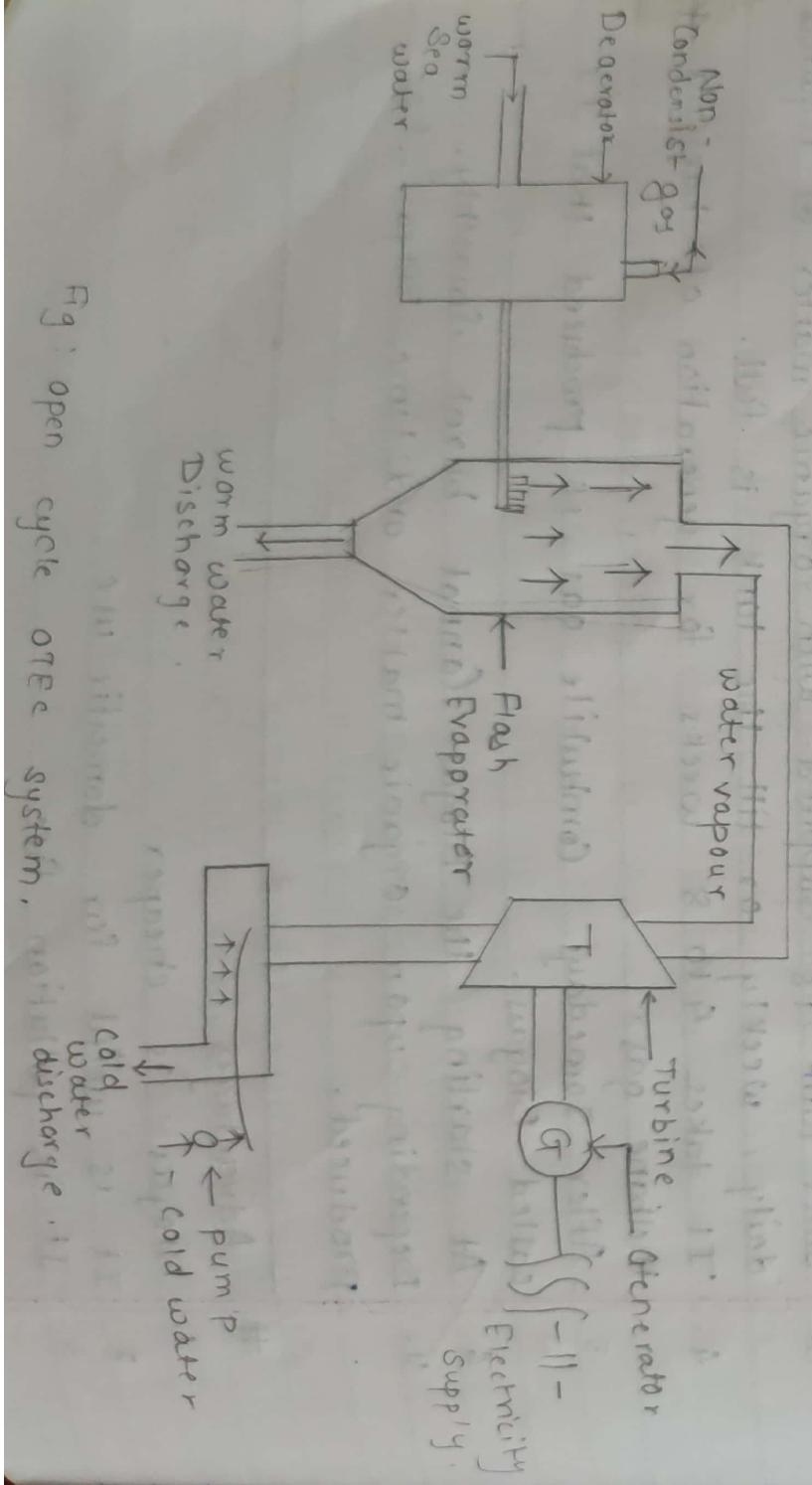
1. Biogas is cheaper.
2. It is useful for domestic use.
3. It is pollution free.

4. It is useful for rural people.
5. The waste from Biogas plant is good fertilizer.
6. Initial investment cost is less.

Tidal Energy

1. Tide is a periodic rise and fall of the water level of sea.
2. Tide occurs due to attraction of moon Sea water by moon.
3. This tides can be used to generate electrical power which is known as Tidal power.
4. When the level of water is above sea level then. It is called as Flood Tide.
5. When the level of water is below sea level Then. It is called as ebb Tide.

11) Explain OTEC with its Schematic Arrangement & Working.



Eg : open cycle OTEC system, cold discharge.

Eg : open cycle OTEC system, cold discharge.

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Construction.

- It consist of Flash evaporator, Turbine, Generator, Pump, Condensation Arrangement & Inlet of warm Sea water.

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Working.

1. The warm surface of sea water is entered into deaerator.
 2. Heat p from warm water is given to low boiling point fluid like ammonia or propane.
 3. Ammonia & propane generates steam, Steam enters into the turbine and turbine starts rotating.
 4. These turbines are low pressure operating turbines.
 5. Turbines are connected to generator and generator produce electricity.
 6. Steam is converted into cold water by condensation.
- Arrangement
- (12) Explain Solar Green House.
- 1. Solar Green House is farming concept in which the Green house utilize maximum possible sun energy.
2. Solar Greenhouse absorbs Sun Energy and stores it.
3. Sun Energy is absorbed & stored by plants and Earth inside Green house.
4. The standard solar green house stores the sun's energy in water barriers and tank at the north wall.
5. The long axis of Solar green house runs east to west not north to south.
6. The north roof of a Solar greenhouse is heavily insulated, not glazed.



7. The solar green house can either stand alone or be attached to house or barns.
8. A solar green house may be an underground pit a shed - type structure or a hoop house.
9. Large scale producers use free-standing solar green houses while attached structures are used by the home scale growers.
10. Passive solar energy are used by small growers as they are a cost efficient way for farmer to expand the growing seasons.
11. Active solar greenhouse supplement energy to move solar heated air or water from storage or collection areas to others regions of the green house.

Assignment - 3

Q. 1. What do you mean by Energy Conservation. Write down at least 10 ways by which Energy is conserved in day to day life.

→ Energy Conservation

It is the decision and practise of using less Energy. The reduction in energy consumptions but without sacrificing the quantity & quality of production.

10 ways of Energy Conservation.

1. Switch off lights and electrical appliances when not using them.
2. Switch to Energy - Saving LED light globes.
3. Shut doors and close curtains.
4. Save Energy in how you wash and dry clothes.
5. Manage your heating and cooling.
6. Turn your refrigerators down.
7. Use Energy - efficient light bulbs.
8. Use Smart power strips.
9. Bake with glass or ceramic pans.
10. Cook using the right sized burner.
11. Install a programmable thermostat.
12. Upgrade your HVAC system.
13. ~~Install energy efficient windows.~~
14. Unplug the devices when not in use.
15. Use double glazing door.



Principles

- 2.) Write a short note on Energy Conservation principle.
- There are two types principles of Energy Conservation.
- I) Maximum Thermodynamic Efficiency (Max. Energy Efficiency)
- It is used as the maximum possible work output by using a given amount of energy input.
 - Eg: Energy losses in pressure cooker during cooking food.
Maximum work = Energy input - Energy loss in transfer output
- II) Maximum Cost Effectiveness
1. To overcome the challenges of high Energy prices, Energy security is become important to improve the Energy efficiency, cost-effectiveness.
 2. In Industries, Hospitals, consume more than 70% of the Natural gas and electricity used in the country.
 3. Therefore it is important to find out effective ways to overcome challenges of high cost energy.
 4. Cost effectiveness of Energy Efficiency is important to find out energy potential.
 5. Energy Efficiency cost-effectiveness is measured by comparing the benefits of an investment with cost.
- 3) What are the Benefits of Energy Conservation.
- Benefits of Energy Conservation
1. Environmental: Increased efficiency can lower green house gas (GHG) emissions & other pollutants, as well as decrease water use.
 2. Economic: Improving energy efficiency can lower individual utility bills, create jobs, & helps stabilize electricity



prices & volatility.

3. Utility System Benefits : Energy Efficiency can provide long term benefits by lowering overall electricity demand, thus reducing the need to invest in new electricity generation & transmission infrastructure.

4. Risk management : Energy Efficiency also helps diversity utility resources portfolios & can be a hedge against uncertainty associated with fluctuating fuel prices.

4. Discuss the general opportunities of energy conservation in HVAC.

→ 1. out of the total energy used in manufacturing industries Hospitals, home, schools and colleges, Energy heating, Ventilation & Air Conditioning (HVAC) consists upto 35%.

2. The design of good HVAC system Consider the Relationship of building System from Energy Consumption Air quality, Environmental benefits.

3. HVAC refers to provide fresh filtered air, heating, cooling and humidity control in a building.

4. To supply the HVAC System, The facilities can have any combination of heating & cooling sources.

5. For heating Facility gas heat pump, Electric Heater is used.

6. For cooling facilities Air Conditioners are used.

Energy Conservation in HVAC / AC System.

1. Reduce HVAC system operation when Building or space is not in use.
2. Reduce HVAC operating Hours.

3. Adjust area that is too hot or too cold.
4. Install unnecessary heating or cooling.
5. Implement a regular maintenance plan.
6. Reduce / install a good HVAC system.
7. Keep door closed when AC is running.

5) Write a short note on Energy Conservation in lighting System.

- 1. Electric lightning is a major energy consumer.
- 2. Using energy efficiency equipment, effective control & design, it is possible to save large amount of energy.
- 3. Following are the examples for energy saving with efficient lightning. Installation of Compact LED or CFL in place of Incandescent lamp.
- 4. Whenever possible install Sensor to turn light on or off.
- 5. Use key tac system for electric power.
- 6. Install LED panel.
- 7. Use of High efficiency light source for Reducing the energy consumption form lightning.

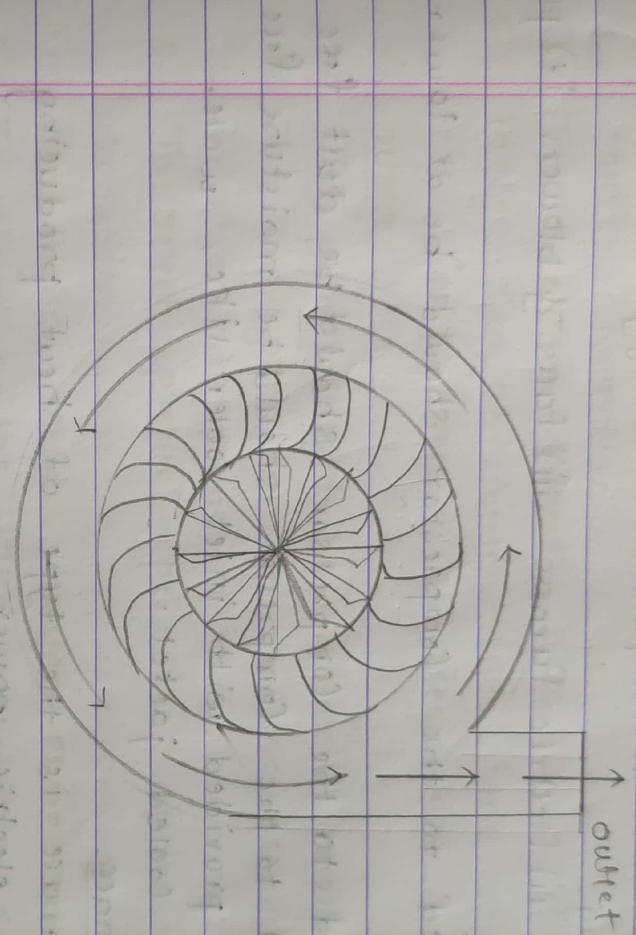
6) What are the different parts of centrifugal compressor and Explain Energy Conservation in Compressor.

→ Compressor is a device which takes atmospheric air in low pressure air, compresses it and deliver high pressure air to the storage tank from which it may be used.

Centrifugal Compressor Construction

It consist of impeller, diffuser, casing.





#

Working

1. Air enters into the compressor at low pressure from inlet valve at casing or inlet valve at centre of impeller or inlet valve at the top.
2. When motor is on impeller starts rotating with high speed.
3. Air also starts rotating with high speed.
4. Diffuser ring help to convert K.P of air into pressure energy by increasing pressure of air.
5. Diffuser give the path to the air.
6. we get high pressure at outlet.
7. Casing is provided for air tight chamber.

- 7) Explain methods of techniques of energy conservation of the following:
- Compressor
 - Electric furnace
 - Fans & blowers
 - Pump
- Ans i) Compressor.
- 1. Air supplied to the compressor should be at lower temperature.
- Air supplied to the compressor should be dust free.
 - Air supplied to the compressor should be moisture free.
 - Compressor is provided with inlet cooler like, water jacket, air cooled jacket.
- ii) Electric furnace.
- An electric furnace is the type of heat producing equipment using electric power.
 - An electric furnace used for foundries for producing cast iron products.
 - The furnaces are provided with number of inflection doors, provide insulation over the doors.
 - It is to be ensure that the furnace chamber should be under positive pressure.
 - Match the load to the furnace capacity.
 - Investigate the total cycle time & optimise it.
 - The furnace should be provided with temperature controls.
- iii) Fans and blowers
- To Reduce Energy cost in fans & blowers, pressure should be minimum.
 - The density of air get affected by temperature moisture, and its effect on energy consumption.
 - For Energy Conservation Selection of fan is important.



4. The design of the fan affect on efficiency & power consumption .
 5. The size of the fan effect on efficiency of fan .
 6. Energy can be conserved in fans and blower by speed control by using Regulation .
- iv) pump
1. The pump should be operated near best Efficiency point
 2. The old pump should be replaced by modified & advanced pump .
 3. To select proper pipe size optimization for pressure reduction .
 4. For higher heads , booster pump should be used .
 5. To minimize the fluid losses repair the seals & packing .

(P)

Assignment - 4

1. Define air pollution. Explain Various type of air pollutants.
→ Defn - Air pollution is the contamination of atmosphere due to release of harmful gases and microparticles in it. The harmful gases & particles change the biological & chemical characteristics of atmosphere. Air pollution is combination of natural & man-made product in the air. It relates to presence of various contaminants like dust, fumes, gases, smoke & odour in atmosphere which are injurious to the health of human vegetation & marine life.
 - # 2. Types of air pollutants.
The various types of air pollutants are.
 - 1) Carbon monoxide.
- It is colourless and odourless gas. It generates due to cigarettes smoking & incomplete combustion of fossil fuels. Near about 60% of carbon monoxide emission is due to vehicles, burning of industrial waste, forest fires etc. A small amount of carbon monoxide does not allow the human body to deliver oxygen to important organs of body which result into human death. It causes various heart related diseases. It causes headache and breathing problems also due to strong affinity to combine with haemoglobin in the blood. It reduces oxygen carrying capacity.



2) Sulphur dioxide

- It is highly reactive colourless gas.
- Near about 70% of sulphur dioxide is emitted from industrial power plants.
- It will reduce sulphuric acid after reaction with oxygen present in atmosphere these will cause fall of sulphuric acid in the form of acid rain.
- It causes respiratory illness etc.

3) Nitrogen oxide

- Nitrogen oxide are produced when N_2 & O_2 are combined at high temperature of thousand degree celsius (1000°C)
- These are formed due to complete combustion of fuel.
- It is reactive gas which reacts with air to produce smoke generation.
- Near about 50% of nitrogen oxide is emitted from vehicle emission & wood burning.
- It has key role in acid rain, ozone depletion & smoke generation.
- It irritates eye, nose & throat which causes headache & damage to lungs.

4) SO_2 & H_2S

- The toxic gas SO_2 & H_2S are formed on burning of sulphur present in petroleum products & coal.
- It causes suffocation, irritation of throat, asthma, & lung cancer in people.
- The effect of SO_2 is to cause destruction of sensitive crop & reducing vegetation.

- The toxic effect of SO_2 is associated with deterioration of surfaces of plants.
- SO_2 causes corrosion of metal parts in presence of moisture.

5) Suspended particulate matter.

- The particles like dust, ash, soild carbon & liquid like sulphuric acid are produced due to burning of fossil fuel like coal & oil.
- Its size is generally less than micrometer they remain suspended in atmosphere for long time.
- It effects respiratory system causing cough, cold, sneezing.
- The very fine particles reaches to lungs & cause bronchitis & cardiac diseases.
- It causes corrosion of metal parts of power system.

6) CO_2

The increase in concentration of CO_2 in atmosphere will lead to its ability to absorb energy & cause global warming of atmosphere known as greenhouse effect.

This temperature increase may cause melting of polar ice with catastrophic flooding in coastal region.

7) Hydrocarbons

Hydrocarbon is raw, unburnt fuel escaping to the atmosphere.

It causes irritation in respiratory system.

Q.2) Discuss about sick building syndrome.

- 1. The term Sick building Syndrome (SBS) is used to describe situation in which building occupants experience acute health & comfort effects that appear to be linked to time spent in a building.
- 2. Some time diagnosing SBS can be difficult because of the wide range of symptoms.
- 3. These can also mimic other conditions, such as the common cold.
- 4. The key of SBS is that your symptoms improve after leaving the building in question, only to come back when you return to the same reaction. Among the possible symptoms are:-
 - Throat irritation, breathing difficulties, tightness in chest
 - Runny nose, burning sensations in the nose, dry, itchy skin rashes, headache, dizziness, fatigue, body aches, fever, chills.

Sick building Syndrome treated.

- 1. SBS is primarily treated by alleviating symptoms while reducing your exposure to the causes of these symptoms.
- 2. Allergy medications can help alleviate itchy eyes, nose & skin over-the-counter options such as Benadryl & Zyrtec are widely available.
- 3. Asthma medications may be needed for wheezing & other breathing difficulties.
- 4. These may be included long-term medications, such as leukotriene modifiers or an inhaler for acute symptoms.

Q.3 Explain various types of air pollutants by different power plants.

- 1. Sulphur dioxide (SO₂) - This pollutant is released during the combustion of fossil fuel containing Sulphur, such as coal. It can cause acid rain, respiratory problems & damage the vegetation.
2. Nitrogen oxide (NO₂) - These pollutants are produced by high temperature combustion & can contribute to the formation of ground level ozone & particulate matter.
3. particulate matter (PM) - This type of pollution consists of tiny particles that can penetrate deep into the lungs & cause health problems.
4. Carbon monoxide (CO) - This colourless & odourless gas is produced during incomplete combustion of fossil fuels. It can cause headaches, dizziness & nausea & can be especially dangerous for people with heart diseases.
5. Mercury - This type of toxic heavy metal can be released into the air as vapour from coal fixed power plants.
6. Lead - lead can be released into the air from lead-acid batteries used for backup power in some power plants. It is a toxic metal that can cause serious health problems especially in children.

4) Discuss various causes of air pollution.

→ 1. Burning of fossil fuel - Burning of results into emission of Sulphur dioxide, the use of vehicles like cars, jeep, truck etc causes air pollution by releasing Carbon monoxide in the environment.

2. Exhaust From factories & industries. - The various manufacturing industries throughout Considerable amount of Carbon monoxide, hydrocarbons, organic compounds into air which Causes air pollution.

3. Mining operation. - In mining operation minerals below the earth are taken out by using large equipments During this process dust & chemicals are released into air which Causes air pollution.

4. power plants - Near about 70% of Consumed energy is generated by burning of fossil fuels. These power plant emits gases like sulphur dioxide, carbon monoxide, Carbon dioxide which Causes air pollution.

5. Wood fuel

Wood fuel is burnt for cooking & heating purpose which Causes indoor air pollution.

6. Volcano eruption

The volcano eruption also causes air pollution the process the hazardous chemicals, harmful gases, fume, dust is released into the environment.

5) State various effect of air pollution.

→ 1. Respiratory and heart problems.

The air pollution causes respiratory and heart problems which in some cases extend into Cancer.

The children suffer from pneumonia, asthma, bronchitis and silicosis.

2. Global warming.

1. The air pollution causes global warming.

2. The causes increase in world wide temperature.

3. The ice from colder regions is melting down which increase the sea level.

4. It also leads to displacement & loss of habitat.

5. The global warming causes depletion of ozone layer and holes in Antarctica region.

3. Acid rain

1 Due to burning of fossil fuels, nitrogen oxide & sulphur oxides are released into atmosphere.

2 During rain these air pollutants are mixed with water droplets & become acidic in nature then they fall on the ground in the form of acid rain.

3 It affects crops, animals, human beings, also various non living things.

4. Eutrophication

1 It means higher amount of Nitrogen contain pollutants which is developed on sea surface & turns into algae.

2. This algae severely effects fish, various marine animals and plants.

5. Effects on wild life.

Due to the toxic chemicals the wild life species are forcefully moved to new places & try to adapt surrounding environment in that place.

6. Depletion of ozone layer.

1. The ozone gas is present in stratosphere.
2. It protects humans from ultraviolet rays.
3. Due to chlorofluorocarbons ozone layer is depleting.
4. The depleted ozone layer allows ultraviolet rays to the earth which will cause skin & eye related problems.

6) What are the causes of acid rain write the mechanism of acid rain also explain chemical rear of acid rain and effects of acid rain.

→ Acid rain is caused by emission of sulphur dioxide & nitrogen oxides (NO_x) from sources as power plant, industrial process and transportation. These emissions react in the atmosphere with other compounds to form sulphuric acid (H_2SO_4) & nitric acid (HNO_3) which then fall to the ground as acid rain. The environment can lead to soil & water pollution, harm to plants & trees damage to buildings & infrastructure. Acid rain can also have a significant impact on freshwater & marine ecosystem, altering the balance of species & food web.

Assignment - 5

- Q.1 Define 'water pollution'. Explain sources, effects & control measures of water pollution.
- The negative changes in physical, chemical & biological properties of natural water bodies due to addition of harmful pollutants which adversely affects on living & non-living things in the environment is called water pollution.

Sources of water pollution.

1. Domestic waste

Domestic waste comes from kitchen, bathroom, toilets, hotel & is called domestic or sewage waste water.

2. Industrial waste.

The waste water generated from various manufacturing process of various industries is called effluent. This is very highly concentrated waste water having high BOD & COD.

3. Oil leakage.

✓ oil leakage into sea can cause serious problem to aquatic life. Its effects depends on oil concentration & its toxicity.

4. Marine dump.

Garbage from household & industry contains paper glass, aluminium, plastic materials etc. This garbage dump into the sea due to this sea water gets polluted.

Effects of water pollution.

1. Effects on human.

Human are effected by diseases like cholera, Jaundice, by drinking of polluted water.

- Higher level of fluoride in water can cause of weeping
- Higher level of arsenic in water can cause a skin cancer.

2. Effects on Animal.

- Fishes or animals, plants or aquatic animals are get poisioned due to water pollution.
- Due to less oxygen in water aquatic animals are get suffocated.

3. Effects on eco-system.

- polluted ground water.
- Increase in water pollution leads to increase the growth of algae on surface of water body, which reduces the dissolve of oxygen level in the water.

Control measures of water pollution.

- ~~water~~ from factories, industries & building should be dispose properly.
- Toxic chemicals spray should be replaced by eco-friendly chemical.
- Do not throw waste & oil in water bodies.
- Use proper & effective fertilizers & pesticides.

Q.2

Define noise pollution explain sources, effects & control measure of Noise pollution.

→ Noise pollution

The unwanted sound which dumped in the environment & which adversely affects on living & non-living things present in the environment is called noise pollution.

Sources of noise pollution

1. Transportation System.

Heavy vehicles, trains, tractors, aeroplanes, vehicles forms are included in transportation system.

- Transportation system noise depends on traffic flow gradient of road, road surface nature.

2. Construction of building highways.

- Bulldozers used for demolition of old side machine used for polishing marbles & tiles, rock, drill, machine, air compressor, breaker, lauder & etc.

3. Industrial Sources.

In that boiler - noise from boiler, machine blower, generator hang, air compressor or pump.

Effects of noise pollution

1. Effects on human beings.

- Difficulty in breathing, increasing in blood pressure, Asthma, difficulty in concentration depression, sleep disturbance.

- Decrease in work efficiency & irritation occur due to noise pollution.
2. Effects on non-living things,
- cracks occur on materials like glasses, door & windows & also sometimes of walls of buildings.
- # Control measures of noise pollution.
- Workers should have ear plug & earmuffs for protecting hearing protection.
 - Trees are planted around the industries about 33% of area should be planted or developed by green belt.
 - Maintenance of vehicle should be done regularly.
 - Lubrication of masonry & surveying should be done in the industry for minimum noise generation.
 - Machines & equipments to be designed relation to insulation & maintain proper alignment of machines moving parts should be done exhaust & ventilation should be properly arranged.

Q.3 What is Solid state. Enlist Types of Sources of Solid wastes. Explain dispose method of solid waste.

→ Solid waste:

The material which arrives from various human activities & which is normally discarded as useless or unwanted it is called solid waste.

Solid waste contain paper, cardboards, plastic, cloth, rubber, glass, leather, construction waste, food waste & ash.

Sources of Solid waste.

1. Residential.
2. Institutional school, hospital, & municipal office
3. Commercial - Retail store, service station, ware house.
4. Industrial consumer goods, agricultural goods.
5. Agricultural farmer operations.

Disposal methods of solid wastes.

1. Sanitary landfill method
2. Composting.
3. Incineration.
4. Dumping into sea.

Q. 4 Explain the Bio-medical waste management in India.

→ Bio-medical waste.

It is defined as wastage generated during the diagnosis treatment of human beings in research activities and testing of biological wastes.

Sources of biomedical waste.

- | | |
|------------------|------------------------------------|
| 1. Nursing homes | 4. Medical laboratory. |
| 2. clinics | 5. Blood bank. |
| 3. Hospitals | 6. Medical camp & training Centre. |

Biomedical waste management

- Waste minimisation : Hospital should try to maintain the records of each waste. They can recycle certain waste items.
- Waste segregation : Segregation of waste should be done at source. This segregation done in colour coded plastic bags & containers.

Waste Category

Types of

Container

plastic bags

colour

code

yellow.

1. 1, 2, 3, 6

plastic bags /

disinfected

Container

Red

3. 4, 7

plastic bags /

disinfected

Container

Blue /

white.

4. 5, 9, 10

plastic bags

Black.

Q. 5 What are the various sources, effects & control measures of soil pollution.

→ Sources of soil pollution.

- Urban waste

It consists of commercial & domestic waste. e.g.

Sewage material, garbage materials like plastic, paper, glass, fibre vegetables & metals etc.

- Industrial waste.

This are mainly discharge from the industry from sugar paper, textile mills & coal industries.

- Agriculture Activities.

Due to use of excessive fertilizers, pesticides, causes change in soil properties.

- Radioactive Components.

Radioactive Components resulting from radioactive waste from laboratory & industries changes soil property & composition.

Effects.

- It reduces the soil productivity.
- Causes soil erosion.
- Causes deforestation.
- It lowers down pH levels of soil.
- It affects the plant growth & human life.

~~control~~ measures.

- proper dumping of waste material
- Good hygienic condition.
- people should be educated for taking care of hygienic condition.