

Ind Module

Syllabus of 2nd Module

① Energy / Alternate source of Energy

Solar, Hydro, Biomass, fossil fuel, geothermal, nuclear energy.

② ~~Harmful~~ effect of human Activities on Environment

i. Agricultural, Housing, Industrial, Transportation etc.

③ Solid waste Management. Imp

④ Pollution → Air, water, noise, soil.

⑤ Global Env. Problems.

→ Acid rain

→ ozone layer depletion.

→ Green house / Global warming.

→ Biodiversity depletion.

→ Overpopulation.

→ Urbanization.

Monday

16/09/19

Solid waste

All the solid and semi-solid waste arising due to human activities excluding human excreta is called solid waste.

There are two types of solid waste.

- 1) Rubbish waste
- 2) Garbage

1.) Rubbish waste :- It includes both combustible and non-combustible metals.

Eg:- Plastic, Rubber → Combustible Metal

2) Garbage: It includes all organic waste material.

Eg:- Peeling of fruits & vegetables and Animal materials etc (i.e. generally produced due to cooking).

Q1:- What is the cause for increasing in solid-waste?

Ans:- Urbanization
Over population
Increase in purchasing

Solid waste Management

(1) Collection of Solid waste :- It involves collection of solid-waste from the pt. where it produce and ~~is~~ to the disposal site.

Imp:

(2) Disposal of s.w. :- Disposal of solid waste means to get rid off solid waste. Following methods are suggested for the disposal of S.W.

(i) open dumping :- In open dumping the waste is deposited in some low lying area which is generally outside the city.

(ii) sanitary land filling :- It is the modified form of open dumping method in which the solid-waste is deposited in the layers of 1.5m thickness covered with soil and compress with bulldozers and spread insecticides to prevent mosquitoes & flies.

(iii) Composting :- Composting is Biological decomposition of solid waste under both aerobic and anaerobic condition by the micro-organism.

(iv) Incineration :- Burning of solid waste to a high temp. ($700 - 1000$) $^{\circ}\text{C}$ in a furnace.

(v) Pyrolysis or destructive Distillation :- In this method the solid waste is heated to very high temp. ($700 - 1000$) $^{\circ}\text{C}$ but only under anaerobic condition. The solid waste gets converted in gases like CO , CO_2 & CH_4 .

Ques

(vi) Pulverization :- The mechanical grinding of solid waste into a powdered form is called Pulverization.

Pulverization reduces the volume of the solid waste.

(vii) Disposal into sea :- This method of solid-waste disposal is generally for those coastal areas where there is deep sea water.

③ Recovery of materials from solid-waste material.
It takes place by two methods.

- (i) Reuse
- (ii) Recycling

(i) Reuse :- Means using the waste material in another form without reprocessing it.

(ii) Recycling :- means reprocess of waste material into some useful product.

Monday

23/09/19

Effect of human activities on Environment

Agricultural Effect on Environment :-

- ① Use of pesticides & fertilizers affecting the crop soil erosion, etc.
- ② Eutrophication :- killing of Aquatic organisms due to lack of oxygen in water consumed by Nitrogenous fertilizers.
- ③ Biomagnification :- The toxic food through food chain is ^{transported} travelled through different level of consumers affecting the whole ecosystem.

- ~~Effect on Environment~~
- ④ Leaching :- Percolation of toxic minerals from the soil into the ground water causing pollution of water.
 - ⑤ Use of hybrid variety of crop seeds, crops becomes more susceptible towards disease.
 - ⑥ CO₂ produced by the burning of biomass & fossil fuel is responsible for global warming.

Housing Effect :-

- ① Land for construction :- Acquiring agricultural and forest area at the cost of making new buildings.
- ② Raw material obtained for the construction of building is by the exploitation of soil, sand, gravel etc.
- ③ Cement require for construction - Cement Industry is considered as one of the heavy pollutant.
- ④ The finish products of a building are responsible for various types of pollution.
- ⑤ The construction site is responsible for causing siltation, clogging of drainage system.
- ⑥ The disposal of building causes soil contamination, Imbalance, soil hydrology and land morphology.

Industrial Effect :-

- ① Energy crises :- About 37% of the total world's energy in the form of electric energy is being consumed by Industries.
- ② Consumption of natural resources :- The raw material required for the bulk production in the Industries consumes natural

resources like, minerals, forests and water.

(3) Air pollution :- Industries are responsible for Air pollution

(4) Water pollution :- The Industrial effluents discharge into nearby rivers causing water pollution.

(5) Health hazards for Workers :- The industrial pollution is responsible for the negative impact on the health of its workers.

(6) Global Environmental issues :- Industries are responsible for increasing various environmental issues like acid rain, global warming and Ozone layer depletion.

Transportation Effect :-

(1) Infrastructure construction at the cost of acquiring fertile land.

(2) Vehicles ~~are~~ running on the roads are responsible for air pollution.

(3) Consumption of energy :- fossil fuel is being consumed in the form of petrol, diesel etc.

(4) Use of tyres, oils, AC's are responsible for ozone layer depletion and other effects.

(5) Noise pollution are responsible for:- Vibrations and sounds produced from vehicles causes noise pollution.

(6) Emission of suspended particulate matter (SPM) released from ~~Vehicle~~ vehicles, ^{causes} harmful to environment effect

Mining Effect :-

- ① Deforestation, Devegetation, loss of habitat to wild life due to mining.
- ② Disconfiguration of land area; effect on soil fertility, hydrology and land morphology.
- ③ Leaching of toxic minerals to the underground water during mining.
- ④ Mining causes negative impact on the health of workers suffering from respiratory diseases.
- ⑤ Mining causes destruction of natural resource.

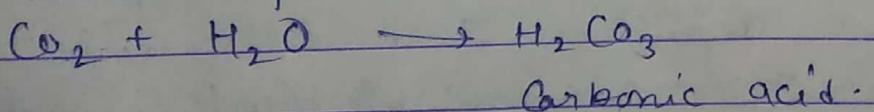
Imp. Complex Global Environmental Problems

- Acid Rain
- Global warming / Greenhouse Effect.
- Ozone-layer depletion
- Overexploitation.
- Urbanization.
- Biodiversity Depletion.

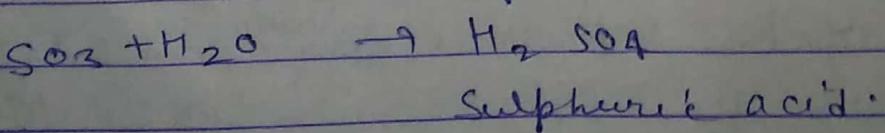
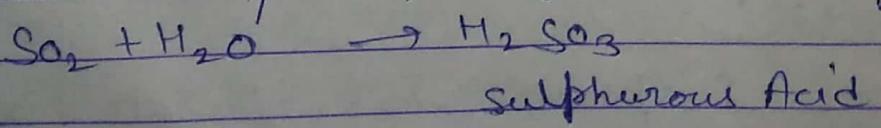
Acid Rain :- Rain water with pH value less than 5.7.

Causes of Acid Rain :-

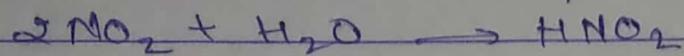
- ① Presence of CO_2 in Atmosphere



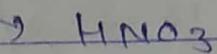
- ② Presence of SO_2/SO_3 release from industries.



③ Presence of oxides of Nitrogen release from Vehicles.



Nitrous Acid



Nitric Acid.

Effect of Acid rain

① Effect on Vegetation :- Acid Rain causes Soil to become acidic in nature and no vegetation will grow on it.

② Effect on historical Monuments (stone leprosy) :-

③ Lake Acidification :- Acidification of lake due to which it affects the metabolism of Aquatic organisms.

④ Foliage of trees & plants:- Due to weakening of their roots.

⑤ Acid rain affects the acidic pH of Ground water due to leaching of toxic minerals.

⑥ Acid rain along with chemicals form Photochemical smog, responsible for skin & respiratory diseases.

Preventions / measures to control Acid rain.

① Liming of lake.

② Use of pollution control equipments for controlling gases like SO_2 & NO_2 .

③ Coating of a protective layer of inert polymer in the water pipes for drinking purposes.

④ Removal of Sulphur and Nitrate Contents from the fossil fuel.

04/10/19 Global Warming/Green house effect Friday

There are certain gases present in our atmosphere like CO_2 , CH_4 , H_2O , water vapour, CFC which are capable of absorbing long wave radiation from the earth surface. These gases are responsible for the overall rise in temp. of the earth surface and enhance the temp. resulting in warming of atmosphere. This phenomena of rise in temp. of the earth surface is called global warming and the gases responsible for this are called greenhouse gases.

Effect of Global Warming

① Melting of glaciers & polar ice :- Rise in sea level frequent flooding & landslide.

② Rise in sea level :- Climatic disturbances, Cyclone, Typhoon etc.

③ Effect on Agriculture:- Both +ve and -ve effect soil moisture will decrease.

More evaporation and transpiration which will drastically effect the crops of wheat and Maize.

④ Effect on dissolved Oxygen in water:- Oxygen dissolved in water decreases, which effects life of Aquatic organisms.

⑤ Effect on human health:- Global warming causes climatic disturbances, low rainfall pattern, which give rise to various water

- borne diseases.

Ovenpopulation Parameter

Prevention

- ① Planting more trees.
- ② shift towards new renewable source of energy.
- ③ Use of photosynthetic algae in water.
- ④ By stabilizing population.

Ovenpopulation

Parameter

- ① Demography :- Study of population.
- ② Census :- Periodical counting of population for every 10 years.
- ③ Death Rate :- No. of Death's per thousand live population in a year.
- ④ Birth Rate :- No. of live birth's per thousand people in a year.
- ⑤ Doubling time :- The time required for the population to get doubled.
- ⑥ Life expectancy :- The expected years of life of a person or a individual.
- ⑦ Infant mortality Rate :- The no. of infant's of age group 0 - 12 months died per thousand live birth in year.

- ⑧ Total fertility Rate :- average no. of Children's that a women would have in her total full life span.
- ⑨ Zero population growth :- When birth and death rate equal then population becomes constl. known as zero population growth.
- ⑩ Age structure :- The composition of population of different ages.
gap: 3 marks

MALTHUS Theory On Overpopulation.

- According to this theory
- ① Food resources are finite and grow in arithmetical ratio while the population increases in geometrical ratio. (1, 2, 3, 4, 5, ...)
 - ② Since the rate of population is greater than the rate of food production, this indicates that in future we will suffer from scarcity of food material and hence will suffer from malnutrition and pre-mature death.
 - ③ Nature induces +ve checks to reduce human population through earthquakes, epidemics, flood etc.
 - ④ Only those people will successfully survive who face these +ve checks while others will be destroyed thus maintaining the balance of nature.

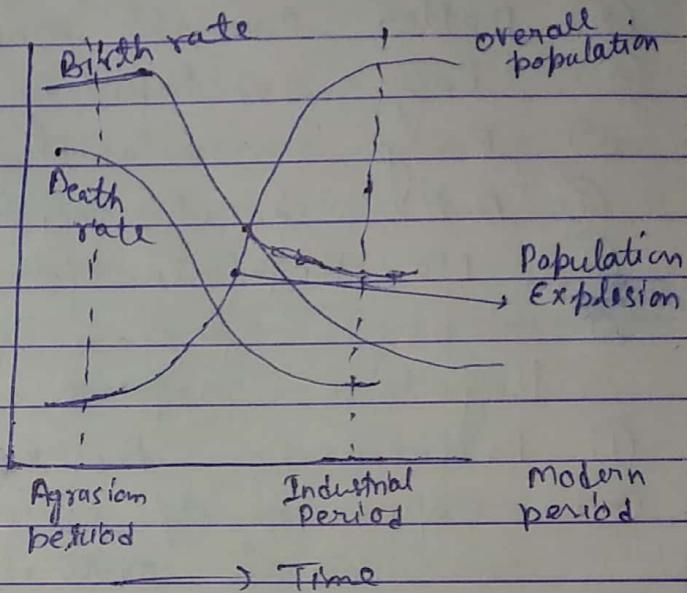
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Population Explosion

The sudden rise in population due to rapid decline in death rate, but the birth rate does not decline with same rate

Reason or Cause of Overpopulation.

- ① Rapid decline in death rate.
- ② Universality of marriage (compulsory) magnitude ↑
- ③ Illiteracy - lack of Education
- ④ Poverty (more childrens more earning hands)
- ⑤ Religious & cultural myths.
- ⑥ Unemployment



Consequences of Overpopulation

- ① Pollution of all types.
- ② High crime - Rate
- ③ Energy crises - lack of fossil fuels.
- ④ Depletion of Natural Resources.
- ⑤ Unemployment crises.
- ⑥ Low Economic development of Country.
- ⑦ Shortage of foods day-to-day commodities

Urbanization

Expansion of cities and Conversion of Rural areas to Urban areas.

Positive Aspects of Urbanization :-

- ① Better medical facility.
- ② Better modes of Education.
- ③ Better Overall modern development.
- ④ Easy availability of day-to-day commodities.
- ⑤ Easy availability of Transportation.
- ⑥ Better social security.
- ⑦ No discrimination on the basis of Caste & Religion.

Negative aspects of Urbanization.

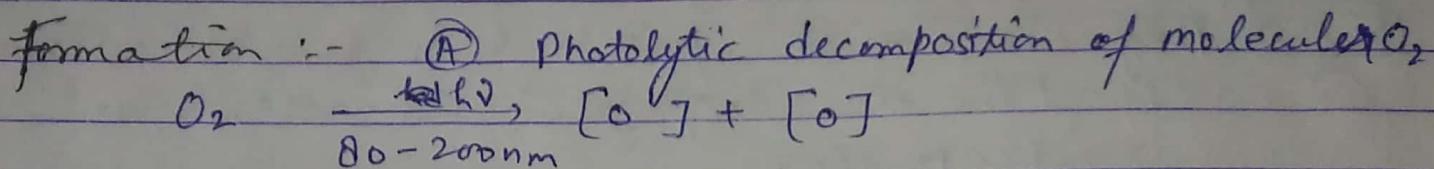
- ① Pollution :- Automobile & noise pollution.
- ② Expansion of cities at the cost of acquiring agricultural area.
- ③ Deforestation :- Cutting of trees for expansion of cities & villages.
- ④ Energy crises → excessive consumption of fossil fuel energy.
- ⑤ Poor environmental condition health & hygiene.
- ⑥ Problem of water logging & traffic jams.

Ozone layer Depletion.

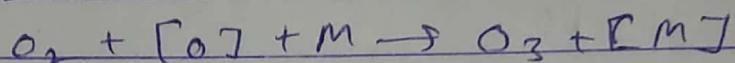
Ozone is a thick layer present in the stratosphere from a vertical height of 16 to 50 km from the earth's surface.

Formation and depletion of ozone (ozone cycle). Ozone layer protects from the harmful Ultra-violet rays reaching to the Earth's surface.

Chapman's Reaction.

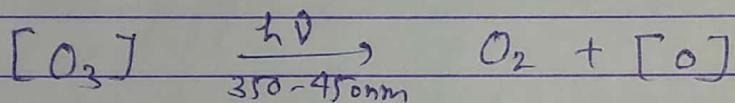


(B) Combination of mol. oxygen with Nascent Oxygen to form ozone.



where M is the Energy carrying species.

Depletion of O_3 .



In this way ozone cycle maintains a balance. However this cycle gets disturbed due to the presence of following compounds in the atmosphere.

- (1) Oxides of nitrogen (NO_x) released from supersonic jet air flyers.
- (2) Nitrous oxide (N_2O) released from fertilizers.
- (3) CFC Compounds released from refrigerators, ACs, etc.
- (4) Halons released from fire extinguishers.

Effects of ozone layer depletion:-

- (1) Change in D.N.A due to harmful U.V. rays causing skin diseases & cancer.
- (2) Melanin pigment cells will be affected.
- (3) Cataract due absorption of harmful U.V. rays by cornea of eyes.

- (4) Photosynthesis process in plants will be effected.
- (5) Degradation of paints & polymeric materials.
- (6) effect on the crop yield. of maize, wheat, soyabean etc.

Energy Resources.

- (1) Geothermal Energy
- (2) Tidal
- (3) wind
- (4) Nuclear
- (5) Solar
- (6) Biomass
- (7) Hydroelectric.

- (1) Energy produces inside the earth from rocks.
- (2) Energy produced by Ocean tides.
- (3) Energy produced by wind.
- (4) Energy produced by nuclear fission & fusion of radioactive metals.
- (5) Energy produce from sun in the form of E.M.R.
- (6) Energy produce from Organic matter obtained from plants & animals.
- (7) Energy produce by free fall of water from height.

Classification of Energy Resources.

① Renewable E.R.

(Energy which can be regenerate again.
Solar energy, wind,
Tidal, etc.)

② Non-Renewable E.R.

which is fixed amounts cannot regenerate again ex → fossil fuel energy,
Nuclear energy.

① Conventional Energy

Those Energy Resource which we are using from last 50-100 years.

Ex → Fossil fuel, hydropower energy. Ex → Solar Energy, Nuclear

② Non-Conventional Energy

which we are using as modern Energy Resource & still in a phase of developments.

Biomass.

Inp ① Biomass Energy :-

Biomass energy is generally produced from organic matter. It is obtained by following two methods.

① Growing those plants which are rich in sugar content like - Sugarcane, Sugar beat, Sweet sorghum (जीरा) etc. the solar energy trapped by the green plants through photosynthesis is converted into the Biomass energy.

The energy can be produced either by direct burning these plants or converting them by fermentation.

② To grow those plants which have high amount of vegetable oil like - Palm oil, Soybean & Tatropha (तटोफा). The oils produced from these plants can be used as bio diesel. A substitute of petrol.

Ques.

- ③ Bio gas:- Bio gas is the mixture of methane CO_2 , H_2 , H_2S ; it is produced by anaerobic degradation of animals waste material by bacteria in absence of O_2 .

Advantage :-

- ① No net increase in the CO_2 amount present in the atmosphere.
- ② Reduce dependency upon fossil fuel.

Amp. Solar Energy.

Energy produce from Solar Energy in the form of E.M.R.

There are two Amp. technology for Utilizing from Solar energy.

- ① Thermal Conversion:- It involves the utilization of heat energy produced in the form of solar radiation.
- ② Photovoltaic Conversion:- It involves the utilization of solar power to generate electricity by different process like - Photochemistry, photoelectric chemistry.

Application of Solar Energy :-

- ① Photovoltaic cell used to lighting of bulbs running electronic appliances.
- ② Solar Power heater used to generator hot water.
- ③ Evaporation ponds for generating salts.
- ④ Solar distillation plants for producing drinkable water.

Limitation (Disadvantage)

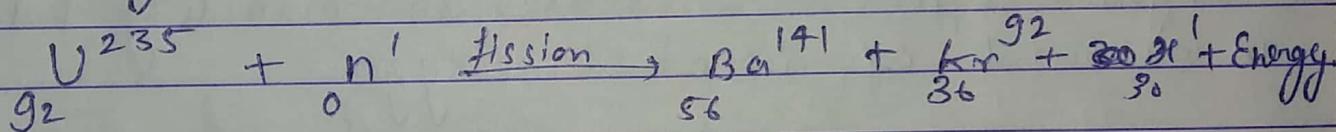
- Can be used only in day light not at night.
- It is an expensive technology.
- Solar panel used to occupies large land surface area.

Ques

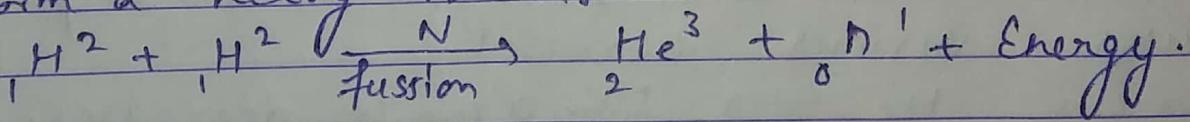
Nuclear Energy

Energy produced by nuclear reactions of radioactive elements. It is produced by two methods:-

- ① Nuclear fission (Ques): Breaking heavier nuclear into lighter nuclear).



- ② Nuclear fusion: Combination of two lighter nuclear to form a heavy nuclear



Pollution

- Ques
- ① Water pollution: - Any undesirable change in the physical, biological, chemical properties of water that makes the water unfit for drinking purposes is called water pollution.

Sources of water pollution:-

- ① Death & decay of plants and animals.
- ② Soil Erosion: - Agriculture run-off from the field to near by rivers and ponds.

- ③ Mining :- Leaching of toxic minerals to underground water
- ④ Municipal sewage :- Contamination of drinking water by sewer pipe lines.
- ⑤ Industrial waste :- Effluent release from industries into near by water-bodies.
- ⑥ Accidental spillage of oil & toxic chemical into sea & river water.

Effects of water pollution

- ① Physical effect :- Increase in turbidity & decrease in amount of dissolved Oxygen.
- ② Toxic chemical effect :- Toxic metal present in water like Cd, Cr, Hg, F are responsible for causes various decrease.
 - Hg → Minamata decreases.
 - Cd → Itai - Itai.
 - Nitrate → blue - body - syndrome.
- ③ Oxydative Effect :- Increasing rate of BOD, COD thus reducing the amount of dissolve oxygen.
- ④ ~~Eutrophication~~^{deadly} Eutrophication :- Lack of oxygen by nitrate accumulation in water through fertilizers resulting loss of oxygen & death of Aquatic organism.
- ⑤ Water borne diseases :- Diseases - like - Cholera, amoebic - dysentery, etc. are caused by polluted water.

Controlled the water pollution :-

- ①. Use of water treatment plant (WTP) & sewage treatment plants (STP) for treatment of polluted water.
- ②. Solid waste should not be discharge into water bodies - (River).
- ③. Afforestation:- By planting more trees to prevent soil erosion.
- ④. Industrial effluent should not be discharge directly w/o treatment.
- ⑤. Industrial effluent should not be discharge direct.
- ⑥. Regularly Cleaning of water - bodies timely.
- ⑦. Public awareness to control pollution.

Air pollution:

Any undesirable change in the chemical composition of air that can adversely affect health of human being.

Source of Air pollution:-

- ①. Natural sources:- By forest fires, Volcanos pollen-grains from flowers etc.

Man made Source:-

- ① Thermal power plants:- fly ash & SO_x .
- ② Burning of fossil fuel:- CO_2 , SO_x , NO_x .
- ③ Vehicular emission:- Carbon monoxide (CO) unburnt hydrocarbon, suspended particulate matter.
- ④ Industrial pollutant:- Industries like - cement, SPM, textile, releases or discharge H_2S , lead particle etc.

Effect of Air pollution :-

- ① Effect on human health :- Eye irritation respiration diseases - asthma, lung diseases due to Oxide of nitrogen & sulphur, PAN, SPM.
- ② Unburnt and lead particles Polycyclic hydrocarbons release by burning of petrol, Diesel causes cancer.
- ③ Silicosis :- It is disease causes due to explosion of dust particles.
- ④ Effect on plants :- ① Chlorosis (lack of chlorophyll) & necrosis (dropping of leaves) due to SO_2 , SO_3 , NO_x .
- ⑤ Effect on Aquatic life :- Acidification of lakes or ponds due to acid rain causes death of aquatic life.
- ⑥ Effect on Environmental problem :- Like - Global warming, Ozone layer depletion. Acid rain are all due to air pollution.

Control of Air pollution :-

- ① Afforestation :- Planting more trees.
- ② Industries should be provided with chimney at sufficient height.
- ③ Minimizing the causes of air pollution by using less transportation & energy sources.
- ④ Use of eco-friendly fuel replacing fossil fuel.
- ⑤ Use of pollution control equipment to reduce air pollution at sources.

Noise pollution:

Noise pollution can be defined as any undesired sounds that affects the welfare of human being unit Decimal is unit of Noise pollution.

Sources:

- ① Transport - Road, Rail.
- ② Industrial operation :- Heavy machinery work in industrial.
- ③ Celebration:- Land speaker ,DJ's, electronic machine , grinder .
- ④ House hold Equipment:- Grinder , mixer , television , music sound etc .

Standard Limit for ambient noise in different area:

- ① Industrial area :- 70 - 75 dB (Industries) .
- ② Commercial area :- 55 - 65 dB (market)
- ③ Residential area :- 45 - 55 dB (Residential colony)
- ④ Silence area → 40 - 50 dB (hospital , school etc) .