

Ajay Kumar Garg Engineering College, Ghaziabad.

Department of Applied Science & Humanities.

Sessional test Solution-II.

Course - B.Tech

Sem. - III

Session - 2017-18

Sub. - Env. & Ecology (RAS-302)

Section-A

Q-1 What are biogeochemical cycles?

Ans: The cyclic movement of chemical substance from surrounding to living species & from living species to surrounding is k/a biogeochemical cycles.

Q-2 Write a note on rill, sheet & Gully erosion.

Ans Rill are finger like appearance on soil through which org matter washed from soil.

Sheet : movement of top fertile soil from one region to another region is k/a sheet erosion.

Gully : When regular movement of water occurs from rills it gets extended through which max. fertile soil is washed.

Q-3 Name the causative Agents of water born disease.

	Disease	Agent
<u>Ans:</u>	Amoebiasis :-	Entamoeba Histolytica.
	Botulism :-	Clostridium botulinum.

Q-4 Write down composition of biogas.

<u>Ans</u>	Compound	%
	CH <sub>4</sub>	50-75
	CO <sub>2</sub>	25-50
	N <sub>2</sub>	0-10
	H <sub>2</sub>	0-1
	H <sub>2</sub> S	0-3
	O <sub>2</sub>	0

Q-5 Mention the permissible limit of F<sup>-</sup> in potable water.

Ans: It is 1.5 ppm.

## Section B

B. Attempt all the parts.

- ⑥ What is deforestation? Discuss its causes, effects and control measures.

Ans.

Deforestation means, cutting down the trees and utilising the space for some other purposes. The removal of forest covers, cutting down the trees, which leaves the land exposed to water and wind.

Causes -

- ① Thinning Forest fires → forest fires in certain areas in dry seasons destroys a huge area of forests, that leads to deforestation.
- ② Human establishments → Demands are increasing with the increasing population. forests are being cleared & in order to meet these demands.. eg. cultivation purpose, residence, infrastructure etc (railway tracks, bridges, roads)
- ③ Urbanisation & Industrialization - Land is being cleared in order to establish more cities, societies and industries.



common man to save forests & nature.

- ② Social forestry — It's an attempt to increase the green coverage through forestry by people, of the people and for the people. Plantation by school, colleges at various places.
- ③ Agro forestry — A system of growing plants with agricultural crops.

⑦ Discuss preventive measures of soil erosion.

Ans.

Soil erosion is the removal of soil particles by the force of either wind or water from the land.

Preventive measures:-

- 1) Contour farming:- The land is prepared with alternate furrows (a long narrow cut in the ground) and ridges at the same level. The water is caught and held in furrows and stores that reduce run off and erosion.
- 2) Mulching — Stems of maize, cotton, tobacco etc. are used ~~to~~ as a mulch to reduce the soil erosion.
- 3) Crop rotation — Changing the crops and cultivation of legumes after a regular crops.

- 4) Strip cropping - planting crops in rows or strips along contours to check flow of water.
- 5) Agrostological methods - Resisting plants are grown as erosion preventers like Korean grass, Mexican grass.
- 6) Miscellaneous methods - Afforestation, construction of drains, bunds etc.

8. Discuss the various problems associated with high fluoride content.

Ans.

People suffer from a disease called fluorosis after consuming water containing fluorine for sufficiently a long time. Quantity of fluoride in water is only 1 ppm.

- Deposition of fluoride on teeth & bones.
- Back pain and cannot easily bend.
- joints get stiffened so movements is impaired. - Skeletal fluorosis.
- Teeth are the worst affected and a brown coating appears on the enamel of teeth. - Dental fluorosis.
- Persons with fluorosis can not stand properly.

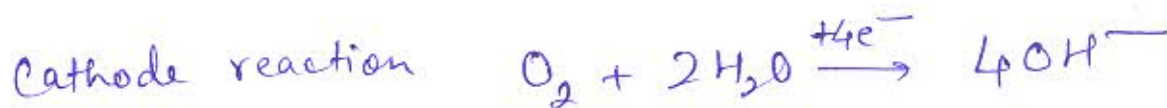
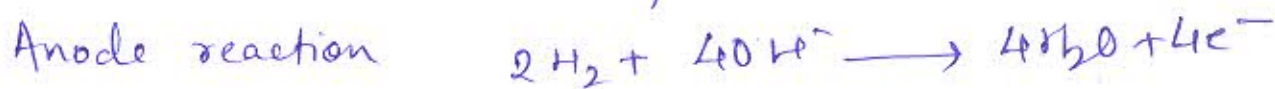
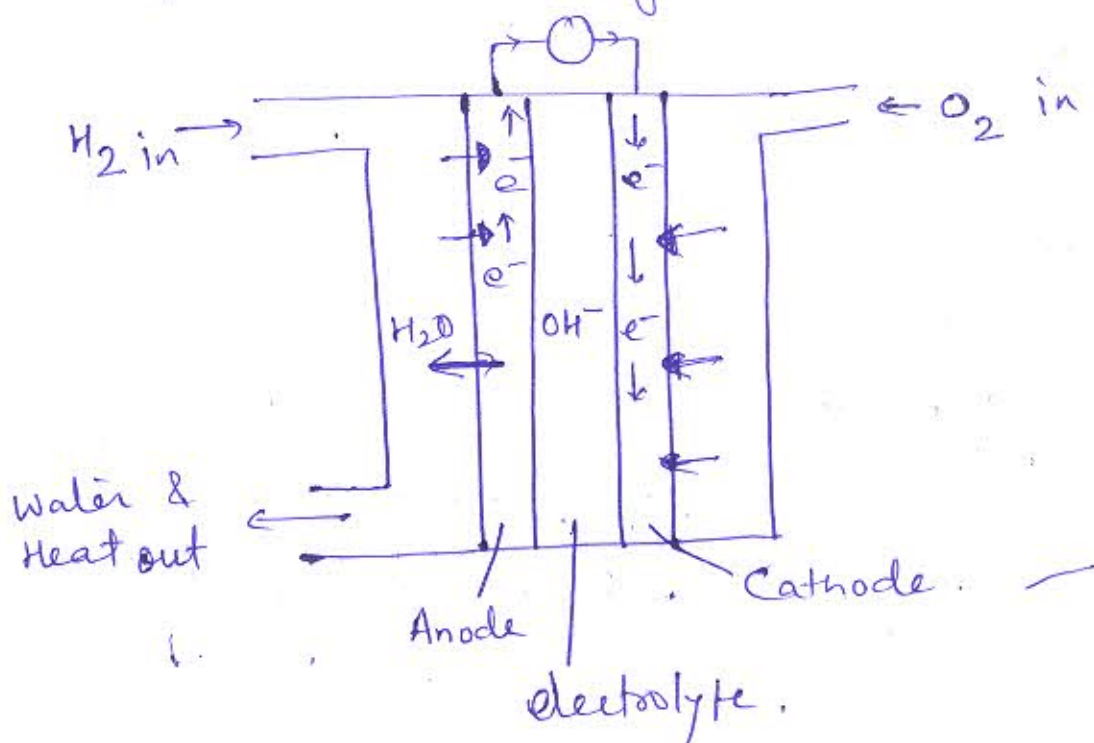


9. Discuss mechanism, reactions & advantages of fuel cell.

Ans. Fuel cell is a device that uses hydrogen and oxygen to create electricity by an electrochemical process.

Hydrogen is fed to the anode where a catalyst separates hydrogen's negatively charged electrons from positively charged ions (protons).

At the cathode, oxygen combines with electron and protons, resulting in water and energy.



## Advantages —

- 1) It is available in abundance and is available as a renewable source of energy.
- 2) It is not toxic and harmless for animals, humans and environment.
- 3) Hydrogen fuel cells are incredibly powerful, used as fuel in rockets, space shuttles.
- 4) There is no green house emissions from it, so doesn't contribute in climate change.
- 5) Maintenance is affordable.

10. Differentiate between nuclear fission and fusion.  
Write a detail note on nuclear energy with advantages and disadvantages.

Ans. All substances are made up by atoms bonded with bonds. These bonds contain energy and can be released by nuclear fission and nuclear fusion.

Nuclear fusion is the combination of 2 atoms and formation of 1 large atom. exp. → Energy from Sun.

Nuclear fission → Mostly used fuel in nuclear power plant is Uranium. In fission reaction neutrons hit the Uranium atom split into 2



Ba & Kr by producing more neutrons and release huge amount of heat.

### Mechanics

Advantage - Nuclear power plants take very small space for set up.

- they do not emit  $\text{CO}_2$  hence no global warming. take place
- In this process, no smoke, dust production
- Small amount of fuel can produce large amount of energy, easy to transport.
- less waste generation.
- weather independent.

### Disadvantages:-

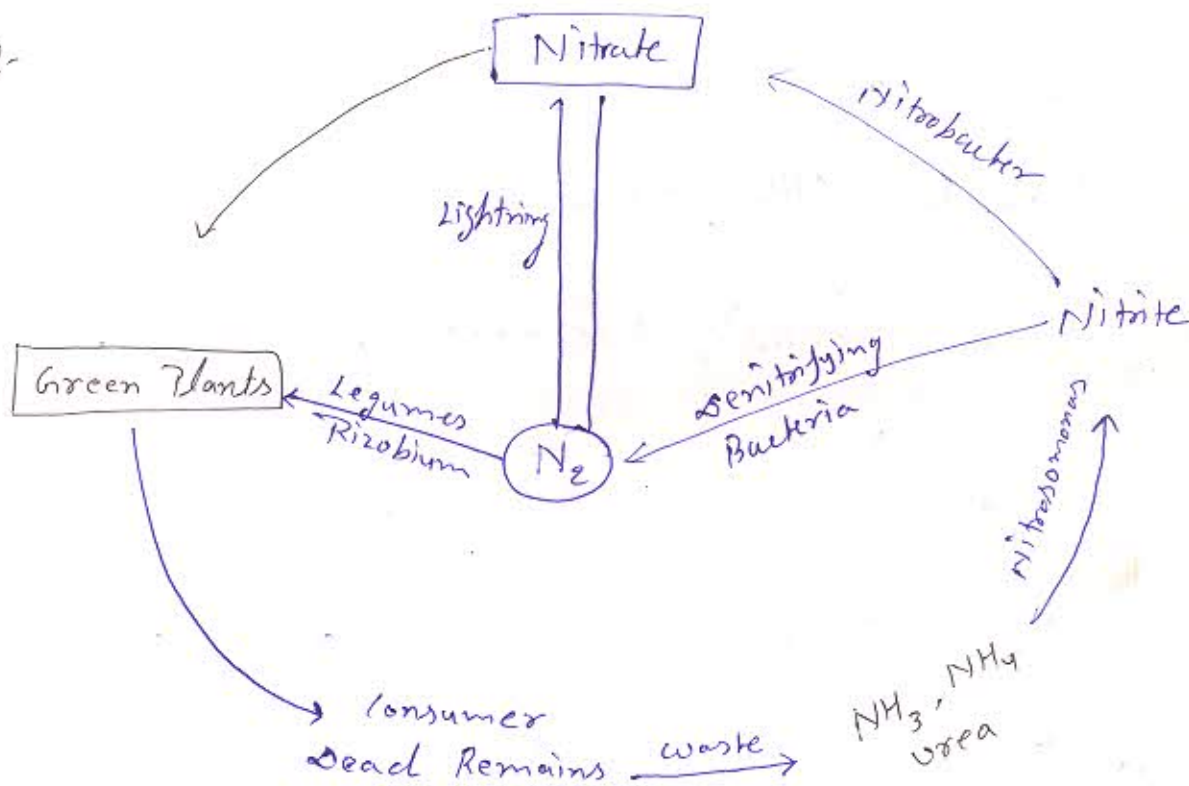
- Commissioning of nuclear power plant takes time and is expensive.
  - U is radioactive, so transport is risky and expensive
  - Disposal is to be planned properly.
  - Affects human health, may cause genetic disease.
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## Section - C

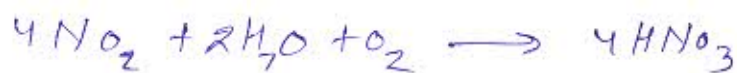
Q-11 Draw a neat sketch of  $N_2$  Cycle. Discuss various steps & reactions involved in it. Name the micro organisms participate in  $N_2$  cycle.

Ans:-



$N_2$  cycle is running by following Three steps.

- Fixation - It may be biological & Abiological
- In Abiological fixation  $N_2$  is converted into  $NO_3$  by thunder & storms by following reaction.



In biological fixation few plants can utilize free  $N_2$  these plants have symbiotic bacteria e.g. *Rhizobium leguminosorum* in their Nodulated roots. The organism of this step is R/A Diazotroph.

Ammonification!: In this process  $N_2$  compounds are converted into  $NH_3$ , Urea & uric acid & accordingly named as Ammonotelic, Ureotelic & Ureotelic.

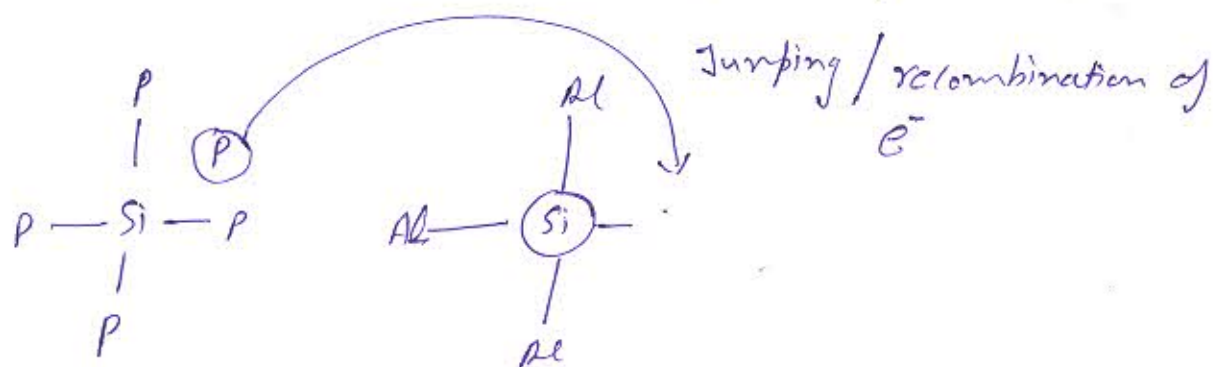
Nitrification!: In this process the ammonium compounds are further converted into Nitrites & then into Nitrates. In other words  $NH_4$  compounds are decomposed by microbes through decomposition process.

- *Rhizobium leguminosorum* which consumes Atmospheric  $N_2$
- ~~Cyanobacter~~ & *Nitrosomonas* is converted  $NH_3$  to Nitrite & *Nitrobacter* converts Nitrite to Nitrate.



Q-12 How Solar Energy is converted into electricity.  
Discuss the mechanism with suitable diagram.  
What are major advantage & disadvantage involved  
in this process.

Ans. Solar Energy is converted into electricity by  
using ~~Solar cooker~~, Solar Photovoltaic cell. In this  
P-N Junction is used to generate electricity. Gen.  
Semiconducting material Si is used in which certain  
impurities are doped like if doping occurs  
with Pentavalent substance ( $P^{+5}$ ) that helps to  
make an ~~hole~~  $e^-$  while doping of trivalent substance  
like  $Al^{+3}$  produces a hole that ~~fills~~ recombine  
with  $e^-$  & electricity is generated.



It can be easily seen in Solar Panel which  
is used to generate electricity in rural Areas.

Mechanism :- Gen Two main mechanism are used to utilize solar energy.

- Thermal Conversion :- In this solar energy is converted into heat by using good conducting material like Cu. exp Solar cooker, Geyser & Heater.
- Photovoltaic Conversion In this solar energy is converted into electricity by using P-N junction. exp. Solar Panel.

Advantage :- It is Renewable source of energy.

:- It is Ecofriendly & Non polluting.

:- It can be used in remote area & on waste land.

:- It is enormous & available till availability of sun

Disadvantage :- It is quite costly but due to govt policy it is available on subsidized rate.

:- It is totally dependent upon sunlight & weather condition therefore it malfunctions on cloudy days.