

Odd-2024

Assignment - 1

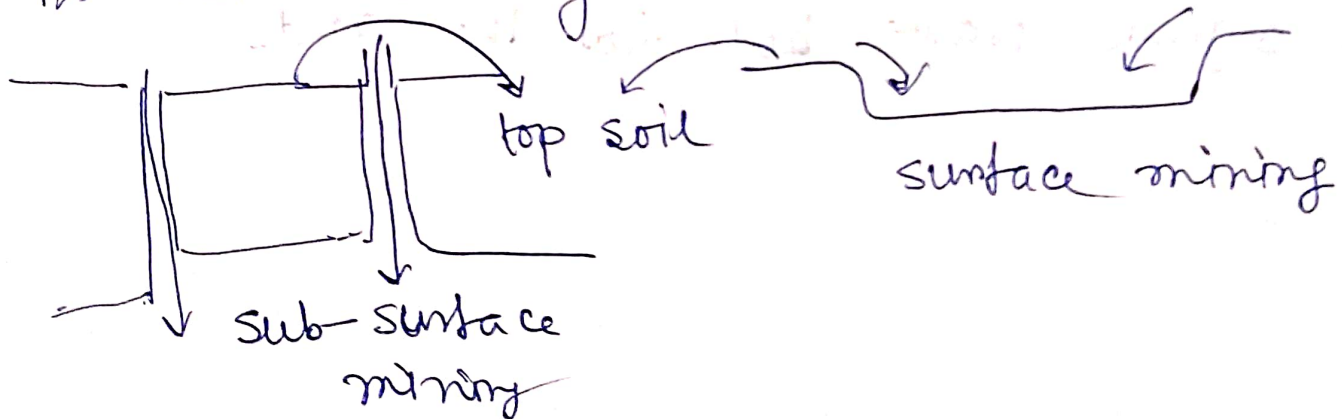
BTech Section 6

① The hilly region of Chhota Nagpur area ~~was used to~~ was a good forested area towards the turn of the century and received fairly frequent showers favouring tea plantations. Following the destruction of forests, rainfall declined in Chhota Nagpur to such an extent that tea-gardens also disappeared from the region.

② Burning of H_2 gas in presence of air forms water, which has high heat capacity. Water vapour strongly absorbs IR radiation and acts as a heat reservoir leading to global warming.

$$2H_2 + O_2 \rightarrow 2H_2O$$

③ Surface mining leads to large amount of deforestation, & since large amount of top soil is removed during such mining.



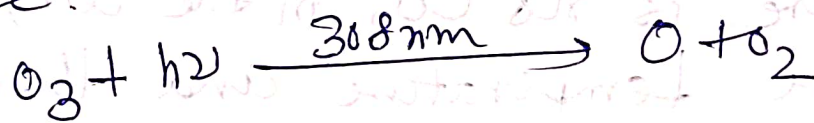
④ In 1960, the Indus water treaty was established, where Indus, Jhelum and Chenab were allocated to Pakistan and Satluj, Ravi and Beas were allocated to India. Since Punjab is an ~~agricultural~~ ^{agricultural} state, India has pre-emptive right to construct barrages across all these rivers in Indian territory. However, the treaty requires that the ~~two~~ three rivers allocated to Pakistan may be used for non-consumptive purposes by India, i.e. without changing its flow and quality.

⑤ ~~The In vitro~~ During microbial-leaching technique the bacterium *Thiobacillus ferrooxidans* has been successfully and economically used for extracting gold embedded in iron sulphide ore. The ores are inoculated with the desired strains of bacteria, which remove the impurities, like sulphur and leave the pure mineral.

⑥ Organic wastes are generally insoluble in water, but acid (H_2SO_4) is soluble in water. Since soil acts as a filter, it can filter out the organic waste, but not the acid.

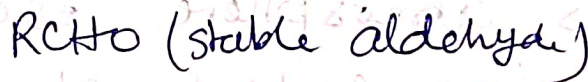
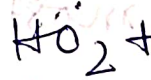
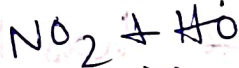
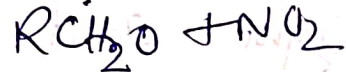
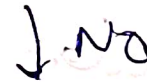
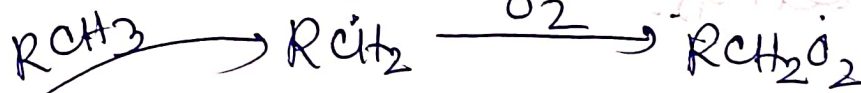
① O_3 serves as a rescuer of biosphere while present in stratosphere due to absorption of harmful UV rays (around 308 nm) generating O radical and O_2 molecule. On the other hand, it acts as a potent pollutant in troposphere, since it leads to formation of photochemical smog.

In stratosphere:



In troposphere:

Reactive hydrocarbon



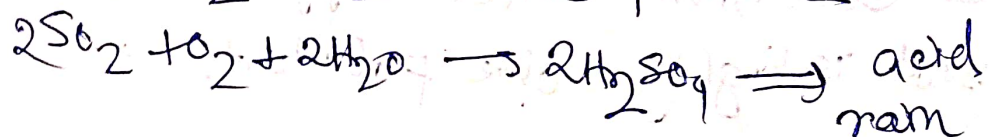
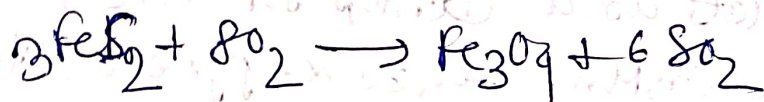
② Soot is a highly condensed product of polynuclear aromatic hydrocarbons (PAHs) consisting of several thousand interconnected crystallites. Since soot has very large size, it is difficult to penetrate. But due to large surface area, soot acts as a carrier for toxic pollutants, like Be, Cd, Cr, Mn, benzo-a-pyrene, etc. Therefore, soot is highly active pollutant.

③ Sample B is more dangerous, since it contains 5% CO. Since the binding capacity of CO with haemoglobin is very high, ~~and~~ it ~~leads to~~ stops the supply of O_2 in various body tissues. ~~and~~ Therefore sample B is more harmful.

④ If there is no CO_2 in the air, air cannot preserve temperature and therefore, at night, the earth surface would become very cold, which becomes unsuitable for living beings.

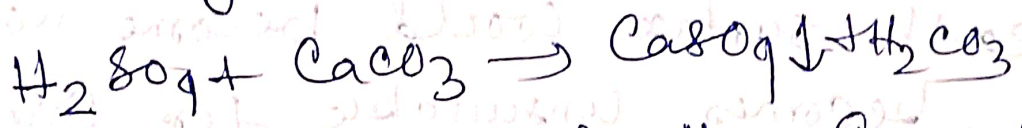
⑤ Molecular H_2 has very low molecular weight and therefore, it ~~can~~ has high escape velocity. So most of the H_2 content of earth's atmosphere escapes ~~due~~ resulting into very low content of free H_2 . On the other hand, it is present as compounds in water, acids and hydrocarbons.

⑥ ~~FeS₂~~ The following equations are responsible for stone leprosy originating from Pyrite containing coal.



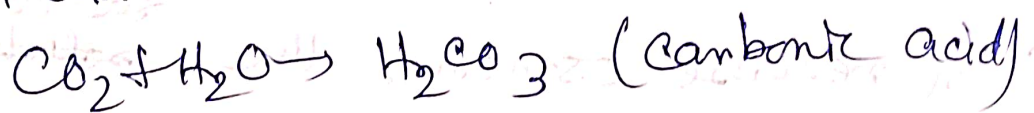
- 1) If there is no H_2O in the air, air cannot preserve temperature and therefore, at night, the earth surface would become very cold, which becomes unsuitable for living beings.
- 2) Arsenic contamination is mainly originated from over utilization of ground water, ~~so~~ that ~~the~~ In this process, the Arsenic layer of underground is exposed. Arsenic accumulation from polluted water can result in skin lesions and ultimately skin cancer.
- 3) In reverse osmosis, the ~~solvent~~ ^{solution} is kept inside a semipermeable membrane and solvent ~~is out~~ remains outside the membrane, where external ~~low~~ pressure is applied in the solution to prevent the diffusion of solvent molecules from pure solvents to inside solution. ~~In waste-water treatment~~ In addition, more pressure is applied ~~to~~ in the solution (inside the membrane) so that water can flow in the reverse direction (solution to solvent), but solute remains inside the membrane. Using this method, the pure water can be pumped out from a waste water sample with a semi-permeable membrane.

- ④ Yes. If river bed is constituted with CaCO_3 , it can resist the acid mine drainage by neutralizing the acid. (Like H_2SO_4)



But ~~due to precipitation~~ If the Ca salt is water soluble (like CaCl_2), the neutralization process is ~~being a while~~ is continued, but ~~for~~ for water insoluble salts (like CaSO_4), such neutralization process is interrupted ~~by~~ due to formation of a layer over the river bed.

- ⑤ Rainwater is slightly acidic due to presence of CO_2 in air.



No. This slight acidity is ~~a~~ beneficial for living beings, since it helps to dissolve the salts of soil so that trees can absorb such salts.

- ⑥ Yes. The non-toxic azo dye will hinder the sunlight for penetration. Ultimately it leads to death of aquatic biota due to absence of photosynthesis.