Explosive & Lubricants & Paints

1) What is explosive? Classify explosive with example what are requirement of good explosive?

=> Explosive are substance or mixture than when ignited undergoes a rapid, violent chemical rxn & produce a large amount of gas, heat, light sound & high pressure.

Explosive are classified as:-

On the basis of their speed.

1. High explosive (eg TNT, TNIG, RDX)
2. Low explosive (eg gunpowder, nitro cellulose)

On the basis of their sensitivity.

1. Primary explosive (eg: Lead azide, Tetracene)
2. Secondary explosive (eg ammonium nitrate agent blasting, RDX, TNT)

The requirement of good explosive are

1. It must produce exothermic reaction along with gas light, sound, & high pressure.
2. The explosion must be strong enough to blast ores, rocks in case of high explosive.
3. The explosion must be strong enough to trigger other explosions in case of primary explosives.

2. What is lubricant? Write about the application of diff. types of lubricants - Write the characteristics of good lubricants

⇒ The substance applied bet^n two moving or sliding surface to reduce frictional resistance bet^n them is known as lubricants.

The application of various types of lubricants are:-

- Liquid lubricant are used as coolant, sealing agents
- Liquid lubricant are used to friction remover for high bearing loads & shock loads
- Solid lubricant are used for coating as insulating surface to make it conducting.

The characteristics of good lubricants are

- It must evenly spread on lubricant surface for uninterrupted motion.
- It must be resilient to high temp. & high motion
- It must last long on the surface

3) Show your familiarity with primary & high explosive. Write the preparation & use's of TNT & TNB.

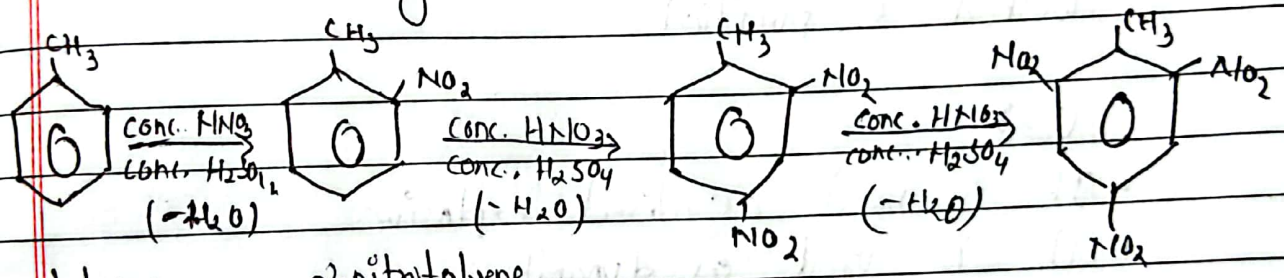
⇒ Primary explosives are also called initating explosive or detonator. They are very sensitive & explode on receiving slight shock/fire. They are mainly used in small quantities to start or initiate the explosion of the main explosive.

Eg. Lead azid (PbN_6), Tetreene ($C_2H_8N_8O$) etc.

High explosive are those explosives which have higher energy than other explosives. However, they are quite stable & less sensitive to fire & mechanical shock. They are mostly used for blasting, terror attacks, excavating etc.

a) TNT.

It stand for trinitrotoluene. It is the principle military explosive. It is economic & safe, to prepare, has low sensitivity to impact, high stability etc. It can be prepared by nitration of toluene with conc. HNO_3 & conc. H_2SO_4 at 140°C then finally at 230°C.



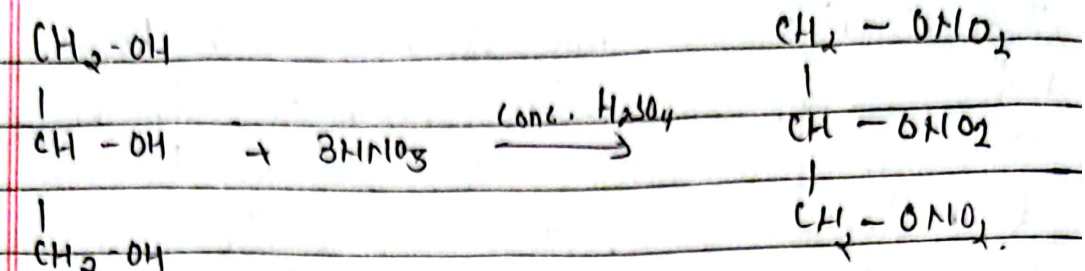
toluene — 2-nitrotoluene — 2-4-dinitrotoluene — 2,4,6-trinitrotoluse

Uses.

- It is used for the shell of a rocket launcher
- It is used in air bond demolition.
- It is used in rock blasting, subsoil blasting.

b) TNG

⇒ It stands for trinitroglycerine. It is prepared by adding glycerol to a cooled mixture of conc. H_2SO_4 (60%) & conc. HNO_3 (40%) at 10°C with constant stirring.



In the industry glyceral is added by well stirring cooling of a mixture of conc. HNO_3 & conc. H_2SO_4 during that the temperature of the reaction mixture does not rise up to 15°c otherwise it may result is a serious explosion. The reaction mixture is then quenched in a large vol. of water & the product is washed & purified.

Uses:

- It is used as direct explosive
- It is used as dynamite.

(Q) Write about enamels & varnishes? Write about semi-solid lubricants & their uses.

=> Enamel is a pigmented - varnish paint which on drying gives a lustrous, hard & glassy finish. The properties of enamel depend largely on the nature of the varnish's vehicle & resin.

Varnishes are homogenous colloidal dispersion soln of natural & synthetic resin in oil or thinner or both. It is used for protective & decorative coating of suitable surface which on drying leaves hard, transparent, glassy, lustrous

& durable film.

Semi-solid lubricants are obtained by dispersion of thickening agent in liquid lubricant. It can also be prepared by saponification of fat with an alkali. The consistency is governed by the amount of mineral oil present in it.

Usese of semi-solid lubricants.

- Used as friction reducer in automobile
- Used in industries
- Used as coolant in automobiles.

5) What are plastic explosives? Why is detonator required for the explosion of TNT?

⇒ Plastic explosive are the combination of explosives that are in polymer state & can be hand moulded & made into various shapes without any serious risk. They are mainly used for industrial applications & military uses.

TNT or trinitrotoluene in short is a high explosive which has low sensitivity to impact, high stability & low melting points so under normal condition, TNT doesn't explode so a detonator is used to trigger a rxn which cause the main explosion of TNT.

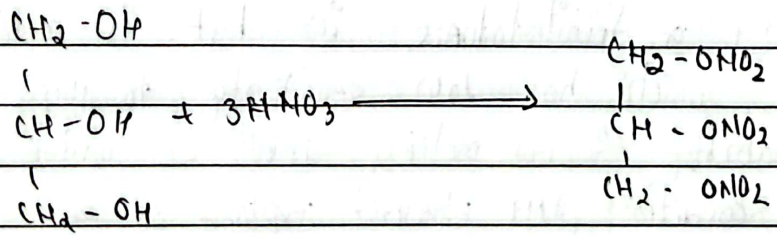
Q6)

=> Paint is viscous suspension of finely divided solid pigment in a fluid medium, which on drying yields an impermeable film of powder. Paint is defined as the decorated & protent liquid or semi-liquid product that holds solid coloring materials in suspension

The importance of lubrication in engineering is
- to decrease the efficiency of machines.
- to decrease the machine maintainence cost.
- to decrease friction & heat generation.
- to increase the life of machine

Q7)

=> Glyceral trinitrate (GTN) is prepared by mixing of glycerol with mixture of conc H_2SO_4 (60%) & conc. HNO_3 (40%) at 10°C with const. stiring



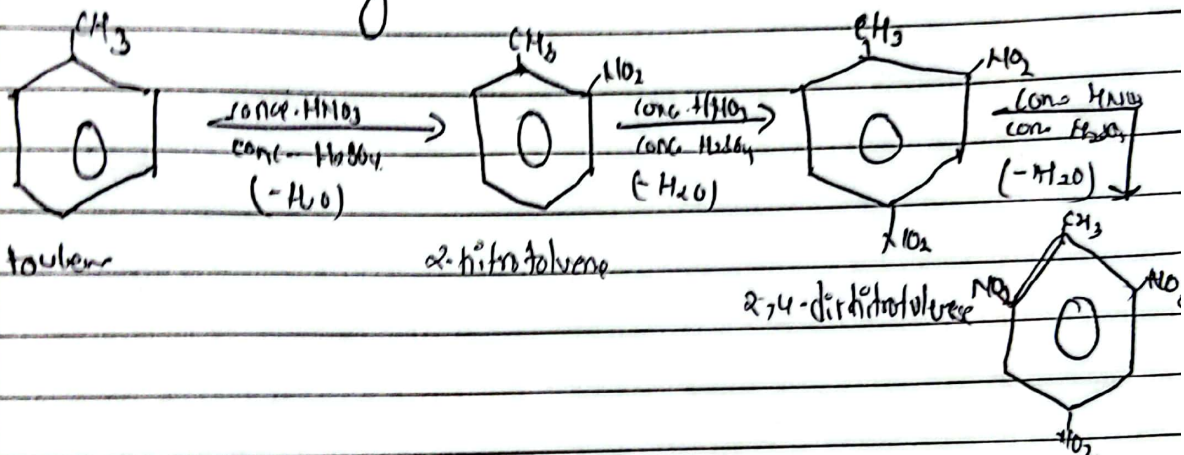
In the industry, GTN is prepared by adding glycerol with stiring to cooling mixture of conc. HNO_3 & conc. H_2SO_4. It is ensured that the temp. of mixture doesn't exceed 15°C as it may lead to deadly explosion.

Uses

- It is used as direct explosive.
- It is used as dynamite

Q 8)

⇒ TNT (Trinitrotoluene) is prepared by nitration of toluence with conc. HNO_3 & conc H_2SO_4 at 110°C then at 180°C & finally at 230°C.



Uses

- It is used in air bond demolition
- It is used in rock blasting, subsoil, blasting