

Thy A.  
①

Engg. chemistry

Batch-15

Page No.

Date

## Solution of Questions

Q1. Lubricants → Any substance introduced between moving or sliding surfaces with a view to reduce the frictional resistance between them or reduce wear and tear, is known as Lubricants.

function of Lubricants :- ① To reduce friction ② It prevent direct contact between rubbing surfaces ③ Reduce loss of energy ④ Reduce expansion of metals ⑤ Absorb shocks etc.

classification → ① liquid Lubricants [Example

② semi-solid Lubricant or Greases.

③ solid Lubricants. example, application, uses etc.

Q2.

composition of portland cement

<u>Component</u>	<u>Abbreviated form</u>	<u>% age</u>
1. Lime [ $\text{CaO}$ ]	C	60-69
2. Silica [ $\text{SiO}_2$ ]	S	17-25
3. Alumina [ $\text{Al}_2\text{O}_3$ ]	A	3-8
4. Iron-oxide [ $\text{Fe}_2\text{O}_3$ ]	F	2-4.
5. MgO		1-5
6. $\text{Na}_2\text{O}$		0.3-1.5

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Principle raw materials:-

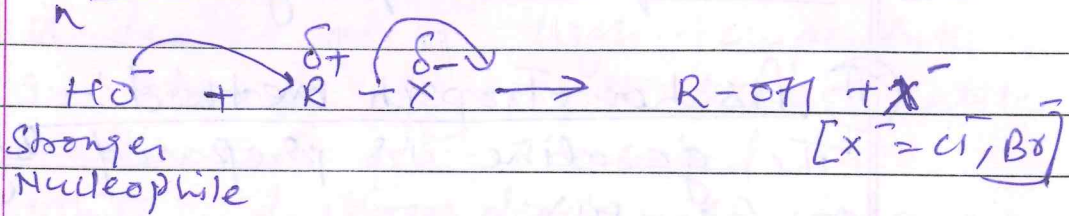
1. Calcareous materials:- These are the main source of  $CaO$  (lime), lime-stone [ $CaCO_3$ ] chalk, calcite, shale etc.
2. Argillaceous materials:- These are the main sources of silica and alumina.  
(i) clay (ii) marl (iii) sand (iv) slate  
(v) Blast furnace slag etc.
3. ferriferous material → source of iron oxide. such as clay, iron ore
4. Gypsum [ $CaSO_4 \cdot 2H_2O$ ]
5. Powdered coal.  
Chemistry (Reaction in Kiln).  
etc. ✓

Q3 Different Types of chemical (organic) reaction.

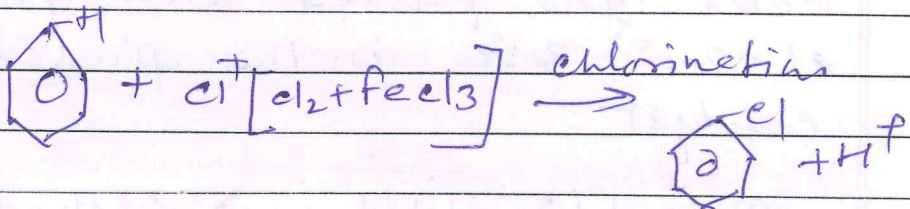
Ans - All organic reactions can be broadly classified into the following four types -

# Nucleophilic

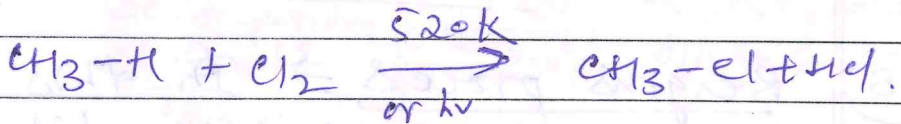
## i) Substitution Reaction



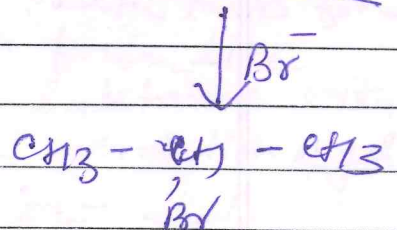
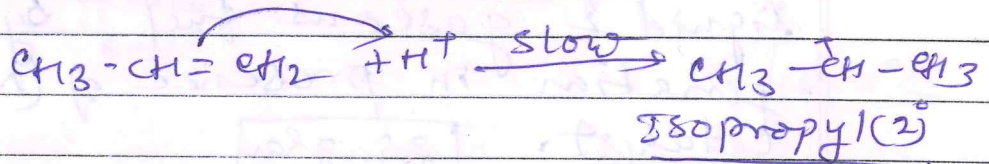
## (ii) Electrophilic Substitution



## (iii) Free Radical



## (iv) Electrophilic Addition



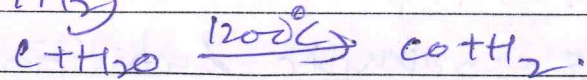
2-Bromopropane  
addition product

Q4

## manufacture of Synthetic petrol

(A) Fischer-Tropsch method:-

The gasoline is prepared by water gas ( $\text{CO} + \text{H}_2$ )



Water gas passed through conversion at  $200^\circ\text{C} - 300^\circ\text{C}$  in the presence of catalyst



Diagram

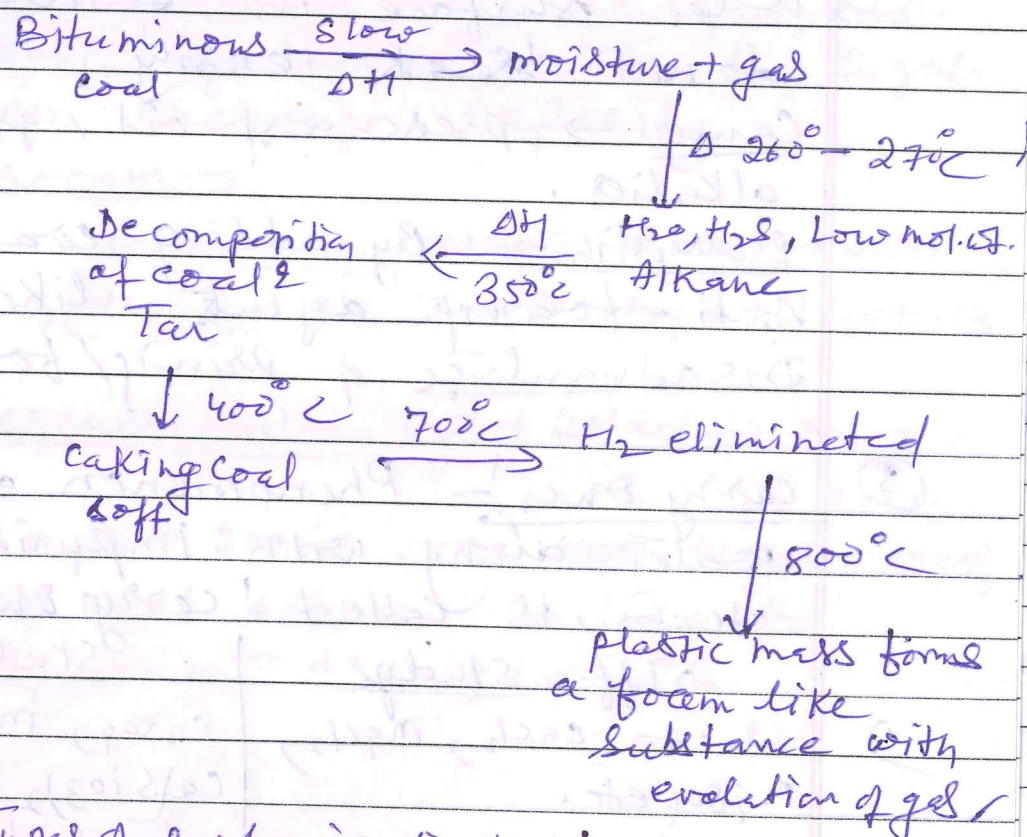
(B) Bergius process  $\rightarrow$  In this process low grade coals (like bituminous and brown coal) is converted into liquid & gaseous fuel by hydrogenation in presence of (Ni or Sn) catalyst.

Diagram



Q5 carbonization of coal - when coal is heated at a high temperature in absence of air, it loses volatile matter and gets converted into white, dustless dense, strong, porous & coherent mass, which is richer in carbon.

Steps in carbonization



Types of carbonization - low and high temperatures

Q6 (a) Priming! - Process of forming wet steam

Causes → dissolved solids, very high water level etc.

Prevention → using mechanical steam purifier, keeping water level low etc.

(b) foaming → foams or Bubbles at the water surface in boilers which do not break easily

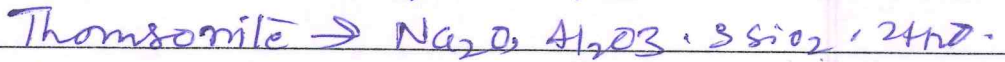
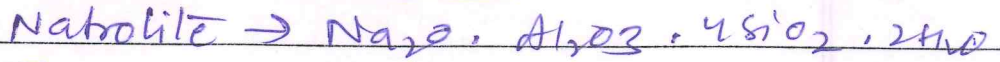
Cause → presence of oil, grease, alkalis.

Prevention → By adding coagulants Anti-foaming agents like Cellulose.   
 Disadvantage of priming/foaming.

(c) carry over! - Phenomenon of carrying water along with impurities by steam, is called 'carry over'.

Diff. sludge	Scale
1) due to $CaCl_2$ , $MgCl_2$ , $MgSO_4$ etc.	$CaSO_4$ , $Mg(OH)_2$ , Calcium etc.

Q.P

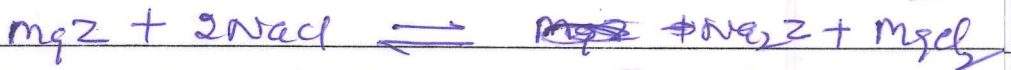
Natural Zeolite

Synthetic Zeolite  $\Rightarrow$  are porous and possess a gel structure. They are usually prepared by heating china clay, feldspar, soda ash. Synthetic zeolite has higher ion exchange capacity.

Process  $\rightarrow$



Regeneration  $\rightarrow$   $\text{CaZ} + 2\text{NaCl} \rightleftharpoons \text{Na}_2\text{Z} + \text{CaCl}_2$



10% NaCl solution is taken to regenerate the zeolite.