

SUBJECT - CHEMISTRY

CLASS - B.Sc (Sub/Gen) PART - II

GROUP - C

TOPIC - Properties

Dr Hari Mohan Prasad Singh

Department of Chemistry

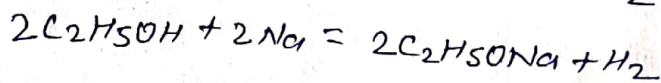
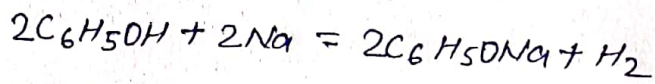
Dr. L.K.V. D College Tajpur Samastipur

Q Describe the physical and chemical properties of phenol.
Mention the uses of phenol.

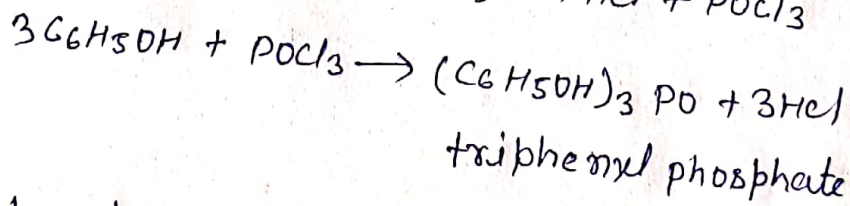
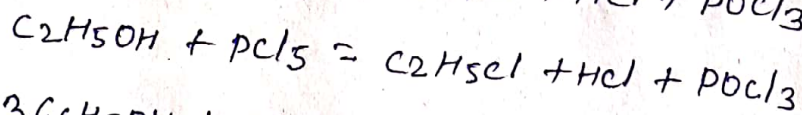
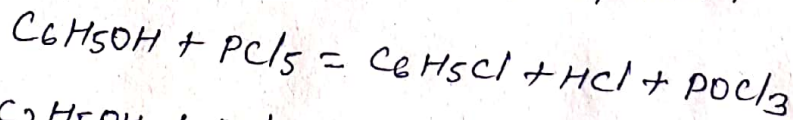
Ans Properties:

A Reactions in which phenol resembles ethanol:

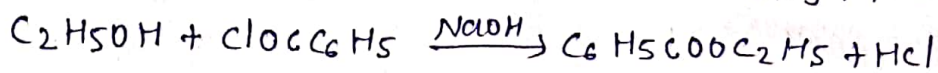
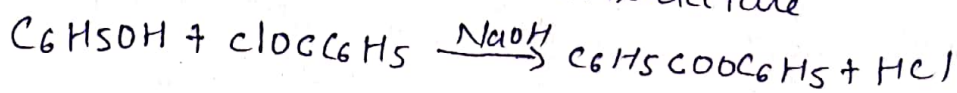
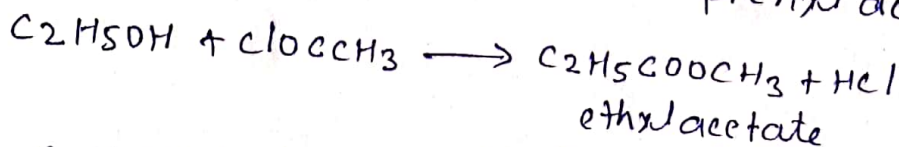
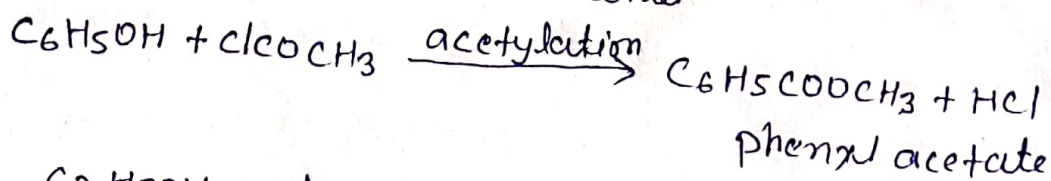
(i) Like ethanol, phenol reacts with Na forming Sodium phenate and H_2 is evolved



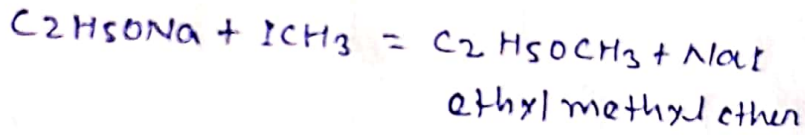
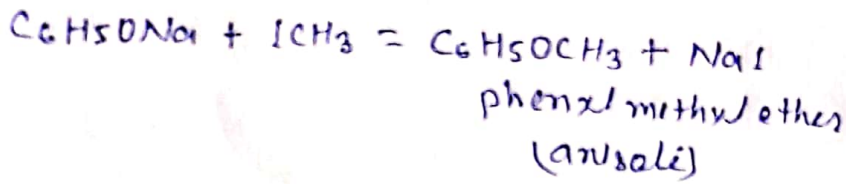
(ii) Like ethanol, phenol reacts with PCl_5 , OH group is replaced by Cl BUT the amount of chloro benzene formed is very small. Main product is triphenyl phosphate.



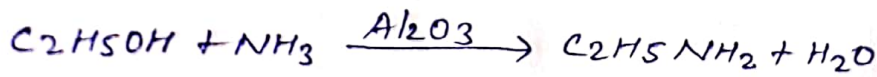
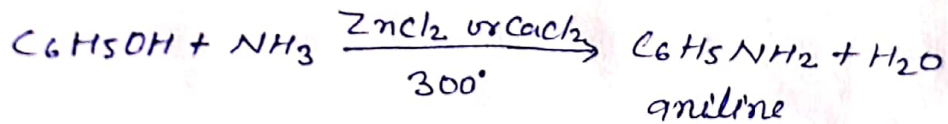
(iii) phenol reacts with acid chloride or acid anhydride to form ester less readily than alcohol.



(iv) Like Sodium ethylate, Sodium phenate also reacts with alkyl halide to form ether. with CH_3I , anisole is the product (Williamson's method).

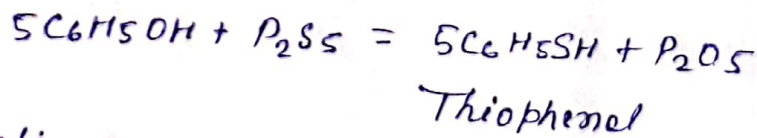
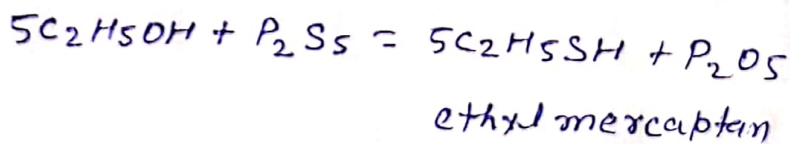


(v) Like ethanol, phenol also reacts with ammonia to give aniline



In case of ethanol, besides 1° amine, 2° and 3° amine are also formed.

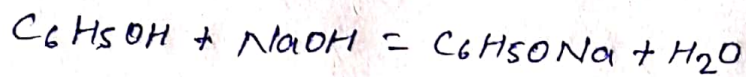
(vi) Like ethanol, phenol reacts with P_2S_5 to form thiophenol



B. Reactions of phenol not given by ethanol:

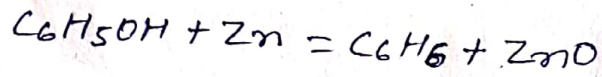
(1) phenol is weakly acidic and dissolves in caustic alkali solution to form alkali phenate, ethanol is neutral and is

not dissolved by alkali solution. Phenol though acidic does not evolve CO_2 from NaHCO_3 solution (different from organic acids) phenate is decomposed by mineral acid and CO_2 to phenol.

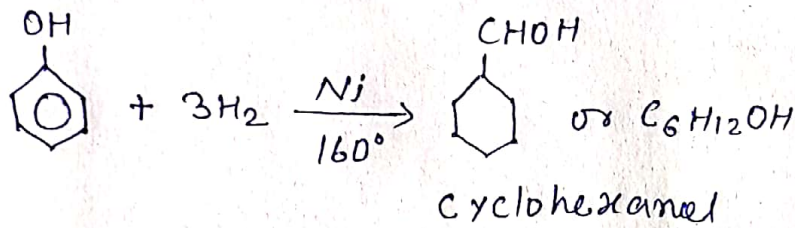


Sodium phenate

(i) When distilled with Zn dust, phenol is converted into benzene



(ii) Phenol can be hydrogenated in presence of Ni catalyst at 160° to cyclohexanol



Uses: As antiseptic - carbolic soap, lotion, preservative for ink for the manufacture of drugs like Salol, aspirin, phenacetin etc bakelite, picric acid as explosive, p-aminophenol as a photographic developer, phenolphthalein as indicator, cyclohexanol as solvent in nylon manufacture etc.