NAME: BASSEY, VICTORY SAMUEL

DEPT: MEDICINE AND SURGERY

COURSE: CHM 102

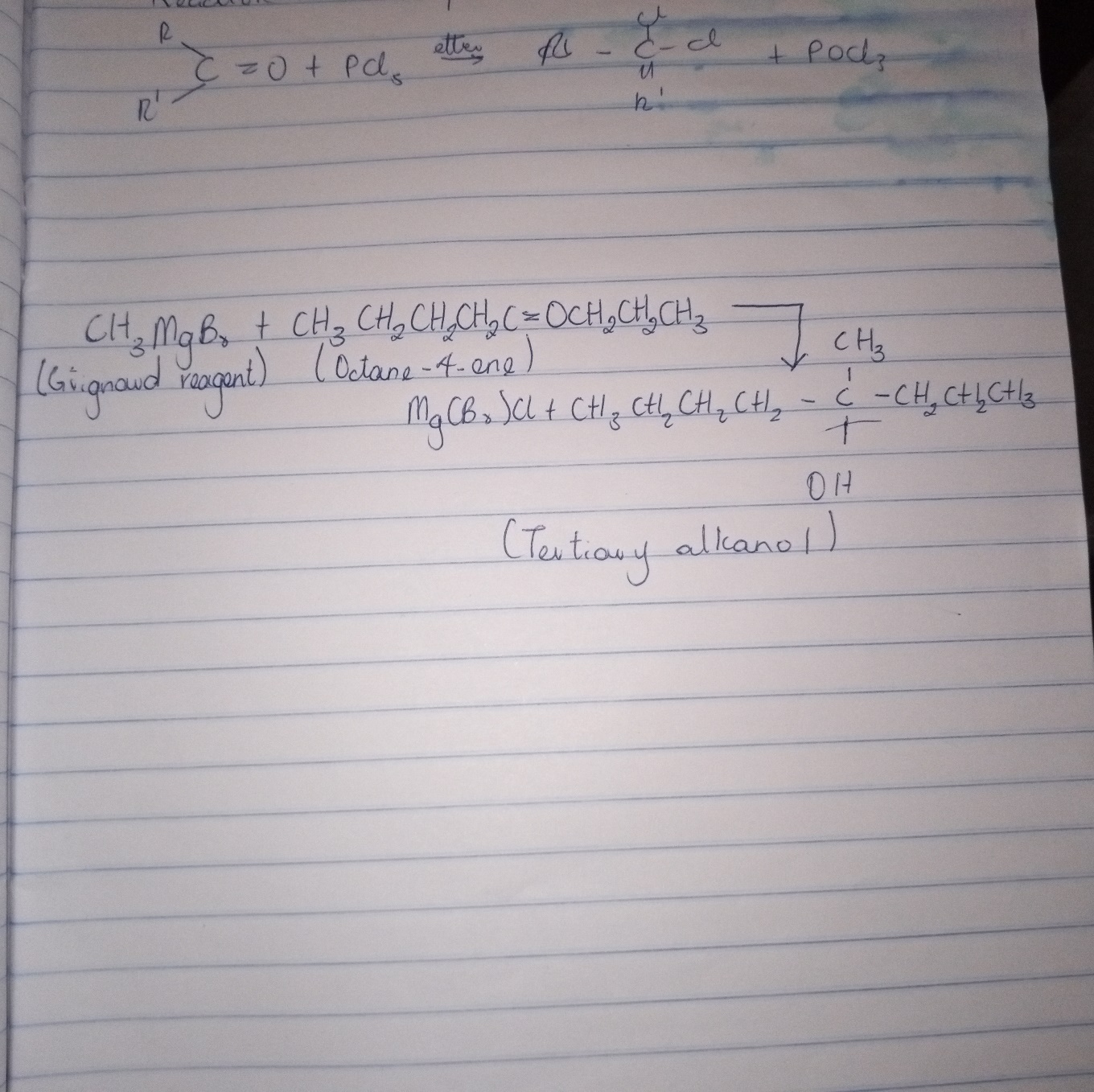
MATRIC NO: 19/ MHS01/119

**ANSWERS**

1. Discuss the two major classification of alkanols. Give two examples for each class.
2. Some of the properties of alkanols depend on the number of carbon atoms attached to the specific carbon atom that is attached to the OH group. Alkanols can be grouped into three classes on this basis:

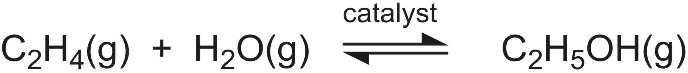
* A primary (1°) alkanols is one in which the carbon atom with the OH group is attached to *one* other carbon atom. Its general formula is RCH2OH.
* A secondary (2°) alkanols is one in which the carbon atom with the OH group is attached to *two* other carbon atoms. Its general formula is R2CHOH.
* A tertiary (3°) alkanols is one in which the carbon atom with the OH group is attached to *three* other carbon atoms. Its general formula is R3COH.

1. Alcohols containing one hydroxyl group are called **Monohydric alkanols**. Some alkanols contain more than one hydroxyl group per molecule. They are known as **polyhydric alkanols**. Two important examples are ethane-1,2-diol (ethylene glycol) which is a ***dihydric*** alkanol, and propane-1,2,3­­-triol (glycerol) which is a ***trihydric*** alkanol.
2. In the Grignard synthesis of Alkanols, react a named Grignard reagent with CH3CH2CH2CH2C=OCH2CH2CH3. Show reaction steps.



1. Discuss the industrial manufacture of ethanol showing all reaction equations and necessary enzymes and temperature of reaction.

Ethanol is manufactured by the direct catalytic hydration of ethene in the presence of steam, using phosphoric acid adsorbed on the surface of a solid (silica) as a catalyst.  The reaction is reversible and exothermic:



From the equilibrium equation, it can be seen that conversion of the feedstock to ethanol is favoured by low temperature, high pressure and high steam concentration. To achieve acceptable reaction rates, a temperature of 500 K is used in the presence of the catalyst. The process is generally operated under a pressure of 60-70 atm.

1. Determine the product obtained in the reduction of Alkonone and Alkanal. Use a specific example for each and show the equation of reaction.

Both alkanals and alkanones can undergo reduction using hydrogen gas and a catalyst, or a metal hydride reducing reagent.

The reduction of an alkanal produces a primary alkanol.

The reduction of an alkanone produces a secondary alkanol.

For example, using a platinum catalyst with hydrogen gas under pressure, we can convert butanal to butan-1-ol, and we can convert butanone to butan-2-ol using a nickel catalyst as shown below:

