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COURSE: Medicine and Surgery

MATRIC NO: 19/mhs01/119

ASSIGNMENT

1. Give the IUPAC names of the following compounds:
2. HCOOH- Methanoic acid
3. HOOCCH2CH2CH2COOH- Pentan-1,5-dioic acid
4. CH3CH2CH2COOH- Butanoic acid
5. HO2C-CO2H- Ethanedioc acid
6. CH3(CH2)4COOH- Hexanoic acid
7. CH3CH=CHCH2CH2COOH- Hex-4-eneoic acid
8. Discuss briefly the physical properties of carboxylic acids under the following headings. (i) Physical appearance (ii) Boiling point (iii) solubility

(i) Physical appearance:

Many carboxylic acids are colorless liquids with disagreeable odors. The carboxylic acids with 5 to 10 carbon atoms all have “goaty” odors (explaining the odor of Limburger cheese). These acids are also produced by the action of skin bacteria on human sebum (skin oils), which accounts for the odor of poorly ventilated locker rooms. The acids with more than 10 carbon atoms are waxlike solids, and their odor diminishes with increasing molar mass and resultant decreasing volatility.

(ii) Boiling point:

The boiling point of a carboxylic acid is generally higher than that of water. Carboxylic acids exhibit strong hydrogen bonding between molecules. They therefore have high boiling points compared to other substances of comparable molar mass. boiling point increases with increasing relative molecular mass. Aromatic carboxylic acids are crystalline solids and have higher melting points than their aliphatic counterparts of comparable relative molecular mass.

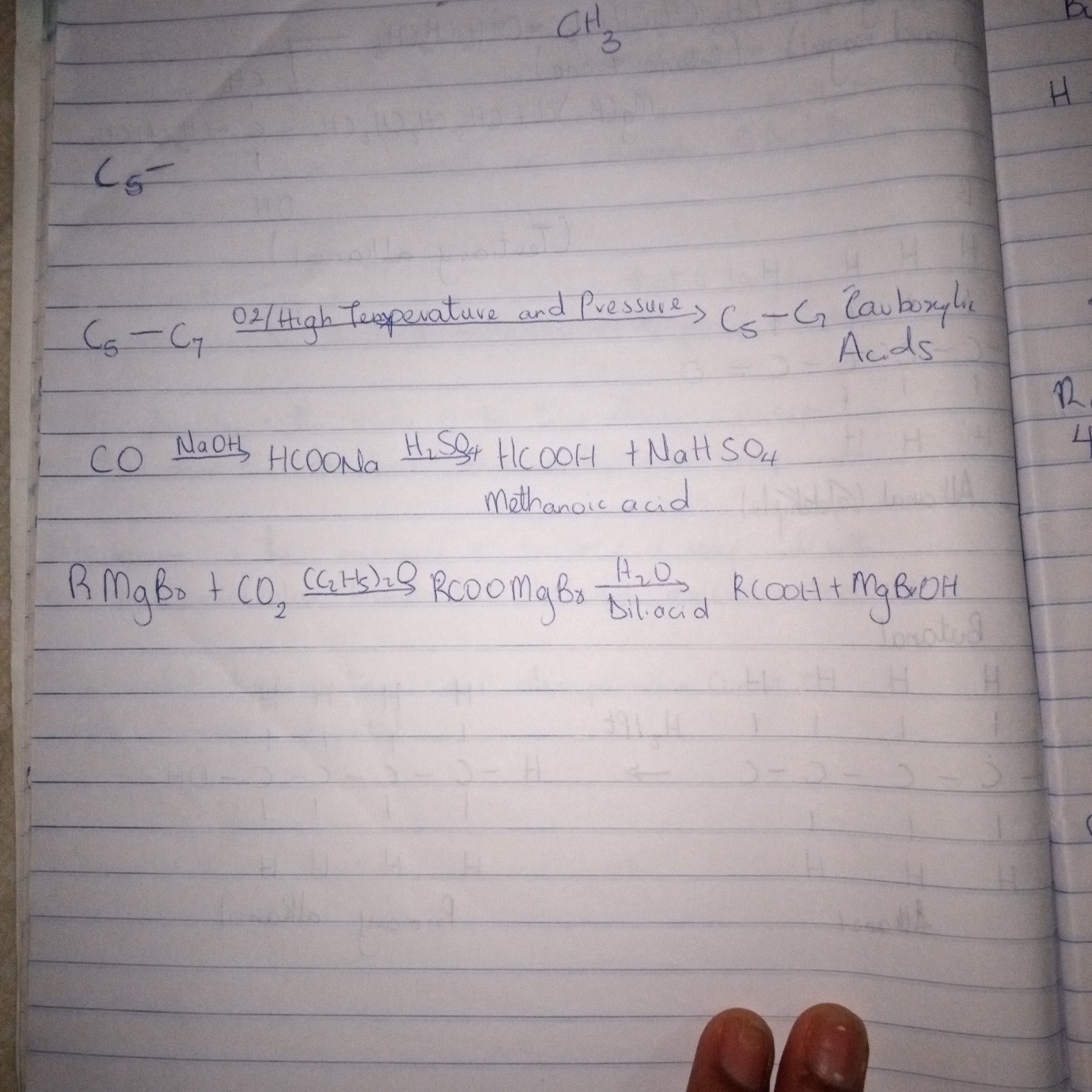
(iii) Solubility:

The carboxyl group readily engages in hydrogen bonding with water molecules. The acids with one to four carbon atoms are completely miscible with water. Solubility decreases as the carbon chain length increases because dipole forces become less important and dispersion forces become more predominant. Hexanoic acid [CH3(CH2)4COOH] is barely soluble in water (about 1.0 g/100 g of water). Palmitic acid [CH3(CH2)14COOH], with its large nonpolar hydrocarbon component, is essentially insoluble in water. The carboxylic acids generally are soluble in such organic solvents as ethanol, toluene, and diethyl ether

1. Write two industrial preparations of carboxylic acids.

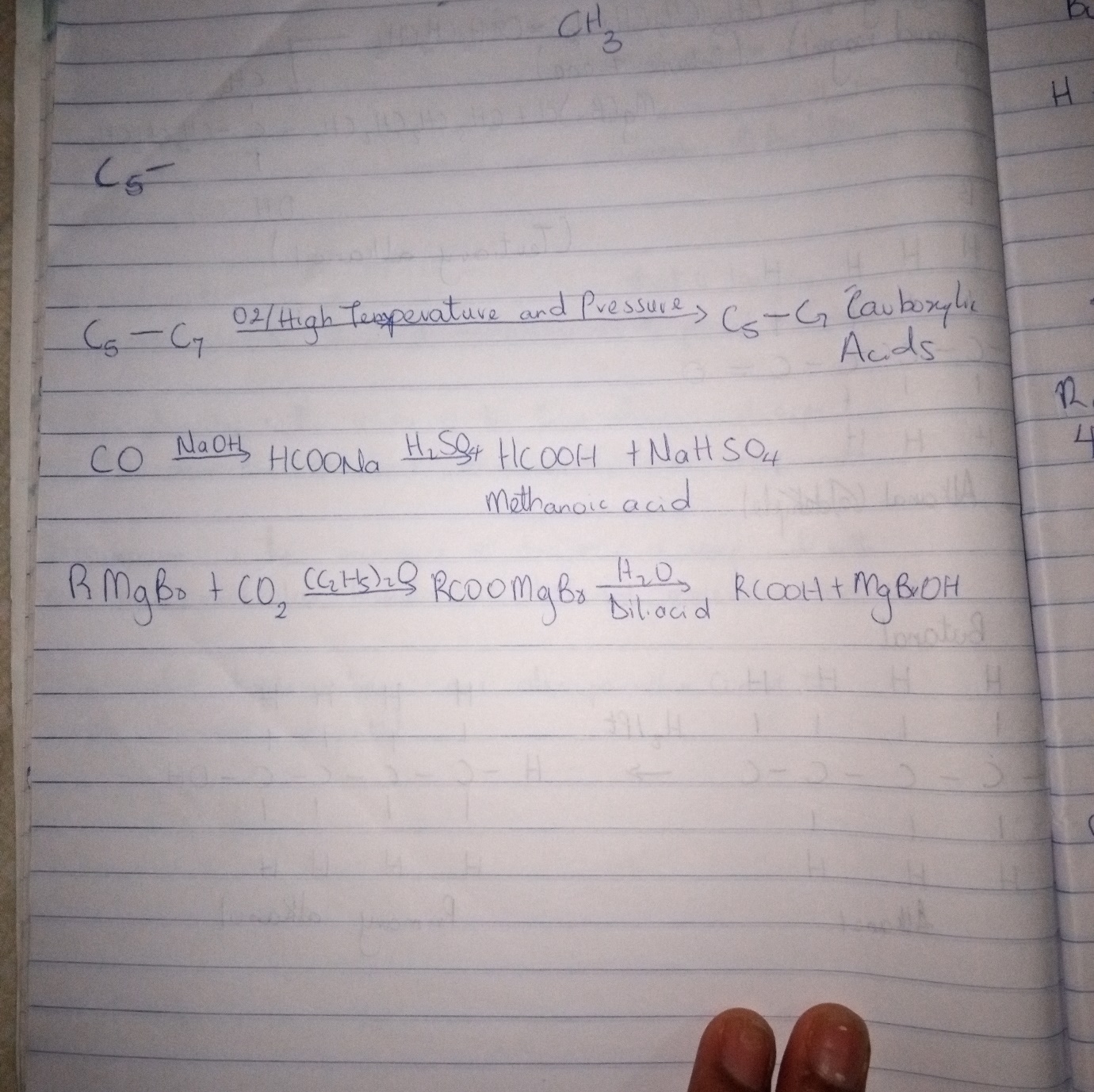
i). From petroleum

Liquid phase air oxidation of C5-C7 alkanes, obtainable from petroleum at high temperature and pressure will give C5-C7 carboxylic acids with mathanoic, propanoic and butanedioic acids as by-products.



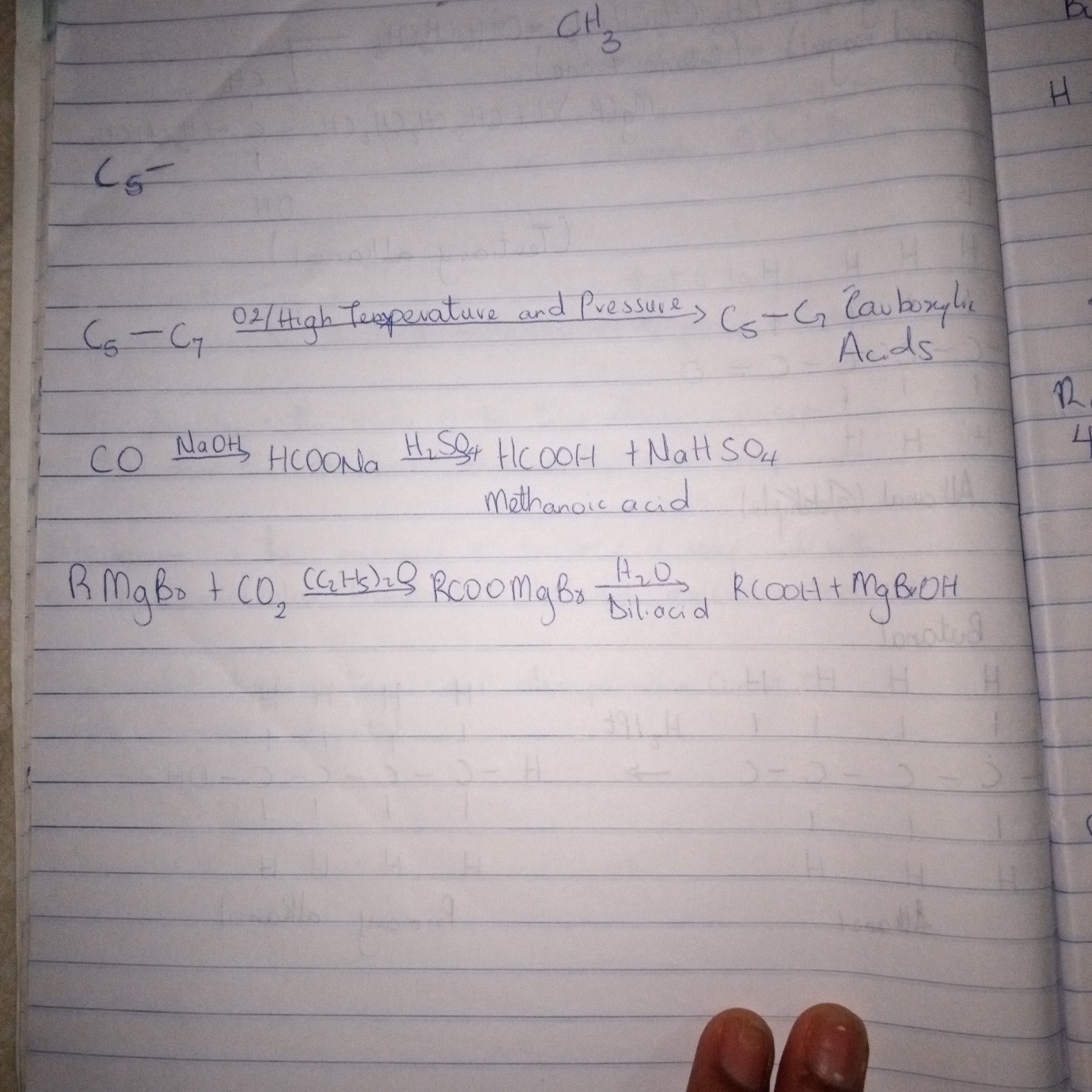
ii). From carbon (ii) oxide

Methanoic (Formic acid) is manufactured by adding carbon (ii) oxide under pressure to hot aqueous solution of sodium hydroxide. The free carboxylic acid is liberated by careful reaction with tetraoxosulphate(VI) acid (H2SO4)



4. With equations and brief explanation discuss the synthetic preparation of carboxylic acid.

Carbonation of Grignard reagent: Aliphatic carboxylic acids are obtained by bubbling carbon(iv)oxide into the Grignard reagent and then hydrolyzed with dilute acid



1. With chemical equation only, outline the reduction, decarboxylation and esterification of carboxylic acid

