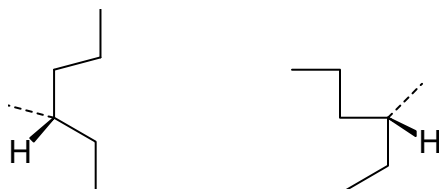


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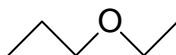
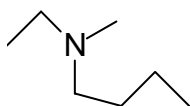
1. Draw a **Haworth projection** of an **aldose** sugar in its hemiacetal  $\beta$ -form and indicate the **anomeric** carbon in this molecule.

2. Define the term **optical isomers**.

In the two optical isomers shown which is the **R** and which the **S** form.



3. Provide **IUPAC names** for the following molecules:



4. A 50mL closed vessel contained 500mg of nitrogen gas at 0°C and  $8.13 \times 10^5 \text{Pa}$ . What mass of  $\text{CH}_4(\text{g})$  would occupy the same volume at the same temperature and pressure? (assume ideal gas behaviour)
5. A 0.34g sample of hydrogen gas ( $\text{H}_2$ ) was added to the 50mL vessel containing the 500mg of  $\text{N}_2$  and the vessel was resealed. Calculate the **mole-fraction** of  $\text{N}_2$  that would be present in this system.
6. A 43 mg sample of rat hemoglobin is dissolved in water at 5°C to make 3.00mL of solution. This solution is placed into an osmometer and the **osmotic pressure** measured and found to be 3.60 torr. What is the **molar mass** of this particular type of hemoglobin?  
( $R = 0.0821 \text{ atm}\cdot\text{L}/\text{mol}\cdot\text{K}$ ;  $1 \text{ atm} = 760 \text{ torr}$ )