# Experiment No. 06

**AIM:** To prepare and submit Hexamine from Formaldehyde and calculate its percentage yield and melting point.

**REFERENCES:**

1. Vogel's Textbook of Practical Organic Chemistry by Brian S. Furniss, Antony J. Hannaford, Peter W. G. Smith & Austin R. Tatchell; Fifth Edition; Page No.….

**REQUIREMENTS**

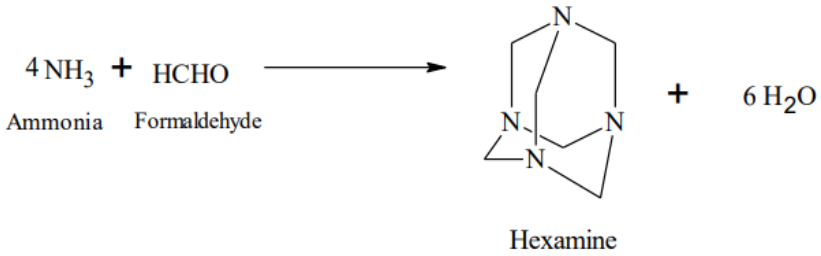
**Chemicals:** Formaldehyde – 4.7 g Ammonia Solution – 7 g

**Apparatus:** Beacker, measuring cylinder, glass road, filter paper, funnel etc.

**PRINCIPLE:**

Hexamine, also known as hexamethylenetetramine or methenamine, is a heterocyclic organic compound commonly used to synthesise plastics, explosives, and pharmaceuticals. It is prepared from formaldehyde and ammonia, where formaldehyde acts as an electrophile and ammonia as a nucleophile, leading to a condensation reaction that forms hexamine.

**REACTION:**




Hexamine

**PROCEDURE:**

1. Measure 47.3 g of formaldehyde solution (38%) and place it in a 250 ml round-bottom flask. Add 70 g of ammonium hydroxide solution (20%) to the flask containing formaldehyde.
2. Stir the mixture vigorously with a magnetic stirrer. Place the flask in an ice bath to keep the temperature low, as the reaction is exothermic. Continue stirring the mixture in the ice bath for 30 minutes to allow complete reaction.
3. After the reaction, let the mixture sit at room temperature for crystallization. To enhance crystallization, place the flask in an ice bath again.
4. Filter the solid hexamine crystals using a filtration apparatus. Wash the crystals with ice-cold water to remove any impurities.

5. The crude product was recrystallized using ethanol and then dried. The dried hexamine crystals were weighed to calculate the percentage yield and melting point.

**CALCULATION:**

The limiting reagent is formaldehyde; Hence, the yield should be calculated from the amount taken.

The molecular formula of formaldehyde = $CH_2O$

The molecular formula of Hexamine = $C_6H_6N_4$

The molecular weight of formaldehyde = 30g/mole

The molecular weight of Hexamine = 134g/mole

***Theoretical yield:***

30 g formaldehyde forms 134 g Tolbutamide

Therefore, 47.3 g formaldehyde will form …….? (X) g Hexamine

X= (134 x 47.3)/30 = ….. g

Theoretical yield = ….g

Practical yield = ————- g

% Yield = (Practical Yield)/(Theoretical Yield) × 100

**RESULT:**

Hexamine was synthesized from formaldehyde and submitted.

| **Name of Compound** | **Hexamine** |
|---|---|
| Theoretical yield | ……gm |
| Practical yield | ……gm |
| % Practical yield | …….% |
| Melting point | …….$^oC$ |