**WORKSHEET ; AMMONIA AND NITROGEN CLASS 10 CHEM 5070**

1. Ammonia contains the elements nitrogen and hydrogen. It is manufactured from these elements in the Haber process



1. The forward reaction is exothermic.
2. Nitrogen is obtained from liquid air by fractional distillation. Why does this technique

separate liquid oxygen and nitrogen?

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1. Name **two** raw materials from which hydrogen is manufactured

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1. The table shows how the percentage of ammonia in the equilibrium mixture varies with

pressure at 600 °C.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| percentage ammonia | 8 | 12 | 15 | 20 |
| pressure/atm | 200 | 300 | 400 | 500 |

1. Explain why the percentage of ammonia increases as the pressure increases.

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1. How would the percentage of ammonia change if the measurements had been made

at a lower temperature?

Explain your answer.

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1. State **two** of the reaction conditions used in the Haber Process.

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1. Ammonia is a base.
2. Name a particle that an ammonia molecule can accept from an acid.

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1. Write an equation for ammonia acting as a base.

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1. Given aqueous solutions, 0.1mol/dm3, of sodium hydroxide and ammonia, describe how

you could show that ammonia is the weaker base.

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1. Another compound that contains nitrogen and hydrogen is hydrazine, N2H4.
2. Draw the structural formula of hydrazine. Hydrogen can form only one bond per

atom but nitrogen can form three.

1. Draw a diagram that shows the arrangement of the valency electrons in one

molecule of hydrazine. Hydrazine is a covalent compound.

Use x to represent an electron from a nitrogen atom.

Use o to represent an electron from a hydrogen atom

1. This question is about compounds of nitrogen.
2. Describe the Haber process giving reaction conditions and a chemical equation.

Reference to rate and yield is not required.

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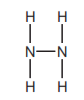
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1. Give **one** use of ammonia

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1. The diagram shows the structure of a hydrazine molecule.



Draw the electron arrangement of a hydrazine molecule. Show the outer shell electrons only.

[2]

1. Hydrazine is a base

*Explain why it act as base*.

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Complete the chemical equation to show that hydrazine acts as a base when added to

water.



1. Nitrogen dioxide is an atmospheric pollutant.
2. State **one** environmental problem caused by nitrogen dioxide.

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1. Explain how oxides of nitrogen, such as nitrogen dioxide, are formed in car engines.

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[Total: 13]

1. Ammonia is manufactured by the Haber process.



[2]

1. Name the raw materials from which nitrogen and hydrogen are obtained.
2. nitrogen from ……………………………………………………………………………………………………1]
3. hydrogen from………………………………………………………………………………………………[1]
4. Name the catalyst used in this process.

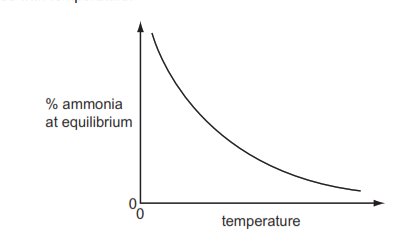
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1. What is the most important use of ammonia?

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1. The following graph shows how the percentage of ammonia in the equilibrium mixture

changes with temperature.



1. Explain the term equilibrium.

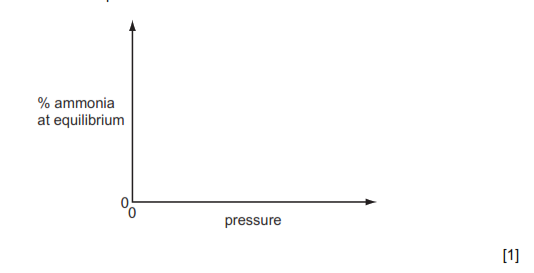
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1. How does the percentage of ammonia vary with temperature?

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1. Sketch a graph which shows how the percentage of ammonia in the equilibrium

mixture varies with pressure



[2]

1. Explain why the graph has the shape shown.

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