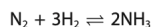


Haber Process

Q1. (2019) – 7d

(d) Ammonia is used to make hydrazine.

In the industrial process to manufacture ammonia, nitrogen and hydrogen are combined in the presence of an iron catalyst.



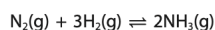
(i) State the name of the industrial process to manufacture ammonia.

(1)

Q2. (2020)

10 (a) Ammonia is manufactured by the Haber process.

The equation for the reaction is



The reaction is reversible and can reach equilibrium.

(i) An iron catalyst can be used in the reaction.

Which row of the table shows how adding the iron catalyst affects the rate of attainment of equilibrium and the equilibrium yield of ammonia?

(1)

	rate of attainment of equilibrium	equilibrium yield of ammonia
☐ A	increases	increases
☐ B	decreases	does not change
☐ C	decreases	increases
☐ D	increases	does not change

Q3. (2020) – 10b (i, iii)

(b) Ammonium sulfate and ammonium nitrate are used as fertilisers as they both contain nitrogen, which will increase the yield of crops.

A)

(i) Suggest **one** other reason for using solid ammonium sulfate and solid ammonium nitrate as nitrogenous fertilisers.

(1)

B)

(iii) Describe **one** similarity and **one** difference between the industrial production of ammonium sulfate and the laboratory preparation of ammonium sulfate.

(2)

similarity.....

.....

difference.....

.....

Q4. (2023) – 5a (ii, iii)

5 (a) Ammonia is manufactured in the Haber process by the reversible reaction between nitrogen and hydrogen.

A)

- (ii) Which row shows the typical conditions of temperature and pressure used in the Haber process?

(1)

	temperature in °C	pressure in atmospheres
☐ A	250	100
☐ B	250	200
☐ C	450	500
☐ D	450	200

B)

- (iii) In the Haber process, iron is added to the vessel where the nitrogen and hydrogen react.

State the purpose of the iron.

(1)

Q5. (2023) – 7a (ii)

- 7 Titration is used to carry out some neutralisation reactions.

(a) Ammonium nitrate can be made by neutralisation.

- (ii) Ammonium nitrate is a fertiliser.
Another fertiliser is ammonium phosphate.

Which elements are combined in ammonium phosphate?

(1)

- ☐ A nitrogen, oxygen and phosphorus only
☐ B hydrogen, oxygen and phosphorus only
☐ C hydrogen, nitrogen and phosphorus only
☐ D hydrogen, nitrogen, oxygen and phosphorus only