NO: DATE:

NITROGEN

→ N_2 unreactive ∵ $N \equiv N$ ↑ bond dissociation enthalpy.

→ 78% atmosphere

→ * NO_2^- , NO_3^- → Nitric acid essential for plants (NO_3^- for proteins)

Ammonia

→ Lewis base due to Lp , Bronsted-Lowry base as can pick up H^+

→ produced by ① ammonium salt + NaOH ← stronger base.

② nitrate + aluminium foil + NaOH + Heat

→ reacts w/ acids to form ammonium salts. **ONLY no H_2O formed!**

→ $4NH_3(g) + 3O_2(g) \rightarrow 2N_2(g) + 6H_2O(g)$ * pure O_2

$\rightarrow NH_3 + 2O_2 \rightarrow HNO_3 + H_2O$ * atmospheric O_2

Haber process

→ $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$ $\Delta H = -92\ kJ/mol$

→ Conditions → 200 atm (pressure ↑, rate ↑, yield ↑, but $)

→ 450 °C (exo, ∴ low temp = yield ↑, but need to have compromis temp or rate too low)

→ iron (rate ↑, lower E_A)

→ remove product as it forms ⇒ force eqm to the right.

→ Uses of NH_3 → dyes, explosives, refrigerant, fertilisers, nitric acid

Eutrophication

→ Nitrogen based fertilisers H_2O soluble

→ Nitrates leach out of soil into river, ∴ encourage algae growth

→ Algae growth use up O_2, submerged plants X carry out photosynthesis

→ Aquatic animals die due to lack of O_2

→ called eutrophication.

Nitrogen oxides, NO_x

→ NO, N_2O, NO_2 } formed during burning of foscil fuels. ← high temp provides E_A

→ photochemical smog, breathing problems.

→ removed in catalytic converters → $CO \rightarrow CO_2$

→ lead from leaded petrol 'poisons' catalysts $NO_x \rightarrow N_2$

unburnt hydrocarbons → $CO_2 + H_2O$

catalyst : palladium rhodium platinum

→ NO catalyses break down of ozone.