**Assignment week 3:**

**1. The vapor pressure of ammonia at room temperature is**

A. More than 10 bar

B. 9.2 bar

C. 20 bar

D. Less than 1 bar

**2. Ammonia can be decomposed over a catalyst to produce**

A. Hydrogen (H2) and nitrogen (N2)

B. Hydrogen (H2) and oxygen (O2)

C. Hydrogen (H2) and urea

D. Oxygen (O2) and nitrogen (N2)

**3. What is the chemical formula of ammonia?**

A. NH2

B. NH3

C. NH4+

D. NH5

**4. What are the boiling and melting points of Ammonia respectively?**

A. -33.5 and -78 C.

B. -78 and -33.5 C.

C. -10.6 and -20.3 C.

D. None of above.

**5. In ammonia production, which of following reaction is correct?**

A. 1/2H2 + O2  H2O + energy

B. H2O + O2  1/2H2 + energy

C. NO + 1/2O2 NO2.

D. N2 (g) + 3 H2 (g) 2 NH3 (g).

**6. Which of the following metal catalyst is used as a catalyst for ammonia production?**

A. Iron.

B. Pencil.

C. KCl.

D. NaCl.

**7. How much temperature is required for ammonia production?**

A. 400-600 C.

B. More than 1000 C

C. At room temperature

D. Operates at 70-90 C

**8. Which of the following statement is correct for ammonia decomposition?**

A. 1/2H2 + O2  H2O + energy

B. NH3 (g)  1/2N2 + 3/2 H2 (g)

C. NO + 1/2O2 NO2.

D. N2 (g) + 3 H2 (g) 2 NH3 (g).

**9. How much temperature is required for ammonia production?**

A. 400-600 C.

B. More than 1000 C

C. At room temperature

D. Operates at 70-90 C

**10. What is the problem of hydrogen when they are transported?**

A. High capital investment required

B. Truck or rail transportation of compressed hydrogen is expensive

C. All of above

**11. For carriers to be practical, they need to meet which following statements?**

A. High effective energy densities

B. The relevant processes should be simple and energy efficient

C. Safe and environmentally benign

D. All of above

**12.** **The hydrogen content in Urea is**

A. 9.1 %

B. 18.2 %

C. 4 %

D. 30 %

**13. Ammonia is being considered as one of the best potential options for a one-way carrier**

A. True

B. False

**14. How much NH3 concentration in air (by volume) would cause immediately fatal?**

A. 1 000 ppm

B. 2 000 ppm

C. 5 000 ppm

D. 10 000 ppm

**15. Which of the following produce H2 via NH3?**

A. NH3 photocatalytic decomposition (APD)

B. NH3 decomposition (AD)

C. NH3 oxidative decomposition (AOD)

D. NH3 electrooxidation reaction (AER)

E. All of above

**16. Which of the following statement is correct for NH3 oxidative decomposition reaction?**

A. NH3 + 0.25 O2 H2 + 0.5 N2 + 0.5 H2O

B. NH3 (g)  1/2N2 + 3/2 H2 (g)

C. NO + 1/2O2 NO2.

D. N2 (g) + 3 H2 (g) 2 NH3 (g).

**17. Which of the following statement is correct for NH3 electrooxidation reaction at anodic electrode?**

A. NH3 + 0.25 O2 H2 + 0.5 N2 + 0.5 H2O

B. 2NH3 (aq) + 6OH- N2 + 6 H2O + 6 e-

C. NH3 (g)  1/2N2 + 3/2 H2 (g)

D. NO + 1/2O2 NO2.

**18.** **Which of the following statement is correct for NH3 electrooxidation reaction at competitive anodic reaction?**

A. NH3 + 0.25 O2 H2 + 0.5 N2 + 0.5 H2O

B. 2NH3 (aq) + 6OH- N2 + 6 H2O + 6 e-

C. 6OH-  3/2O2 + 6 H2O + 6e-

D. NO + 1/2O2 NO2.

**19. TiO, ZnO and ZnS are most promising semiconductor-based catalysts for NH3 photocatalytic decomposition.**

A. True

B. False

**20. The NH3 decomposition reaction is regarded as ….**

A. Endothermic process

B. Exothermic process