



ANANDALAYA
PERIODIC TEST 2
Class : XI

Subject: Chemistry
Date: 14/12/2019

M.M: 40
Time: 2 Hours

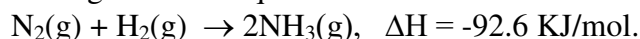
General Instructions:

1. All questions are compulsory.
2. Marks for each question are indicated against it.
3. Section A: Question numbers 1 to 10 are very short answer questions, carrying 1 mark each.
4. Section B: Question numbers 11 to 14 are short answer questions, carrying 2 marks each.
5. Section C: Question numbers 15 to 18 are short answer questions carrying 3 marks each.
6. Section D: Question numbers 19 & 20 are long answer questions carrying 5 marks each.

SECTION A

Read the given passage and answer questions that follow:

The Haber's process for synthesis of ammonia from nitrogen and hydrogen is represented by following chemical equation:



The reaction is carried out in presence of a catalyst iron. The value of K_c for the reaction is 1.2 at 375°C . Answer the following questions:

1. What is the effect of presence of catalyst on the yield of ammonia? (1)
2. How does the value of K_c for this reaction change with change in temperature? (1)
3. Write the expression for equilibrium constant for this reaction. (1)
4. For the process to occur under adiabatic conditions, the correct condition is: (1)
(a) $\Delta T = 0$ (b) $\Delta p = 0$
(c) $w = 0$ (d) $q = 0$
5. The enthalpies of all elements in their standard states are: (1)
(a) unity (b) < 0
(c) zero (d) different for each element
6. The colourless solution of silver nitrate slowly turns blue on adding copper chips to it because of (1)
(a) Dissolution of copper (b) oxidation of copper atoms
(c) reduction of copper ions (d) Oxidation of silver ions
7. Determine the oxidation state of C in HCO_3^- . (1)
8. Which chemical species is the oxidising agent in the following reaction: (1)
 $\text{N}_2\text{H}_4(\text{l}) + 2\text{H}_2\text{O}_2(\text{l}) \rightarrow \text{N}_2 + 4\text{H}_2\text{O}(\text{l})$
9. _____ is the chemical process in which oxidation number of the element decreases. (1)

In the following question a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct option out of the choices given below the question.

10. **Assertion (A):** All Arrhenius acids are also Bronsted acids. (1)
Reason (R): All Arrhenius bases are also Bronsted bases.
(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true but R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.

SECTION B

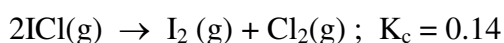
11. Calculate work done when a gas is compressed by an average pressure of 0.50 atm so as to decrease its volume from 800 cm^3 to 600 cm^3 . (2)
12. For the reaction, $2\text{Cl}(\text{g}) \rightarrow \text{Cl}_2(\text{g})$, what are the signs of ΔH and ΔS ? Explain. (2)
13. (a) The reaction quotient of a reversible reaction is Q_c and the equilibrium constant is K_c . In which direction will the equilibrium shift if $Q_c < K_c$? (2)
(b) The solubility of ZnS is 1.04×10^{-6} . Find out its solubility product at this temperature.
14. While sulphur dioxide can act as an oxidising as well as reducing agent in its reactions whereas ozone act only as an oxidant. Why? (2)

SECTION C

15. In a galvanic cell $\text{Cu}/\text{Cu}^{2+} // \text{Ag}^+/\text{Ag}$: (3)
(a) What is the net cell reaction?
(b) Which metal act as negative electrode?
(c) What is the direction of flow of conventional current?
16. (a) Write the conjugate acid and base of HSO_4^- . (3)
(b) Calculate the pH of 3.0 g of NaOH dissolve in water to give 200 ml of the solution.

OR

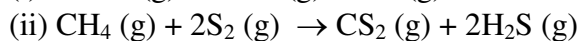
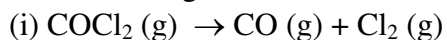
What is the equilibrium concentration of each of the substances in the following equilibrium when the initial concentration of ICl was 0.78 M?



17. (a) What is a disproportionation reaction? Give an example. (3)
(b) Balance the following redox reaction in acidic medium:
 $\text{Cr}_2\text{O}_7^{2-}(\text{aq}) + \text{SO}_2(\text{g}) \rightarrow \text{Cr}^{3+}(\text{aq}) + \text{SO}_4^{2-}(\text{aq})$
18. Explain the following terms: (3)
(a) Isolated system
(b) Entropy
(c) State function

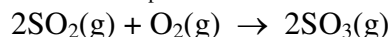
SECTION D

19. (a) Which of the following reactions will get affected by increasing the pressure? Also, mention whether change will cause the reaction to go into forward or backward direction. (5)



- (b) What are polyprotic acids? Explain with an example

- (c) At 450 K, $K_p = 2.0 \times 10^{10} \text{ bar}^{-1}$ for equilibrium reaction:

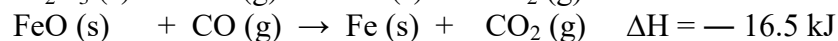
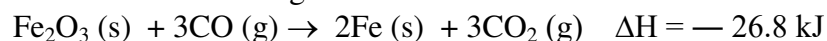


What is K_c at this temperature. [$R = 0.083 \text{ L bar K}^{-1} \text{ mol}^{-1}$]

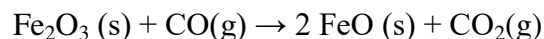
20. (a) What is the difference between extensive and intensive properties? (5)

- (c) When $\Delta H > 0$ and $\Delta S < 0$, a reaction is never spontaneous. Why?

- (d) Consider the following two reactions:



What is the value of ΔH for the reaction:



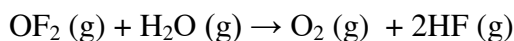
OR

- (a) State Hess's law of Constant Heat Summation.

- (b) The equilibrium constant for a reaction is 10 at 27°C. Calculate the value of ΔG^0 at 27°C.

($R = 8.314 \text{ JK}^{-1} \text{ mol}^{-1}$)

- (c) Calculate the standard enthalpy change and standard internal energy change for the following reaction at 300 K:



Given that the standard enthalpy of formation of OF_2 , H_2O and HF are -23 kJ mol^{-1} , $-241.8 \text{ kJ mol}^{-1}$ and $-268.6 \text{ kJ mol}^{-1}$ respectively.