

# SESSION ENDING EXAMINATION 2012-2013

## CHEMISTRY

### CLASS XI

TIME: 3.00 Hrs Max. Marks: 70

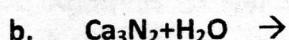
#### General Instructions:

- i. All questions are compulsory.
- ii. Q.Nos. 1 to 8 are very short answer and carry 1 mark each.
- iii. Q Nos. 9 to 18 are short answer questions and carry 2 marks each.
- iv. Q Nos. 19 to 27 are short answer questions and carry 3 marks each.
- v. Q Nos. 28 to 30 are long answer questions and carry 5 marks each.
- vi. Use log table if necessary.

1. Define Orbitals?
2. Write Vander Waal's equation for 1 mole of the gas?
3. Calcium ( $Z=20$ ) loses electron successively to form  $\text{Ca}^{+1}$ ,  $\text{Ca}^{+2}$  and  $\text{Ca}^{+3}$ . Which step will have highest ionization enthalpy?
4. What are the conditions for adiabatic process?
5. Calculate the number of neutrons in Deuterium?
6. Write conjugate acid and conjugate base of water?
7. What is SI unit of mass?
8. Write IUPAC name of  $\text{CH}_3\text{CH(OH)CH}_2\text{COOH}$
9. If the speed of light is  $3.0 \times 10^8$  m/s. calculate the distance covered by light in 2 nano second.
10. Calculate the number of atoms in each of the following-
  - a. 52 moles of He.
  - b. 52 gram of He.
11. Give the hybridization state of -
  - a.  $\text{NO}_3^-$  ion or  $\text{SO}_2$
  - b.  $\text{CH}_4$  or  $\text{NH}_3$

12. Sample of HI (g) is placed in the flask at a pressure of 0.2 atm. At equilibrium, the partial pressure of HI (g) is 0.04 atm. What is the value of  $K_p$  for the given equilibrium?

13. Complete the following chemical reactions-



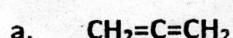
14. Give a brief account of the following-

a. Blue colored solution of Alkali metals in liquid Ammonia.

b. Tendency to give flame colors by alkali metals.

15. Is Boric Acid a Protic Acid? Explain.

16. Calculate the SIGMA and PIE bonds in the following molecules-



17. An organic compound contains 69% Carbon and 4.8% Hydrogen, the remainder being Oxygen. Calculate the masses of  $\text{CO}_2$  and  $\text{H}_2\text{O}$  produced when 0.20 gram of this substance is subjected to complete combustion.

18. Draw cis and trans structure of Hex-2-ene. Which isomer will have higher b.p.

19. a. Write Mendeleev's periodic law.

b. Consider the following species.  $\text{N}^{3-}$ ,  $\text{O}^{2-}$ ,  $\text{F}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ , and  $\text{Al}^{3+}$

i. What is common in them?

ii. Arrange them in order of increasing ionic radii?

20.

a. Why free rotation about a  $\pi$ - bond is not possible?

b. Why  $\text{H}_2\text{O}$  is liquid while  $\text{H}_2\text{S}$  is a gas?

c. Why water has maximum density at 277K

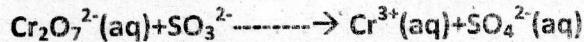
21. Calculate the volume Occupied by 8.8gm of  $\text{CO}_2$  at  $31.1^\circ\text{C}$  and 1 bar pressure. ( $R=0.083\text{bar LK}^{-1}\text{mol}^{-1}$ )

OR

What would be SI unit of quantity  $\text{PV}^2\text{T}^2/\text{n}$ .

22. The degree of ionization of a 0.1 M bromoacetic acid solution is 0.132. Calculate the  $\text{P}^\text{H}$  of solution and the  $\text{P}^\text{Ka}$  of bromoacetic acid.

23. Write the balanced ionic equation for the reaction-



24. What is the cause of anomalous behavior of first member of each s and p block elements?
25. How inorganic benzene is formed and draws its structure? Also write the hybridization of B and N in it?
26. Explain why  $(\text{CH}_3)_3\text{C}^+$  is more stable than  $\text{CH}_3\text{CH}_2^+$  and  $\text{CH}_3^+$  is the least stable carbocation.
27. What are the major causes of water pollution? Write at least two steps to minimize water pollution.
28. a. Write short notes-
- Pauli's Exclusion principle
  - Aufbau principle
  - Hund's rule of maximum multiplicity
- b. An element with mass number 81 contains 31.7% more neutrons as compared to protons. Assign the atomic symbol.

Or

- a. Write a neutral molecule which is isoelectronic with  $\text{ClO}^-$
- b. Which is more paramagnetic  $\text{Fe}^{3+}$  OR  $\text{Fe}^{2+}$ ?
- c. What transition in the hydrogen spectrum would have the same wave length as the Balmer transition  $n_1=4$  to  $n_2=2$  of  $\text{He}^+$  spectrum?
29. a. Define enthalpy change.
- b. Calculate the standard enthalpy of formation of  $\text{CH}_3\text{OH}$  (l) from the following data-
- $\text{CH}_3\text{OH}$  (l) +  $3/2 \text{ O}_2$  (g) ----->  $\text{CO}_2$  (g) +  $2\text{H}_2\text{O}$  (l) ;  $\Delta_f H^\circ = -726 \text{ KJ Mol}^{-1}$
  - $\text{C}$  (s) +  $\text{O}_2$  (g) ----->  $\text{CO}_2$  (g) ;  $\Delta_c H^\circ = -393 \text{ KJ Mol}^{-1}$
  - $\text{H}_2$  (g) +  $1/2 \text{ O}_2$  (g) ----->  $\text{H}_2\text{O}$  (l) ;  $\Delta_f H^\circ = -286 \text{ KJ Mol}^{-1}$
- OR
- a. For an isolated system,  $\Delta U=0$ , what will be  $\Delta S$ ?
- b. The enthalpy of combustion of Methane, Graphite and Dihydrogen at 298K are  $-890.3 \text{ KJ Mol}^{-1}$ ,  $-393.5 \text{ KJ Mol}^{-1}$  and  $-285.8 \text{ KJ Mol}^{-1}$  respectively. Calculate enthalpy of formation of  $\text{CH}_4$ (g).
30. a. An Alkene A on ozonolysis gives a mixture of Ethanal and pentan-3-one. Write structure and IUPAC name of A.

- b. How would you convert the following compounds in to benzene-
- Ethyne to Benzene
  - Benzene to Nitrobenzene

OR

Addition of HBr to propene yields 2-bromopropane, while in the presence of benzoyl peroxide the same reaction yields 1-bromopropane.Explain and give mechanism.

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