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Roll No. : 01

SESSION ENDING EXAMINATION, 2014-15

SUBJECT - CHEMISTRY

CLASS - XI

Time : 3:00 Hrs.

M.M. 70 MARKS

**GENERAL INSTRUCTIONS :**

1. All questions are compulsory.
2. Question no. 1 to 5 are very short answer questions and carry 1 mark each.
3. Question no. 6 to 10 are short answer questions and carry 2 marks each.
4. Question no. 11 to 22 are short answer questions and carry 3 marks each.
5. Question no. 23 is value based question and carry 4 marks.
6. Question no. 24 to 26 are long answer type questions and carry 5 marks each.
7. Use log table if necessary , use of calculator is not allowed.

[P.T.O.]

Q.1: What do you understand by "Limiting reagent". (1)

Q.2: State Hiesenberg Uncertainty Principle. (1)

Q.3: The value of Vander waal's constants a and b are as given for two gases :

Gases	a (Atm L <sup>2</sup> mol <sup>-2</sup> )	b (L mol <sup>-1</sup> )
CO <sub>2</sub>	3.6	0.043
SO <sub>2</sub>	6.7	0.056

Out of these two gases which gas molecules will possess largest magnitude of intermolecular forces of attraction ? (1)

Q.4: In Lassaigne's test for detection of nitrogen in an organic compound , the blue colour appears due to the formation of ..... (1)

Q.5: For a reaction both enthalpy change and entropy change are positive. Under what conditions the reaction will be spontaneous ? (1)

Q.6: (i) How many subshells are associated with n=4 ?  
(ii) How many electrons will be present in the subshells having m<sub>s</sub> value of -1/2 for n=4 ? (1+1)

Q.7: (i) Define electron gain enthalpy .  
(ii) Why is the electron gain enthalpy of chlorine more negative than fluorine ? (1+1)

Q.8: (i) In what group of the periodic table the element will found having electronic configuration : [Xe] 4f<sup>14</sup> 5d<sup>4</sup> 6s<sup>2</sup>  
(ii) Why first ionization enthalpy of nitrogen is more than oxygen? (1+1)

Q.9: Which out of NH<sub>3</sub> and NF<sub>3</sub> has higher dipole moment and why ? (2)

[P.T.O.]

OR

Draw the molecular orbital diagram of dioxygen and calculate bond order. (2)

Q.10:(i) Draw the structure of diborane .

(ii)  $\text{PbCl}_4$  is less stable than  $\text{SnCl}_4$  but  $\text{PbCl}_2$  is more stable than  $\text{SnCl}_2$ . Why ? (1+1)

Q.11:(i)  $\text{CO}_2$  is a gas while  $\text{SiO}_2$  is solid at room temperature. Why?

(ii)  $\text{SiCl}_4$  can be easily hydrolysed but  $\text{CCl}_4$  does not hydrolysed. Why ?

(iii) Silicon shows a higher covalency than carbon. Why ? (1+1+1)

Q.12: An electron beam is accelerated by a potential difference of 10000 volts. What is the wavelength of the wave associated with the electron beam ?

(mass of electron =  $9.1 \times 10^{-31}$  Kg,

Charge of electron =  $1.6 \times 10^{-19}$  C)

OR

Calculate the uncertainty in the velocity of a cricket ball of mass 150 g , if the uncertainty in its position is of the order of  $1\text{\AA}$ .  
( $h = 6.6 \times 10^{-34}$  Kg m<sup>2</sup> s<sup>-1</sup>) (3)

Q.13:(i) Draw the orbital structure of ethane .

(ii) Out of  $\text{H}_2\text{O}$  and  $\text{H}_2\text{S}$  which have high boiling point and why?

(iii)  $\text{He}_2$  molecule does not exist. why ? (1+1+1)

Q.14:(i) Define " Charles law ". (1)

(ii) Calculate the temperature of 4 mol of gas occupying  $5 \text{ dm}^3$

[P.T.O.]

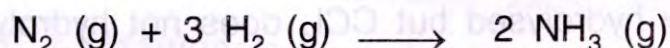
at 3.32 bar pressure.

$$(R = 0.083 \text{ bar dm}^3 / \text{mol/k}) \quad (2)$$

Q.15: Define the following terms :

- (i) Hess's law
- (ii) Standard enthalpy of atomization
- (iii) Entropy (1+1+1)

Q.16: For the reaction :



$$\Delta H = -95.4 \text{ kJ} ; \quad \Delta S = -198.3 \text{ J/k}$$

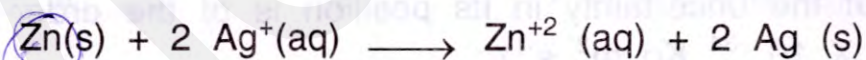
Calculate the temperature at which Gibb's free energy change is equal to zero . Predict the nature of the reaction at this temp. and above it . (3)

Q.17:(i) Given the standard electrode potentials :

$$\text{K}^+/\text{K} = -2.93 \text{ V} , \text{Ag}^+/\text{Ag} = +0.80 \text{ V} , \text{Cr}^{3+}/\text{Cr} = -0.74 \text{ V}$$

Out of these electrode which will be the strongest reducing agent? (1)

(ii) Represent the Galvanic cell in which the reaction takes place:



- (a) Which of the electrode is negatively charged ?
- (b) What are the carriers of the current in the cell ? (1+1)

Q.18: Chlorophyll, the green colouring material of plants contains 2.68 % of magnesium by mass. Calculate the number of moles of magnesium and atoms in 5.00 g of this complex. (Atomic mass of Mg=24) (2)

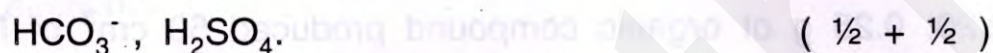
[P.T.O.]

- (i) Write the name and formula of the liquid substance.
- (ii) Why this compound is stored in dark coloured bottles ?
- (iii) How is the strength of the substance generally expressed ?
- (iv) What values are associated with the chemistry teacher ?

(1+1+1+1)

Q.24(i) State Le-chateliers principle. (1)

- (ii) Write conjugate base for the acids :



- (iii) What is the difference between solubility product and ionic product ? (1)

- (iv) Calculate the PH of of a solution having  $[\text{H}_3\text{O}^+]$  of  $10^{-3}$ . (2)

OR

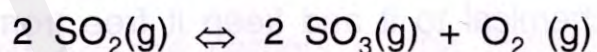
- (i) State " Common ion effect ". (1)

- (ii) For a hypothetical reaction :



What will be the effect on the equilibrium with

- (a) Decrease of temperature
  - (b) addition of Helium gas (1+1)
- (iii) At 700 K , the equilibrium constant  $K_p$  , for the reaction



is  $1.8 \times 10^{-3} \text{ k Pa}$ . What is the numerical value in moles per litre of  $K_c$  for this reaction at this temperature ? (2)

[P.T.O.]

Q.25:(a) Account for the followings : (1+1+1)

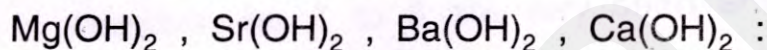
- (i) Be and Mg do not give flame colouration .
- (ii) Li is the strongest reducing agent.
- (iii) Potassium carbonate can not be prepared by Solvay process

(b) In what ways Li shows similarities to Mg in its chemical behavior. (any two) (2)

**OR**

(a) Write three properties of Lithium which differ from the rest of the members of group 1.

(b) Arrange the following in order of the property mentioned :



increasing basic character

(c) Complete the reaction :



Q.26:(a) Explain the following reactions :

(i) Wurtz reaction

(ii) Friedel crafts alkylation

(1+1)

(b) Convert :

(i) 1-bromopropane to propene

(ii) Sodium acetate to methane

(1+1)

(c) Melting point of cis-2-butene is lower than that of trans-2-butene. why ? (1)

**OR**

[P.T.O.]

- (a) Propanal and pentan-3-one are the products of reductive ozonolysis. What is the structure of the alkene ? (1)
- (b) Explain Huckel's Rule. (1)
- (c) Convert
- (i) Benzene to nitrobenzene
- (ii) Ethyne to ethanal (1+1)
- (d) Why the boiling points of n-alkanes are higher than their branched chain isomers ? (1)
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