**I.P.S.Sr.Sec.School**

**Max Time : 3 hr** **Class : 11th Max Marks : 70**

**Chemistry Final Exam**

**Section A**

**MCQs : [ 1 x 15 = 15 ]**

1. In which case effective nuclear charge is minimum ?

|  |  |
| --- | --- |
| a) Be | b) Be2+ |
| c) Be3+ | d) all have the same effective nuclear charge |

1. The first ionization potential (eV) of Be and B respectively are

|  |  |  |  |
| --- | --- | --- | --- |
| a) 8∙29, 9∙32 | b) 9∙32, 8∙29 | c) 9∙32, 9∙32 | d) 8∙29, 8∙29 |

1. Which of the following sets of ions represents a collection of isoelectronic species?

|  |  |  |  |
| --- | --- | --- | --- |
| a) N3-, O2-, F –, S2- | b) Li+, Na+, Mg2+, Ca2+ | c) K+, Cl -, Ca2+, Sc3+ | d) Ba2+, Sr2+, K+, Ca2+ |

1. Among the following the third ionization energy is highest for

|  |  |  |  |
| --- | --- | --- | --- |
| a) Magnesium | b) Boron | c) Beryllium | d) Aluminium |

1. Which molecule / ion out of the following does not contain unpaired electrons ?

|  |  |  |  |
| --- | --- | --- | --- |
| a) | b) O2 | c) | d) B2 |

1. Which of the following are non-polar molecules ? (I) NCl3 (II) SO3 (III) PCl5

|  |  |  |  |
| --- | --- | --- | --- |
| a) I only | b) II only | c) I and II only | d) II and III only |

1. The oxidation state of S atoms in S4 from left to right respectively are



|  |  |  |  |
| --- | --- | --- | --- |
| a) + 6 , 0 , 0 , + 6 | b) + 3 , + 1 , + 1 , +3 | c) + 5 , 0 , 0 , + 5 | d) + 4 , + 1 , + 1 , +4 |

1. In ion, the formal charge on the oxygen atom of P – O bond is

|  |  |  |  |
| --- | --- | --- | --- |
| a) +1 | b) -1 | c) - 0.75 | d) + 0.75 |

1. Which of the following species has tetrahedral geometry ?

|  |  |  |  |
| --- | --- | --- | --- |
| a) | b) | c) | d) H3O+ |

1. How many and bonds are present in CH2 CH – CH CH – CH3 ?

|  |  |  |  |
| --- | --- | --- | --- |
| a) 9 , 4 | b) 12 , 2 | c) 12 , 6 | d) 10 , 3 |

1. Which of the following represents the sequence of hybridisation of carbon atoms from left to right sp2 , sp2 , sp and sp ?

|  |  |
| --- | --- |
| a) CH2 CH – C CH | b) HC C – CH CH2 |
| c) H3C – CH CH – CH3 | d) CH2 CH – CH CH2 |

1. The hybridisation of carbons of C – C single bond of HC C – CH CH2 is

|  |  |  |  |
| --- | --- | --- | --- |
| a) sp3 – sp3 | b) sp – sp2 | c) sp3 – sp | d) sp2 – sp3 |

1. What are the hybridisation and shapes of the following molecules ? (i) CH3F (ii) HC N

|  |  |
| --- | --- |
| a) (i) sp2 , trigonal planar ; (ii) sp3 , tetrahedral | b) (i) sp3 , tetrahedral ; (ii) sp , linear |
| c) (i) sp , linear ; (ii) sp2 , trigonal planar | d) (i) sp2 , trigonal planar ; (ii) sp2 , trigonal planar |

1. Number of electrons in 1.8 mL of H2O is

|  |  |  |  |
| --- | --- | --- | --- |
| a) 6.02 x 1023 | b) 3.011 x 1023 | c) 0.602 x 1023 | d) 60.22 x 1023 |

1. 11.2 litre of a gas at STP weighs 14 gm. The gas could not be:

|  |  |  |  |
| --- | --- | --- | --- |
| a) N2 | b) CO | c) B2H6 | d) N2O |

**One Mark Questions : [ 1 x 5 = 5 ]**

1. Explain Molality.
2. Explain state function.
3. Calculate number of electrons in 10 molecules of CO2.
4. Explain Isobars with Examples.
5. Give IUPAC name of : CH2 CH – CH2 – CHO .

**Section – B [ 2 X 7 = 14 ]**

1. How will you prepare 3-methylbut-1-yne by starting with ethyne?
2. What is lindlar’s catalyst? What is it used for?
3. Explain oxidizing and reducing agent.
4. How long would it take a radio wave of frequency 5 x 108 sec – 1 to travel from Mars to the Earth, a distance of 8 x 107 Km.
5. Explain dipole moment and write its S.I. unit.

**Or**

What are the maximum and minimum oxidation numbers of N , S and Cl?

1. If the binding energy of electrons in a metal is 250 KJ/mol, what should be threshold frequency of the striking photons?
2. At 450 K , KP = 2 x 1010/bar for the given reaction at equilibrium

2 SO­2 (g) + O2 (g) 2 SO3 (g) , What is KC at this temperature ?

**Section – C [ 3 X 7 = 21 ]**

1. Complete the following reactions : (a) CH3­ – C C – CH3

(b) CH3­ – C C – CH3 (c) CH3­ – C C – CH3

1. Write the characteristics of Chemical equilibrium.
2. Explain Hund’s rule of maximum multiplicity and Pauli exclusion principle.

**Or**

Commercial available concentrated hydrochloric acid contains 38% HCl by mass.

a) What is the Molarity of this solution? This density is 1.19 gcm-3.

b) What volume of concentrated hydrochloric acid is required to make 1 L of 0.1 M HCl?

1. 10 g of argon is compressed isothermally and reversibly at a temperature of 27 from 10 L to 5 L. Calculate w, q , U and H for this process.
2. 1 g of a mixture of carbonates of calcium and magnesium gave 240 cm3 of CO2 at STP. Calculate the percentage composition of the mixture.
3. Calculate the wave number for the longest wavelength transition in the Balmer series of atomic Hydrogen.
4. A sample of pure PCl5 was introduced into a evacuated vessel at 473 K. After equilibrium was reached , the concentration of PCl5 was found to be 0.5 x 10 – 1 mol/L. If KC is 8.3 x 10 – 3 what are the concentrations of PCl3 and Cl2 at equilibrium ?

**Section – D [ 5 X 3 = 15 ]**

1. (a) A welding fuel gas contains carbon and hydrogen only. Burning a small sample of it in oxygen gives 3.38 g carbon dioxide, 0.69 g of water and no other products. A volume of 10 L (measured at STP) of this welding gas is found to weight 11.6 g. Calculate : i) empirical formula ii) molar mass of the gas iii) molecular formula

(b) Write the Hybridization and draw the shape of the following : (i) ICl3 (ii) XeF4 (iii) PCl3.

1. (a) Draw the M.O. diagram of O2.

(b) Compare bond order of : (i) F2 , , (ii) NO , NO+.

1. (a) Explain Photoelectric effect and plot a graph between:

(i) Intensity of incident light and Number of ejected electrons.

(ii) Frequency of incident light and Number of ejected electrons.

(b) What designation is given to an orbital having :

(i) n = 2 , l = 1 (ii) n = 3 , l = 0 (iii) n = 5 , l = 3

**Or**

1. Balance the following equations by Ion electron method :
2. (aq) + (aq) + H+ (aq) I2 (aq) + H2O (l) [In acidic medium]
3. (aq) + H2O2 (aq) (aq) + H2O (l) [In basic medium]
4. Explain Plank’s Quantum theory.