CLASS – XI

TIME: 3 HOURS CHEMISTRY M.M.- 70

General Instructions :

1. All questions are compulsory.
2. Q 1 to Q 5 carry one marks each.
3. Q 6 to Q 10 carry 2 marks each .
4. Q 11 to Q 22 carry 3 marks each.
5. Q 23 carry 4 marks.
6. Q 24 to Q 26 carry 5 marks .
7. The kinetic energy of a moving electron is 5 X 10 -25 J. What is the de - Brogile wavelength ?
8. Find out the position of the element in the periodic table satisfying the electronic configuration ( n – 1)d3 ns2 for n = 4.
9. The pressure of 1: 4 mixture of dihydrogen and dioxygen enclosed in a vessel in one atmosphere . what would be the partial pressure of dioxygen.
10. MnO2-4  undergoes disproportionation reaction in acidic medium but MnO-4 does not . Explain.
11. Among the alkali metal ions , which has the maximum hydration enthalpy.
12. Define molarity . what will be the molarity of solution which contain 5.55 g of NaCl (*s*) per 500 ml ?
13. (a) predict the atomic number and name of the element from the

 following quantum numbers n=3,1=2,m=0,s= - ½

(b) how will you calculate ratio of energy of 3rd and 4th orbit of H-atom?

 8. (a) Although, both CO2 &H2O are triatomic molecules, the

 shape of the H2o molecule is bent while that of CO2 linear.

 Explain this on the basic of dipole moment.

(b) find out the isoelectronic species from the following.

 CO, NO+, N2, SnCl2,NO-2

9. The degree of ionization of a 0.1 M bromoacetic acid is 0.132.

 calculate the pH of the solution and pKa of bromoacetic acid.

 Or

Calculate the pH of a solution formed by mixing equal volumes of two solutions A and B of a strong acid having pH=6 and pH=4 respectively 10. (a) Arrange the following in increasing order of hyperconjugation.

 (CH3)3 C----, CH3CH2----,(CH3)2 CH----

 (b) Draw the resonance structures of NO3- and show the movement of electrons by curved arrows.

11.using the data (all values are in kilocalories per mole at 250C) given below, calculate the bond energy of C ----C AND C---H bonds.

(a) ΔH0 combustion (ethane)= -372.0

(b) Δ H0 combustion (propane)= - 530.0

(c) Δ H0 for C (graphite)----> C (g)= 172.0

(d) Bond energy of H----H=104.0

(e) Δ fH0 of H2O (1)= -68.0

(f) Δ H0 for CO2 (g) = -94.0

12.(a) What is the mass per cent of carbon in carbon dioxide?

 (b) Find out the no. of atoms in 28g of N2 & 32g of O2.

 (c) How many moles are present in 88g  of CO2?

13. The concentration of sulphide ion in 0.1 M HCl solution saturated with hydrogen sulphide is 1.0 x10-19 M. if 10mL of this is added to 5 mL of 0.04 M solution of the following feSO4, MnCl2, ZnCl2 and CdCl2, in which of these solutions precipitation will take place?

(Given, KSP of FeS=6.3X10 -18

 KSP of MnS =2.5X10-13

KSP of ZnS=1.6X10-24

KSP of CdS=8.0X10-27)

14. What will be the pressure exerted by a mixture of 3.2g of methane and 4.4g of carbon dioxide contained in a 9dm3 flask at 270C?

15.(a) Among halogens, the correct order of amount of energy released in electron gain enthalpy.

 F, Cl, Br, I

 (b)Arrange the following species in decressing order of size.

 I-, I+ ,I

 (c) Identify the element from the following configuration

 1s2,2s2,2p6, 3S2 , 3P6 ,3D5, 4S 2

16. Permanganate ion reacts with Bromide ion in Basic medium to give Manganese dioxide and bromate ion . Write the balanced ionic equation for the reaction.

17. (a) Calculate the formal charge on oxygen atom of P--------O bond in PO3-4 .

(b) How many number of Electrons are present in Anti bonding orbital of O2-2 ?

(c) On the basis of VSEPR theory , Draw the structure of XeF4 molecule ?

18. (a) oxygen atom has atomic number 8 and nitrogen has 7. Calculate the total number of electrons in nitrate ion..

(b) calculate the mass of photon of sodium light having wavelength 600 nm. And velocity = 3 X108 m/s.

(c ) How many radial nodes are present in 4d – orbital ?

19. (a) Carry out the following conversion :

 (i) But-1-yne to pentan -2- one ?

(ii) Bromomethane to propanone?

(b) How will you prepare Ethyne from calcium carbide?

20. (a) Give complete mechanism for the nitration of benzene.

 (b) Convert the following

 (i) benzenediazonium chloride to benzene

 (ii) ethene to mrthanal

21. When water is added to compound A of calcium ,solution of compound B is formed. When carbon dioxide is passed into the solution, it turns milky due to formation of compound if excess Of carbon dioxide is passed into the solution milkiness disappear due to the formation of compound. Identify the compound A,B,C.D.Explain why the milkiness disappear in the last step.

22. (a) What happens when alluminium (III) Chloride reacts with alkaline water?

(b) Complete the following reaction.

2H2SO4- (aq)---Electrolysis--🡪 A(aq)---Hydrolysis---🡪 B+C+D

(C) If same mass of liquid water and a piece of ice is taken, then why is the density of ice is less than that of liquid water?

23. During the educational trip from a college, a group of students visited a village having beautiful lake. Students noticed that some villagers are washing clothes around the lake. They also observed the dumping of waste materials from the houses into the lakes.

After a few years, the students visited the same village again. They were shocked to find the green cover over the lake water, stinking smell was coming out and its water had become unusable. Answer the following:

1. What is green covers over lake water?

 (b)What does the lake water badly stinking?

 (c) How this problem can be avoided to make lake beautiful again?

24. (a) Account for the following

 1) AlCl3 behaves as an acid.

 2) +1 oxidation state is more stable than the +3 oxidation state for

 Thallium.

 3) PbO2 is a stronger oxidising agent than SnO2 .

 (b) Complete the following reaction .

 1) 2Al(s) + 2NaOH(aq) + 6H2O(l) ---🡪

 2) Na3[AlF6]+3BF3---🡪

25. The ammonia evolved from the treatment of 0.30 g of an organic compound for the estimation of nitrogen was passed in 100mL of 0.1M sulphuric acid. The excess of acid required 20mL of 0.5M sodium hydroxide solution for complete neutralization. Calculate the percentage of nitrogen in the compound.

26. 5 moles of an ideal gas at 293K is expanded isothermally from an initial pressure 0.4 kPa to a final pressure of 0.1 kPa against a constant external pressure of 0.1 kPa.

(a) Calculate q, W, ΔU, and ΔH .

(b) Calculate the corresponding values of q, W, ΔU and ΔH, if this process is carried out reversibly.

If