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General Instructions:

Q1 to 5 carry 1 mark each
Q no 6 to 10 carries 2 marks each
Q no 11 to 22 carries 3 marks each
Q no 23 carries 4 marks
Q no 24 to 26 carries 5 marks each

Q1.Write the E.C of Cu atom 2^a

Q2.State Pauli's exclusive principle

Q3.Calculate the molecular mass of glucose molecule $C_6H_5O_6$

Q4.What are isoelectronic species?

Q5. CO_2 and H_2O have different shapes,although both are triatomic molecules why?

Q6. Which out of NH_3 and NF_3 has higher dipole moment and why?

Q7.Calculate the wavelength of an electron moving with a velocity of $2.05 \times 10^7 ms^{-1}$

Q8. Calculate the mass % of each element in sodium sulphate molecule

Q9. Derive a relationship between Cp and Cv for an ideal gas.

Q10. If the combustion of 1 gm of graphite produces 20.7KJ of heat ,what will be the molar enthalpy change?

OR

Q10.Draw diagram to show the formation of double bond between carbon atoms in Ethene molecule

Q11. Enthalpy of combustion of one mole of benzene is 3267.0kJ at 298K and 1 atmp pressure.Calculate the standard enthalpy of formation of benzene? Given the enthalpy of formation of CO_2 and H_2O are -393.5kJmol-1 and -285.83kJ /molrespectively

Q12 a) On the basis of M.O theory compare the relative stability of H_2^+ and H_2^-

b)A golf ball has a mass of 40g and speeds of $45ms^{-1}$.If the speed can be measured with an accuracy of 2%calculate its uncertainty in the position.

Q13. If 20.0 g of $CaCO_3$ is treated with 20.0g of HCl how many grams of CO_2 can be generated .write the complete balanced equation.Identify the limiting reagent.

Q14. A photon of wavelength $4X10^{-7}m$ strikes on metal surface the work function of the metal is 2.13eV.Calculate

(i) The energy of the photon(eV) (ii) the K.E of emission (iii) the velocity of the photoelectron (1ev $=1.6x10^{-19}$ J)

Q15. Answer the following:

(i) How does the metallic and nonmetallic character vary across the period from left to right

(ii) Nitrogen has a positive electron gain enthalpy whereas oxygen has negative .Explain

(iii) Electron gain enthalpy of halogens are high explain.

Q16. (i) write the order of Hydrogen bonding in NH_3 H_2O and HF

(ii) Explain the Amphoteric nature of water.

Q17 a)Predict the sign of Δ S for the decomposition of Sodium Bicarbonate

b)Write the IUPAC name and symbol for the element with atomic no 118
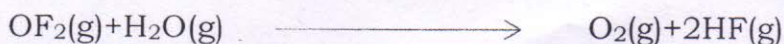
c)Explain expanded Octet rule with an example

(OR)

Q17. Explain the shape and hybridization of the following molecules

BrF_5 ,XeF_2, SF_4

Q18 a)State first law of thermodynamics

b) Calculate the standardenthalpy change and standard internal energy change for the following reactions at 300K

$$OF_2(g)+H_2O(g) \longrightarrow O_2(g)+2HF(g)$$

Standard enthalpies of formation of various species are given

$OF_2 = 23.0 kJ/mol$ $H_2O = -241.8 KJ/mol$ $HF = -268.6 kJ/mol$
$R = 8.314 J/K/mol$

Q19.Napthalene ball contains 93.71% of carbon and 6.29% hydrogen.If the molar mass is 128g calculate its molecular formula ? $C_{10}H_8$

Q20.   a)Give the significance of Spin quantum no.

    b)Define the term photoelectric effect

    c)What is the energy of lowest energy level of hydrogen atom?

Q21.   Answer the following:

    a)What is the basic difference between the terms electron gain enthalpy and electronegativity

    b)Predict the formula of the binary compound formed between the following pairs of elements: a) Magnesium and Nitrogen   b)Silicon and Oxygen

Q22.a) Explain the important aspect of resonance with reference to the

    CO_3^{-2} ion.

    b) What is meant by Hybridization of atomic orbitals?Describe the shape of sp and sp^2 hybrid orbitals

Q23. The teacherin a chemistry class asked the students "You know oxygen and sulphur belong to the same group of the periodic table.They must possess similar characteristics. While the hydride of oxygen is liquid at room temperature,the hydride of sulphur is a gas Isn't it strange?" said the teacher.

    a)How do you account for the different physical states of hydrides of oxygen and sulphur at room temperature?

    b)How do you explain that ice floats over water?

Q24.   a)Hydrolysis of sucrose gives glucose and fructose. The Equilibrium constant for the reaction is 2×10^{13} at 300K. Calculate the Standard Free Energy change at 300K

(log 2= 0.3010)

b)What is the basic difference between the enthalpy of formation and enthalpy of reaction?Illustrate with suitable example

(OR)

Q24. a)What is meant by an ideal gas and a real gas?What are the causes of deviation from ideal behavior?

b)Define Dalton's Law of partial pressure

c) Physical properties of ice,water and steam are very different why?

d)Calculate the total number of electrons present in 1.4g of dinitrogen gas

Q25. a)Define lattice enthalpy.How is it related to the stability of the ionic compound?

b)What type of bond exists in graphite?

c)Use molecular orbital theory to explain why Be_2 does not exist?

d)Define Hydrogen Bond. State the two types of hydrogen bonds with suitable eg:

(OR)

Q26. a) All transition metals are d-block elements but all d-block elements are not transition elements Explain.

b)Explain why the electron gain enthalpy of fluorine is less negative than that of chlorine?

c)Why is the electron gain enthalpy of nitrogen is zero?

d)Write the general electronic configurationof f-block elements

e) Complete the equation: $Cl_2O_7 + H_2O$ ---------------

Q26. a)What are degenerate orbitals? Give example

b)According to de Broglie matter should exhibit dual nature.i.e.wave nature and particle nature.However a cricket ball of mass 100g does not move like a wave when it is thrown by a bowler at a speed of 100Km/hr.Calculate the wavelength of the ball and explain why it does not exhibit wave nature

c)Nickel atom can lose two electrons to form Ni+2ion.The atomic no. of Ni is 28.From which orbital will nickel lose two electrons?

(OR)

Q26. a)Calculate the energy of one mole of photons of radiation whose frequency is 5×10^{14} Hz

b) Using s,p,d,fnotations describe the orbitals with the following quantum nos.

i)n=3 ,l=1   ii) n=4, l=3

c)Butyric acid contains only C, H and O. A 4.24 mg sample of butyric acid is completely burnt.It gives 8.45mg of CO_2 and 3.46 mg of H_2O.What is the mass percentage of each element of butyric acid.