CHEMISTRY

12th 3Marks

1.Define an Heisenberg's uncertainty principle.

It is impossible to measure simultaneously both the position and velocity of a microscopic particle with absolute accuracy (or) certainty.

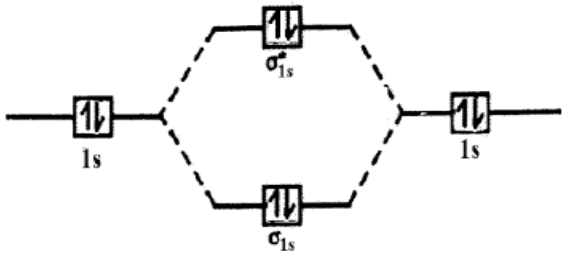
$$\Delta x \Delta p \geq \frac{h}{4\pi}$$

Δx - uncertainty in the position of the particle,

Δp - uncertainty in the momentum of the particle.

2. Why He_2 is not formed?

He - $1s^2$ $(\sigma_{1s})^2$ $(\sigma^*_{1s})^2$



Bond order = ½ (N_b – N_a) = 2-2/2 = 0

3. Distinguish between particle and wave

Particle	Wave
1.A particle is localized in space	A wave is delocalized in space
2.Particle do not interfere	wave can interfere
3.Total number of particle in a space is equal to their sum.	The resultant wave can be larger or smaller then the individual wave.

4.Write about hydridisaton.

Intermixing of orbital an atom having nearly the same energy to given exactly equivalent orbital's with same energy identical shape and symmetrical orientation in space

5. Define bond order.

Half the difference between the number of electron in bond molecular orbitals and the number of electron in antibond molecular orbitals.

bond order = ½ (N_b – N_a)

6. What is the signification of negative electron energy?

- ✓ The energy of an electron at infinity is arbitarily assumed to zero
- ✓ The influence of nucleus it does some work and spends its energy in this process
- ✓ The energy of the electron decreases and it become less than zero.

7. Why electron affinity of fluorine is less than that of chlorine?

Small size of fluorine atom.

These occurs repulsion among electrons of the valency shell and also with electrons to be added.

8.Why the first ionization energy of Al is lower then that of Mg?

Mg: $[Ne]3s^2$; Al: $[Ne]3s^2\ 3p^1$

One has to remove 3p electron in case of aluminium and 3S electron in the case of magnesium.

9. Disadvantage of pauling and Mullikan's scale disadvantage of paulling of paulling scale .

It is that bond energies are not know with any degree of accuracy for many solid elements.

Disadvantage of mulliken's scale:

It is that electron affinities with the exception of a few elements are not reliably know.

10. Why electron affinity of Be and N are zero?

Be- $1s^2\ 2s^2$ fully filled orbital

N- $1s^2\ 2s^2\ 2p^3$ half orbital

They have two attain stable electronic configuration and do not have the tendency to accept electron.

11. Why ionization energy neon is higher then fluorine?

Neon (Z = 10) has higher nuclear charge than fluorine (Z = 9).

Neon attains the stable configuration. So the removal or electron from the outer shell is very difficult

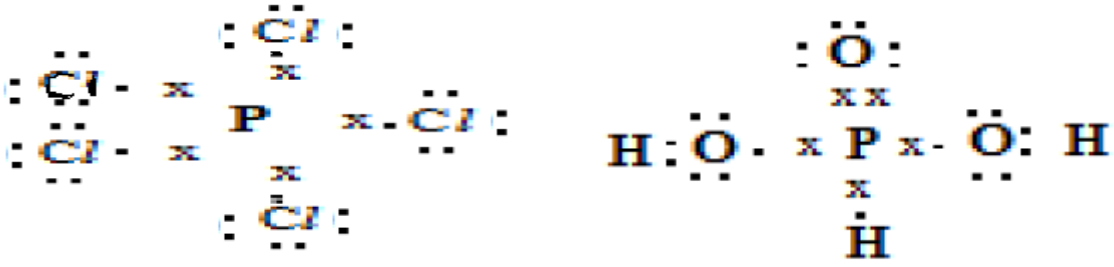
12. Prove that P_2O_5 is a powerful dehydrating agent.

$$H_2SO_4 \xrightarrow[-H_2O]{P_4O_{10}} SO_3$$

13. What is inert pair effect?

The electron in the ns orbital becomes inert and they are less available for bonding .

14. Draw the electron dot formula of PCl_5 and H_3PO_3



15. What is plumbo solvency?

Lead reacts with water containing dissolved air has a solvent action on lead due to the formation of lead hydroxide a poisonous compound. this Phenomenon is called plumbo solvency

$$2Pb + O_2 + 2H_2O \rightarrow 2Pb(OH)_2$$

16. Mention the uses of neon?

- ✓ It is used in discharge tubes and fluorescent bulbs
- ✓ It is used to protect electrical instrument from high voltage
- ✓ It is used in begcon lights for safety of air navigation as the light possesses fog.

17. Why HF do not stored in glass bottle?

It cannot be stored in glass or silica bottles as it attacks silicates or silica

$$Na_2SiO_3 + 6HF \rightarrow Na_2SiF_6 + 3H_2O$$

$$SiO_2 + 4HF \rightarrow SiF_4 + 2H_2O$$

18. What is the action of heat on orthophosphoric acid?

$$H_3PO_4 \xrightarrow{523K} H_4P_2O_7 \xrightarrow{589K} 2HPO_3 + H_2O$$

19. H_3PO_4 is Tribasic acid Prove?

$$H_3PO_4 + NaOH \rightarrow NaH_2PO_4 + H_2O$$

$$H_3PO_4 + 2NaOH \rightarrow Na_2HPO_4 + 2H_2O$$

$$H_3PO_4 + 3NaOH \rightarrow Na_3PO_4 + 3H_2O$$

20. H_3PO_3 is DiproticWhy?

$H_3PO_3 + NaOH \rightarrow NaH_2PO_3 + H_2O$

$H_3PO_3 + 2NaOH \rightarrow Na_2HPO_3 + 2H_2O$

21. Discuss the oxidizing power of fluorine.

Fluorine is the strong oxidizing agent

It oxidises other halide ions into halogens.

$F_2 + 2\ X^- \longrightarrow 2F^- + X_2 \quad (X^- = Cl^-, Br^-, I^-)$

22. How is potash alum prepared?

- Alunite or alum stone $K_2SO_4.Al_2(SO_4)_3.4Al(HO)_3$
- It is finely powered and boiled with dil H_2SO_4.
- The forming of ammionum sulphate is combines with potassium sulphate, the alum is crystallized.

23. Write about the Holme's signal.

$Ca_3P + 6H_2O \rightarrow 2PH_3\uparrow + 3Ca(OH)_2$

$CaC_2 + 2H_2O \rightarrow C_2H_2\uparrow + Ca(OH)_2$

24. Why do d-block element from complexes?

- Small size and high positive charge density.
- Presence of vacant (n-1)d orbital which are of apprpriate energy to accept lone pair of electron from the ligands for bonding with them.

25. Explain Why d-block element exhibit variable oxidation states?

- Several (n-1)d and ns electron.
- The energies of (n-1)d and ns orbital are fairly close to each other.

26. Why transition metal compounds are colored?

- The presence of unpaired electrons
- The energy gap between two energy leaves in the saved subshell being small.
- One energy level to another can be provided by the visible light.

27. What is Philosopher's wool? How is it formed?

When Zinc is heated in air at 773K, it burns to form a white cloud of Zinc oxide which settles to form a wooly flock.

$$2Zn + O_2 \xrightarrow{773K} 2ZnO$$

28. What is chrome plating?

Cathode : The articles to be plated

Anode : A plate of lead

Electrolyte : chromic acid + sulphuric acid

First plated with: Nickel

29. What is spitting of silver ? How is it prevented?

Molten silver absorbs 20 time its volume of oxygen which it again expels on cooling .Globules of molten silver are thrown off .this is called spitting of silver .

Prevention : By covering the molten with a layer of charcoal.

30. Explain Chromyl chloride test with equation.

$K_2Cr_2O_7 + 4KCl + 6H_2SO_4 \rightarrow 2CrO_2Cl_2 + 6KHSO_4 + 3H_2O$

31. Write the action of aquaregia on gold.

$2Au + 9HCl + 3HNO_3 \rightarrow 2AuCl_3 + 6H_2O + 3NOCl$

32. What is the action of heat on copper sulphate crystals?

$$CuSO_4 5H_2O \xrightarrow[-4H_2O]{100^0C} CuSO_4 H_2O \xrightarrow[-H_2O]{230^0 C} CuSO_4 \xrightarrow{720^0 C} CuO + SO_3$$

33. What is Purple of Cassius? How is it prepared?

Purple of Cassius is colloidal Au + $Sn(OH)_4$

$2AuCl_3 + 3SnCl_2 \rightarrow 2Au\downarrow + 3SnCl_4$

$SnCl_4 + 4H_2O \rightarrow Sn(OH)_4 + 4HCl$

34. State uses of ratio carbon dating?

- ✓ It is a great tool for correlating facts of historical importance.
- ✓ It is very useful in understanding the evolution of life and fall of civilizations.

35. Explain the principal of hydrogen bonding

Fission → heat + neutrons

$_3Li^6 + _0n^1 \rightarrow _1H^3 + _2He^4 + 4.78$ MeV

$_1H^2 + _1H^3 \rightarrow _2He^4 + _0n^1 + 17.6$ MeV

36. What is nuclear fission reaction?

When lighter nuclear moving at a high at a high speed are fused to gether to form a heavy nucleus.

$$_1H^2 + _1H^3 \rightarrow _2He^4 + _0n^1 + \text{energy}$$

37. What is 'Q' value of a nuclear reaction?

The amount of energy absorbed or released during the nuclear reaction.

$$Q = (m_p - m_r)\ 931\text{MeV}$$

m_p - sum of the masses of products

m_r - sum of the masses of reactants.

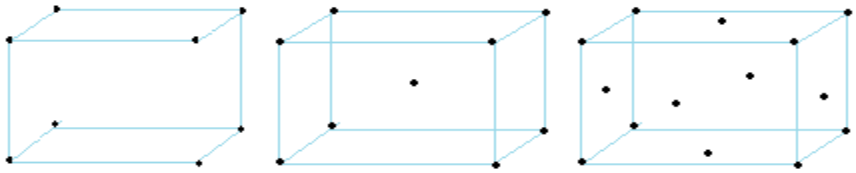
38. What are super-conductors?

- ✓ Superconductors are ultra cold substance that conduct electricity without resistance.
- ✓ These materials have virtually zero electrical resistance.

39. Write a note on molecular crystal?

- ✓ The lattice points in molecular crystal consists of Molecules which do not carry any charge.
- ✓ Diploe –diploe interaction eg. Ice
- ✓ Vander Waals forces eg. All kinds of molecular Solids.

40. Sketch the s.c, b.c.c and f.c.c structures



41. Define Bragg's equation?

$$n\lambda = 2d \sin\theta$$

n = order of reflection , λ = wave length of x-rays

d = interplaner distance in the crystal, θ= angle of reflection.

42. What is a vitreous state?

Glassy state or vitreous state is a condition in which certain substances can exist lying between solid and liquid state.

43. When does entropy increases in a process?

- In a chemical reaction, when a number of molecules of products are more than the number molecules of reactant entropy increases.
- In physical process, when a solid charges to liquid when a liquid to vapour when a solid charges to vapour entropy increases.

44. What is Gibb 's' free energy?

G = H - TS

H-enthalpy, T-temperature, S-entropy.

45. State trouton's' rule.

The heat of vaporisation is divided by the bolling point of the liquid is a constant.

$$\Delta S_{vap} = \frac{\Delta H_{vap}}{T_b} = 21 cal.deg^{-1}.mole^{-1}$$

46. Which substance that deviate from the trouton rule?

- Hydrogen and helium are low boiling liquids. Their boiling point is slightly greater than 0K.
- Water and alcohol have intermolecular hydrogen bonding.

So they have high boiling points and they possess high ΔH_{vap} value.

- Acetic acid whose molecules are partially associated in vapor phase and possess very low entropy vaporization which is very much less than 21 cals/mol/deg.

47. State Lechatelier's principle.

If a system at equilibrium is subjected to a disturbance or stress then the equilibrium shifts in the direction that tends to nullify the effect of the disturbance or stress.

48. What is reaction Quotient.

The ratio of the product of initial concentration of product to products of initial concentration of reactant under non- equilibrium conditions.

$$Q = \frac{[L]^l[M]^m}{[A]^a[B]^b}$$

49. Dissociation of PCl_5 Decreases in the presence of increase in Cl_2 Why?

$$PCl_5 \rightleftharpoons PCl_3 + Cl_2$$

Increase of concentraction of Cl_2 the equilibrium shift in the reverse direction ie.,more PCl_5 formed and dissociation of PCl_5 is decreased.

50.Write a note on parallel reactions.

The reactions in which one or more reactants react simultaneously in two or more pathways to give two or more products are known as parallel reactions.

Bromo benzene → o-dibromobenzene + HBr

Bromo benzene → p-dibromobenzene + HBr

51. What is activation energy?

Activation Energy = Threshold Energy - Energy of colliding molecules.

52. Write the Arrhenius equation and explain the terms?

$$K = Ae^{-Ea\backslash RT}$$

K- rate constant, Ea - activation energy,

A-frequency factor, R - gas constant, T-temperature in Kelvin.

53. Define Order of a reaction

The sum of power of the concentration of reactants that involved in the rate equation .

54. Write three example of opposing reactions.

$$CO_{(g)} + NO_{2(g)} \underset{Kr}{\overset{Kf}{\rightleftharpoons}} CO_{2(g)} + NO_{(g)}$$

$$CH_2 \quad \underset{Kr}{\overset{Kf}{\rightleftharpoons}} \quad CH_3 - CH_2 = CH_2$$
$$CH_2 - CH_2$$

$$2HI(g) \underset{Kr}{\overset{Kf}{\rightleftharpoons}} H_{2(g)} + I_{2(g)}$$

55. What is heterogeneous catalysis? Write the examples.

The catalytic process in which the reactant and catalyst are in the different phases.

$$2SO_{2(g)} + O_{2(g)} \overset{Pt(s)}{\rightleftharpoons} 2SO_3$$

56. Write a note about promoters.

A substance which though itself not a catalyst it promotes the activity of a catalyst is called a promoter.

$$N_2 + 3H_2 \underset{Mo}{\overset{Fe}{\rightleftharpoons}} 2NH_3$$

Mo – promoter

57. What are catalytic poison? Give an example

A substance which destroys the activity of the catalyst poison

$$2SO_2 + O_2 \underset{As_2O_3}{\overset{Pt}{\rightleftharpoons}} 2\,SO_3$$

As_2O_3- catalyst poison

58. What is electrophoresis.

The movement of sol particles under an applied electric potential.

59. What is active centre?

- The catalytic surface has unbalanced chemical bonds on it.
- These are crowded at the peaks, cracks and corner of the catalyst.
- The catalytic activity due to adsorption of reacting molecules is maximum at these spots.

60.Why is a colloidal system of gas in gas does not exist?

Gases are completely miscible and always form true solution.

61. What is brownion movement?

The continuous rapid zig-zag ,chaotic random and ceaseless movement executed by a colloidal particle in the dispersion medium is called

Reason: This is due to unbalanced bombardment of particle by molecules of dispersion medium.

62. State kohlrausch's law

At infinite dilution where in the ionization of all electrolytes is complete each ion migrates independently and contributes a definite value to the total equivalent conductance of the electrolyte.

63. What are buffer solutions?

One which maintains its p^H fairly constant even upon the addition of small amount of acid or base.

e.g $CH_3COOH + CH_3COONa$

64. What is common ion effect?

The reduction of the degree of dissociation of a salt by the addition of a common ion is called common ion effect.

$$AgCl_{(s)} \rightleftharpoons Ag^{+}_{(aq)} \; Cl^{-}_{(aq)}$$

NaCl is added to the AgCl solution. Here Cl^- ion is act as a common ion. So the dissociation of AgCl is decreased.

65. State ostwald's dilution law

Ostwald's dilution law relates the dissociation constant of the weak electrolyte with the degree of dissociation and the concentration of the weak electrolyte.

$$k_a = \frac{C\alpha^2}{1-\alpha}$$

66. Define Faraday first and second law of electrolysis?

FIRST LAW:-

The mass of the substance liberated at the electrodes during the electrolysis is directly proportional to the quantity of electricity that passes through the electrolyte.

SECOND LAW:

When the same quantity of electricity passes through solution of different electrolytes the amount of substances liberated at electrodes are directly proportional to chemical equivalent.

67. What are the condition for optical isomerism?

*The compounds should contain Asymmetric (or) chiral carbon atom.

*The compounds should have non-super imposable object and mirror image configuration.

68. Why meso tartaric acid is an optically in active compound with chiral carbon atom?

*Two Asymmetric carbon atom the confiaguration of one carbon is the mirror image of the other is laevo rotatory.

*Symmetric plane divides the molecule into equal halves.

*super-imposable on its mirror image.

69. Difference between Racemic from and Meso from.

Racemic from	Meso from
1. It is a mixture that can be separated into two optically Active froms	It is a single compound and hence cannot be Separated
2. Optically inactive due to External compensation	optically inactive due to . Internal compensation
3. Molecules are chiral	Molecules are achiral

70. Define racemic mixture? Give an example.

✓ It is a mixture that contains equal amount of d-isomer and l-isomer.

✓ Optically inactive form due to external compensation.

e.g. Equal amount of d and l tartaric acid.

71. What are chromophores? Give two example.

An organic compounds appears colored due to the presence of certain unsaturated groups (the groups with multiple bonds) in it.

e.g. Nitro, Azo.

72. Why iodoform and phenolic solutions are called antiseptic?

Iodoform , CHI_3 is used an antiseptic and its solutions 1% solutions is disinfectant.

0.2percent solution of phenol acts as an antiseptic and its 1% solution is a disinfectant.

73. Give any three characteristics of dye?

✓ A dye should have a suitable colour.

✓ It should be able to fix it self or be capable of being fixed to the fabric. Resistant to the action of water, dilute acids and alkalies.

74. Write a note on anti oxidants.

The substance that act against oxidants are called antioxidants.

e.g. Vitamin - C, vitamin - E

75. What is antipyretics?

Lowering the body temperature to the normal

e.g. Aspirin , antipyrine.

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