LIONS SCHOOL MIRZAPUR

HALF YEARLY EXAMINATION - 2020-21

CLASS - XI TIME-3 HRS.

SUBJECT – CHEMISTRY (043) M.M -70

GENERAL INSTRUCTIONS:-

i. Attempt all the questions. Marks are given against each question.
ii. Q. No. 1 to 20 are multiple choice question of one mark each.
iii. Q. No. 21 to 25 are very short answer questions of one mark each. Answer them in one word or one sentence each.
iv. Q. No. 26 to 28 are short answer questions two marks each. Answer them in 20 words each.
v. Q. No. 29 to 36 are short answer questions of three marks each. Answer them in 30 - 40 words each.
vi. Q. No. 37 to 39 are long answer questions of five marks each. Answer them in 75 - 100 words each.
vii. Use log table if necessary.
viii. Use of calculator is prohibited.

SECTION – A

Q.1 At what temp will both Celsius and Fahrenheit scale will read the same value.

a) -40^0 b) 40^0 c) 100^0 d) -100^0

Q.2 Maximum number of electron on a principal shell are:-

a) n^2 b) n c) $2n^2$ d) $3n^2$

Q.3 Which of the following have no units:-

a) Electronegativity b) Electron gain enthalpy

c) Ionisation enthalpy d) Metallic character

Q.4 Which of the following species has tetrahedral geometry.

a) BH_4^- b) $N\bar{H}_2$ c) CO_3^{2-} d) H_3^+O

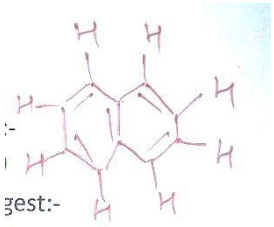
Q.5 The element with atomic number 57 belongs to:-

a) S-Block b) P-Block c) d-Block d) f-Block

Q.6 The number of radial nodes for 3P orbital is

a) 3 b) 4 c) 2 d) 1

Q.7 The number of ‖ bonds are σ bonds in the following structure is:-



a) 6, 19 b) 4, 20 c) 5, 19 d) 5, 20

Q.8 In which of the following substance will hydrogen bond be strongest:-

a) HCl b) H_2O c) HI d) H_2S

Q.9 Species having same bond order are:-

a) N_2 b) N_2^- c) F_2^+ d) O_2^-

Q.10 T – type shape is exhibited by molecule.

a) ClF_3 b) $CHCl_3$ c) CCl_4 d) PCl_5

Q.11 The temp at which real gases obey the ideal gas laws over a wide range of pressure is called:

a) Critical temp b) Boyle's temp c) Inversion temp d) Reduced temp

Q.12 Density of Neon is highest at.

a) STP b) 0^0 C; 2 atm d) 273^0 C and 1 atm d) 273^0 C and 2 atm

Q.13 Which of the following is not correct:-

a) Δ G is zero for a reversible reaction

b) Δ G is +ve for a spontaneous reaction

c) Δ G is -ve for a spontaneous reaction

d) Δ G is +ve for an equilibrium

Q.14 Identify the intensive properties from the following:-

a) Enthalpy and temp

b) Volume and temp

c) Enthalpy and volume

d) Temp and refractive index

Q.15 In evaporation of water the entropy:-

a) Decreases

b) Increases

c) Does not change

d) Increases & decreases

Q.16 Heat evolved in calorie by combustion of 1 gm of a fuel is called:-

a) Calorific value
b) Heat of combustion
c) Heat of formation
d) None of these

Q.17 The law of mass action proposed by:-

a) Gulberg & Waage
b) Le – chateliers & Braun
c) Kossel and Lewis
d) Vant Hoff's

Q.18 The state of equilibrium refers to:-

a) State of rest
b) Dynamic state
c) Stationary state
d) State of inertness

Q.19 Bond order of He2 is:-

a) 1
b) 0
c) 2
d) 3

Q.20 1 bar is equal to:-

a) 1 atm
b) 0.987 atm
c) 3 atm
d) 4 atm

SECTION – B

Q.21 1 L of a gas weights 1.24gm at S.T.P.. What will be its molar mass and vapour density. 1

Q.22 How many unpaired electrons are present in Fe^{3+}? Atomic number of $Fe \rightarrow 26$. 1

Q.23 Which transition in hydrogen spectrum. Corresponds to third line of Balmer series? 1

Q.24 How do atomic sizes vary in a group and in a period? 1

Q.25 What is the valency of carbon in C_2H_4 and C_2H_2 ? 1

SECTION – C

Q.26 Solubility of AS_2S_3 is X then what will be its solubility product? 2

Q.27 Determine the molecular formula of an oxide of iron in which the mass % of iron and oxygen are 69.9 % and 30.1 %. Atomic mass of $Fe \rightarrow 56$ and oxygen $\rightarrow$ 16. 2

Q.28 The equilibrium constant for a reaction is 10. What will be the value of Δ G? R $\rightarrow$ 8.314; T $\rightarrow$ 300 K. 2

SECTION – D

Q.29 Prove that $KP = KC(RT)^{\Delta n}$ 3

Or

Determine the solubilites of silver chromate, barium chromate, Ferric hydroxide, Lead chloride and Hg_2I_2 at 298K from solubility product constant determine the molarities of Individual ions.

$Ksp \quad Ag_2CrO_4 \rightarrow 1.1 \times 10^{-12}$

Ksp $Fe(OH)_3 \rightarrow 1 \times 10^{-38}$

Ksp $pbCl_2 \rightarrow 1.6 \times 10^{-5}$

Ksp $Hg_2I_2 \rightarrow 4.5 \times 10^{-29}$

Q.30 What is Hess's law of constant heat of summation? Write its various application. Also explain tephigraph. 3

Q.31 Prove PV = n RT by using Boyle's Law. Charle's Law & Avogadro's law.

Or

The drain cleaner Drainex contains small bits of aluminium which reacts with caustic soda to produce dihydrogen gas. What volume of hydrogen at 20^0 C and one bar will be released when 0.15g of aluminium reacts. 3

Q.32 Give three differences between Bonding molecular orbitals and anti-bonding molecular orbitals. 3

Q.33 What is electron gain enthalpy? Write factors affecting electron gain enthalpy. Also mention what change take place in E.G. E down the group and along a period. 3

Or

What is Ionisation enthalpy? Write the factors affecting ionisation enthalpy. Also mention what change take place in I – F_2 down the gp and alons the period.

Q.34 What is empirical formula? Write the rules for determination of empirical formula. Write the relationship between empirical formula and molecular formula. 3

Q.35 A welding fuel gas contains carbon and hydrogen only burning a sample of it in oxygen gives 3.38 gm. of CO_2 and 0.69 gm of water and no other products. A volume of 10 L (measured at S.T.P) of this welding gas in found to weigh 11.6g. Calculate i) Empirical Formula

ii) Molar mass of the gas

iii) Molecular Formula

Q.36 What is Mendeleev's periodic law? Write the groups & periods mention the advantage and disadvantages of Mendeleev's periodic law and table.

Or

What is modern periodic law? Write the groups and periods. Mention advantages and disadvantages also. 3

Q.37 a) What is First law of thermodynamics? Write its limitation. 1

b) What is Avogram? 1

c) A vessel of 120 ml capacity contains a certain amount of gas at 35^0C and 1.2 bar pressure. The gas is transferred to another vessel of volume 180 ml at 35^0 C. What would be its pressure. 2

d) What is calorific value? 1

O r

a) What is third law of thermodynamics? 1

b) What is limiting reagent. Also explain excess reagent. 1

c) What is entropy of fusion? 1

d) On a ship sailing in pacific ocean when tem is 23.4^0 C, a balloon is filled with 2 litre of air. What will be the volume of the balloon when ship reaches Indian ocean where temperature is 26.1^0 C. 2

Q.38 i) What is Boyle's law? 1

ii) What is AZT? What is its use? 1

iii) Out of NH_3 and N_2 which will have larger value of a. 1

iv) What is equilibrium constant Kc for the following reaction at 400K?

2 NOCl(g) ⇌ 2 NO(g) + Cl2(g)

$\Delta H^0 = 77.2$ KJ; $\Delta S^0 = 122$ JK^{-1}. R → 8.314 2

Or

a) What is Charle's law? 1

b) What is Cis-platin? Mention its use.

c) What do you understand by STP. 1

d) For the reaction at 298K 2A+B ⟶ C.

$\Delta H = 400KJ$ Mol-1 and Δ S=2 KJ $K^{-1}mol^{-1}$ becomes spontaneous. Considering ΔS to be constant over the temperature range. 2

Q.39 i) What is Henry's law? 1

ii) What is Lechateliers Principle. 1

iii) At 450 K, $Kp = 2 \times 10^{10}$ bar for the given reaction at equilibrium

$2SO_2(g)$+ $O_2(g)$ ⇌ 2 SO_3(g)

What is Kc at this temperature? 2

iv) Explain why pure liquid or solid can be ignored while writing the equilibrium constant expression. 1

Or

i) What is law of mass action? 1

ii) What is concentration quotient?

iii) What is the concentration of each of the following substances in the equilibrium when initial concentration of ICl was 0.78 M.

2 ICl(g) ⇌ I_2(s)+Cl2(g) KC 0.14.

iv) What is Ostwald's dilution law? Also explain degree of dissociation α.