PUBLIC EXAMINATION MARCH – 2020

CLASS :12 **TENTATIVE ANSWER KEY** **SUBJECT: CHEMISTRY**

PART – I

Choose the correct answer **15 X 1 = 15**

TYPE A		
1	b	(1)-(ii), (2)-(i), (3)-(ii), (4)-(iii)
2	a	Electromagnetic separation
3	d	Sc
4	c	Therapeutic index
5	c	basic, acidic, basic
6	b	TACGAACT
7	c	2,4-dimethyl aniline
8	b	5F
9	c	Both Assertion and Reason are true and Reason is not the correct explanation of Assertion
10	d	Lithium-ion battery
11	b	$H_2N_2O_2$
12	c	S_N2 reaction
13	d	32%
14	a	half life period
15	c	o-phenol sulphonic acid

TYPE B		
1	b	$H_2N_2O_2$
2	c	o-phenol sulphonic acid
3	b	5F
4	d	32%
5	c	Both Assertion and Reason are true and Reason is not the correct explanation of Assertion
6	b	(1)-(ii), (2)-(i), (3)-(ii), (4)-(iii)
7	a	Electromagnetic separation
8	c	2,4-dimethyl aniline
9	c	S_N2 reaction
10	c	Therapeutic index
11	d	Lithium-ion battery
12	d	Sc
13	a	half life period
14	c	basic, acidic, basic
15	b	TACGAACT

PART II

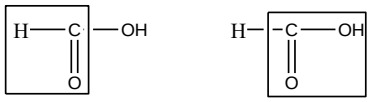
Answer any SIX questions. Question No. 24 is compulsory **6 X 2 = 12**

Q.NO	ANSWERS		MARKS
16	$Ca(OH)_2 + Cl_2 \longrightarrow CaOCl_2 + H_2O$		2
17	d-block – i) Tungsten ii) Ruthenium f-block – iii) Promethium iv) Einsteinium	4x½	2
18	$[Cr(H_2O)_6]Cl_3$ $[Cr(H_2O)_5Cl]Cl_2.H_2O$ $[Cr(H_2O)_4Cl_2]Cl.2H_2O$ (any two)	2 x 1	2
19	The number of octahedral voids – 6 The number of tetrahedral voids – 12	2 x 1	2
20	**Lewis acid**: positive ion (or) an electron deficient molecule (e.g) BF_3 **Lewis base**: anion (or) neutral molecule with at least one lone pair of electrons. (e.g) H_2O	2 x 1	2
21	**Dispersion medium :** Solid **Dispersed phase :** Liquid	2 x 1	2
22	Catalyst : Pd Catalytic Poision : $BaSO_4$ (aldehyde cannot be further reduced to alcohol) $CH_3COCl + H_2 \xrightarrow{Pd/BaSO_4} CH_3CHO + HCl$	2 x 1	2
23	$CH_3NO_2 + 3\ Cl_2 \xrightarrow{NaOH} CCl_3NO_2 + 3HCl$		2
24	The C-O-C bond angle is slightly greater than the tetrahedral bond angle due to the repulsive interaction between the two bulkier alkyl groups.		2

PART III

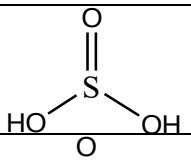
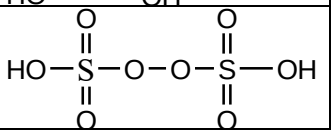
Answer any SIX questions. Question No. 33 is compulsory **6 X 3 = 18**

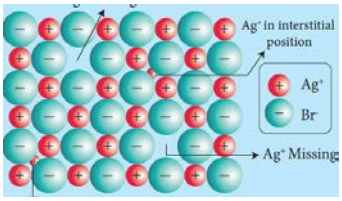
Q.NO	ANSWERS		MARKS
25	$K_2Cr_2O_7 + 4NaCl + 6\ H_2SO_4 \longrightarrow 2\ KHSO_4 + 4\ NaHSO_4 + 2\ CrO_2Cl_2 + 3\ H_2O$		3
26	Sc^{3+} - d^0 , No unpaired electron d-d transition is not possible, $[Sc(H_2O)_6]^3$ is colourless	3 x 1	3
27	$[H_3O]^+ = Ka \frac{[acid]_{eq}}{[base]_{eq}}$ $[H_3O]^+ = Ka \frac{[acid]}{[salt]}$ $-\log [H_3O]^+ = -\log K_a - \log \frac{[acid]}{[salt]}$ $pH = pK_a - \log \frac{[acid]}{[salt]}$ $pH = pKa + \log \frac{[salt]}{[acid]}$ $pOH = pK_b + \log \frac{[salt]}{[base]}$	1 1 ½+½	3
28	❖ Unlike galvanising the entire surface of the metal to be protected need not be covered with a protecting metal instead, metals such as .Mg .or zinc which is corroded more easily than iron can be used as a sacrificial anode and the iron material acts as a cathode. ❖ So iron is protected, but Mg or Zn is corroded		3
29	i) As_2S_3 - Spherical ii) Blue gold sol - Disc or plate like iii) Tungstqic acid sol - Rod like	3 X 1	3

30	❖ Formic acid contains both an aldehyde as well as an acid group  ❖ Formic acid reduces Tollen's reagent (ammonical silver nitrate solution) to metallic silver ❖ Formic acid reduces Fehling's solution. It reduces blue coloured cupric ions to red coloured cuprous ions.	3 X 1	3
31	**Fibrous proteins** • Linear molecules similar to fibres • Insoluble in water • Held together by disulphide bridges and weak intermolecular hydrogen bonds. Example: Keratin, Collagen etc… **Globular proteins** • Spherical shape. • The polypeptide chain is folded into a spherical. • These proteins are usually soluble in water and have many functions including catalysis.	1½ 1½	3
32	1. Reduce the product spoilage and extend the shelf-life of food 2. Addition of vitamins and minerals reduces the mall nutrient 3. Flavouring agents enhance the aroma of the food 4. Antioxidants prevent the formation of potentially toxic oxidation products of lipids and other food constituents	Any Three	3
33	1. The presence of inner d and f-electrons which has poor shielding effect compared to s and p-electrons. 2. Effective nuclear charge on the valance electrons increases	1½ 1½	3

PART - IV

Answer All the Questions **5 X 5 = 25**

Q.NO	ANSWERS		MARKS
34 a)	Fractional crystallization - impure metal – solidify- impurities-molten region. Impurities- more soluble- impure metal –rod-heated-mobile induction - pure metal crystallizes-impurities- molten zone-repeated - purity level-inert gas atmosphere- prevent the oxidation of metals-Ge,Si and Ga- semiconductor. OR		5
b)	i) 1. Valency of element is greater than or equal to two 2. Element should have an ability to bond with itself 3. The self bond must be as strong as its bond with other elements 4. Kinetic inertness of catenated compound towards other molecules ii) $SiO_2 + 4HF \longrightarrow SiF_4 + 2H_2O$ $Na_2SiO_3 + 6HF \longrightarrow Na_2SiF_6 + 3H_2O$	Any two point 2 x 1 3	5
35 a)	i) Sulphurous acid — H_2SO_3 —  Marshall's acid — $H_2S_2O_8$ —  ii) a) diamminesilver(I) ion b) pentaamminechlorocobalt(III) ion OR	1½ 1½ 2	5
b)	i) **Magnetic property** - No. of unparied electrons = 4, Paramagnetic **Magnetic moment** - $\mu s = \sqrt{n(n+2)}$ $= \sqrt{4(4+2)}$ $= \mathbf{4.899\ BM}$	1 1	

	ii) Dislocation of ions from its crystal lattice. Occupies an interstitial position-ionic solids-Cation and anion differ in size- does not affect the density For example AgBr  	3	5
36 a)	A ⟶ product Rate law can be expressed as Rate = k [A]^1 Where, k is the first order rate constant. $\frac{-d[A]}{dt} = k[A]^1$ $\Rightarrow \frac{-d[A]}{[A]} = k\,dt$ ...(1) $\int_{[A_0]}^{[A]} \frac{-d[A]}{[A]} = k\int_0^t dt$ $\left(-\ln[A]\right)_{[A_0]}^{[A]} = k(t)_0^t$ $-\ln[A] - (-\ln[A_0]) = k\,(t-0)$ $-\ln[A] + \ln[A_0] = kt$ $\ln\left(\frac{[A_0]}{[A]}\right) = kt$ ...(2) $k = \frac{2.303}{t}\log\left(\frac{[A_0]}{[A]}\right)$ ----- (3) $\ln[A_0] - \ln[A] = kt$ $\ln[A] = \ln[A_0] - kt$ $\Rightarrow y = c + mx$		5
	OR		
b)	i) a) Vinegar - 2 b) Black coffee - 5 c) Baking soda - 9 d) Soapy water - 12	½ x 4=2	5

ii)

$$\kappa = \frac{1}{R}\left(\frac{l}{A}\right)$$

$$\kappa = \frac{1}{15\Omega} \times \frac{1.5\times10^{-2}\text{m}}{4.5\times10^{-4}\text{m}^2}$$

$$= 2.22\ \text{Sm}^{-1}$$

$l = 1.5\ \text{cm} = 1.5\times10^{-2}\text{m}$

$A = 4.5\ \text{cm}^2 = 4.5\times(10^{-4})\text{m}^2$

$R = 15\Omega$

3

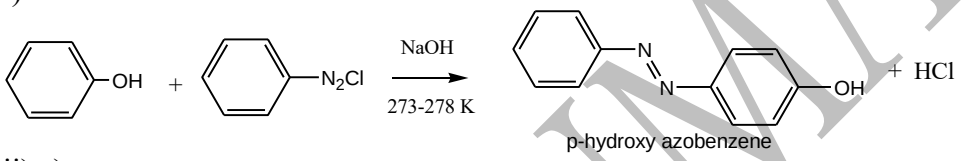
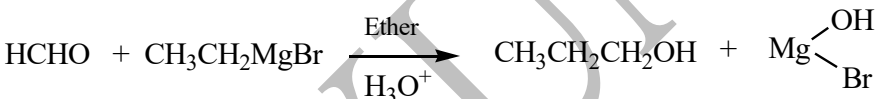
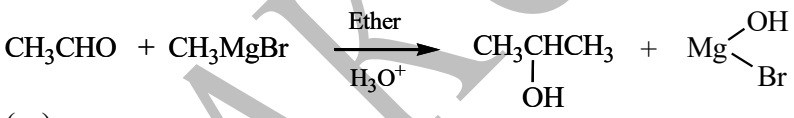
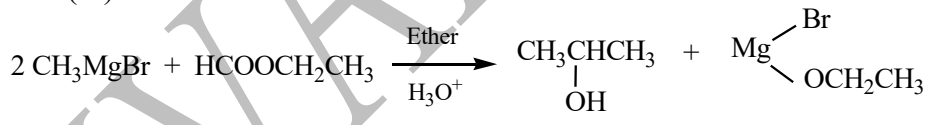
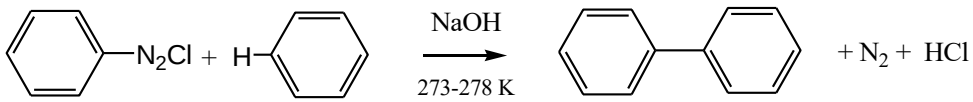
37 a)

Chemical adsorption	Physical adsorption
1. It is very slow .	It is instantaneous
2. It is very specific depends on nature of adsorbent and adsorbate.	It is non-specific
3. chemical adsorption is fast with increase pressure, it can not alter the amount.	In Physisorption, when pressure increases the amount of adsorption increases.
4. When temperature is raised chemisorption first increases and then decreases.	Physisorption decreases with increase in temperature
5. Chemisorption involves transfer of electrons between the adsorbent and adsorbate.	No transfer of electrons
6. Heat of adsorption is high i.e., from 40-400kJ/mole.	Heat of adsorption is low in the order of 40kJ/mole.
7. Monolayer of the adsorbate is formed.	Multilayer of the adsorbate is formed on the adsorbent.
8. Adsorption occurs at fixed sites called active centres. It depends on surface area	It occurs on all sides.
9. Chemisorption involves the formation of activated complex with appreciable activation energy.	Activation energy is insignificant.

Any three

3 x 1 =3

5

	ii) 1. Mixture of natural rubber and sulphur onto a hot stove. Become strong and elastic. 2. Natural rubber is mixed with 3-5% sulphur and heated at 100-150˚C causes cross linking of the cis-1,4-polyisoprene chains through disulphide (-S-S-) bonds. 3. The physical properties of rubber can be altered by controlling the amount of sulphur that is used for vulcanization. In sulphur rubber, made with about 1 to 3% sulphur is soft and stretchy. When 3 to 10% sulphur is used the resultant rubber is somewhat harder but flexible OR	2	
b)	i)  p-hydroxy azobenzene ii) a)  b)  (or)  	2 1½ 1½	5
3 8 a)	i) 40% aqueous solution of formaldehyde is called formalin. It is used for preserving biological specimes. ii) Disaccharides two monosaccharide's are linked by oxide linkage called 'glycosidic linkage', which is formed by the reaction of the anomeric carbon of one monosaccharide reacts with a hydroxyl group of another monosaccharide OR	2 3	5
b)	i)  ii) A – CH_3CN - Methyl cyanide B – CH_3NC - Methyl isocyanide	3 1 1	5

QUESTION PAPER ANALYSIS

PART	MARKS	TOTAL QUESTIONS	BOOK BACK	INTERIOR	TOTAL MARKS
I	1 MARK	15	8	7	15
II	2 MARK	9	1	8	18
III	3 MARK	9	1	8	18
IV	5 MARK	10	4	6	50