## Roll No. 2017 058759

Total No. of Questions : 26]

## 053/B

[Total No. of Printed Pages : 4

## SS

## 2037

## ANNUAL EXAMINATION SYSTEM

#### CHEMISTRY (Theory)

#### (Common for Science & Agriculture Groups)

#### (English Version)

#### (Evening Session)

#### Time allowed : Three hours

#### Maximum marks : 70

- Note: (i) You must write the subject code/paper code 053/B in the box provided on the title page of your answer-book.
  - (ii) Make sure that the answer-book contains 30 pages (including title page) and are properly serialed as soon as you receive it.
  - (iii) Question/s attempted after leaving blank page/s in the answer-book would not be evaluated.
  - (iv) Log tables may be asked for if needed.
  - (v) Use of simple calculator is allowed.
  - (vi) Marks allotted to each question are indicated against it.
  - (vii) The paper comprises of 26 questions. Attempt total 26 questions. Internal choice is given in Q. No. 19, 23, 24, 25 and 26.
  - (viii) Question No. 1 to 8 carry one mark each. Answer in one line.
    - (ix) Question No. 9 to 16 will be of two marks each. All questions are compulsory. They are short answer type questions.
    - (x) Question No. 17 to 23 will be of 4 marks each. All questions are compulsory. Internal choice is given for Q. No. 19 and 23.
    - (xi) Question No. 24, 25 and 26 (Three questions) will be of 6 marks each. All questions are compulsory. Full internal choice is given.

#### All questions are compulsory.

1. Under what conditions the van't Hoff factor is less than one?

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• •	en an		(2)	`e		5	ST: ~~	, see g
Z.	Define molecul	arity of a reaction.						1
3.	Write down IUI	PAC name of CH <sub>3</sub> -N	H₂-CH₃ IH				·	1
4.	Complete the fo	ollowing reaction :-				• •	· · ·	1
		Na +. NaoH	623Km,300atm Copper Salt		·		· ·	
5.⁄	Write down the	position isomer of						1
- <b>C</b>	р СН₃-С-СН₂-СН₂-СН	13	•	j.		:	· · ·	•:
6.	Write down nan	ne of one antiseptic.	· · ·			· .	:	1
7.	What are artific	ial sweetners ?						: <b>1</b>
8.	What are polysa	accharides ?					si de la contra de	1
۶	The two ions A+	and B- have radii 8	8 pm and 200	pm respec	tively.	In the close	packed c	rystal of
¥	compound AB,	predict the coordina	tion number of	ofA⁺.			: · ·	2
16.	A first order rea	action is 20% comp	lete in 10 min	utes. Calc	ulate tl	he time $\widehat{for}$	75% còr	npletion
	of the reaction.		· · · · ·	۰۰ ۱۰ ۱۰ - ۲۰۰۰ ۱۰ ۱۰		· · · ·		2
11	What is Froth f	lotation process for	concentratio	n of ore?	en de la composition Anti-activitation		يې ( <sup>14</sup>	2
12.	Write down diff	erences between ad	dition and cor	ndensation	ı polym	iers.		2
13	Express geomet	trical isomerism in			ي. مور التي	e i Standar	•	2
	CI CI	Pt	•				· .	
	cí	NH <sub>3</sub>		· . ·			etiştir. A	- · ·

14. What is mutarotation ?

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	(3)	
15.	Write down coupling reaction of amines.	2
16	Explain how the colour of $K_2Cr_2O_7$ solution depends on $p_H$ of the solution ?	2
17.	Unit cell of an element (atomic mass = 108 amu and density = $10.5 \text{ g cm}^{-3}$ ) has an edge length	gth
	of 409 pm. Deduce the type of crystal lattice.	4
18.	(i) Prove that depression in freezing point is a colligative property.	2
	(ii) 45g of ethylene glycol ( $C_2H_6O_2$ ) is mixed with 600g of water. Calculate the freezing po	oint
	depression ( $K_f$ for water = 1.86 K Kg mol <sup>-1</sup> ).	2
19.	Explain the variation of molar conductivity of strong and weak electrolytes with dilution.	4
	or	
	Write the Nernst equation and calculate the emf of following cell at 298K :-	4
	$Mg(s)/Mg^{2+}(0.001M) \parallel Cu^{2+}(0.0001M) / Cu(s)$	
ينيەن . بىر	Given $E^{\circ}Mg^{2+}/Mg = -2.37V$ , $E^{\circ}Cu^{2+}/Cu = 0.34V$	
20.	Define coagulation. Differentiate between physical adsorption and chemical adsorption.	4
21.	(i) Among noble gases, only Xe is known to form chemical compounds. Why?	2
	(ii) Sulphur is a solid but oxygen is a gas. Why?	2
22.	(i) Alcohols have higher boiling point than alkanes. Why?	2
×	(ii) Discuss oxidation of primary, secondary and tertiary alcohols.	2
23.	(i) Write Cannizzaro reaction.	1.
. • .•	(if) Write aldol condensation.	1
•	(in) Why aliphatic carboxylic acids are stronger than phenols?	2
•	• or	
	(i) Carboxylic acids do not give characteristic reactions of carbonyl group. Explain.	2
	(ii) Why do aldehydes and ketones have high dipole moment?	2

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[Turn over

~ ~			
24.	(i)	$PbCl_2$ is known but $PbCl_4$ is not known. Explain with inert pair effect.	2
	(ii)	Why is $SF_6$ much less reactive than $SF_4$ ?	2
•	(iii)	Give hybridization and draw structure of $XeF_2$ .	2
·		or	• .
	(i)	Draw flow chart for Haber's process for the manufacture of ammonia.	3
	(ii)	Write down the reaction of Ozone with Potassium nitrite.	2
	(iii)	Draw structure of IF <sub>5</sub> .	. 1
25.	(i)	Why do transition elements exhibit higher enthalpies of atomization?	2
	(ii)	Calculate equivalent weight of $KMnO_4$ in alkaline medium.	2
	(iii)	What are the consequences of Lanthanoid contraction ?	2
		Or	3.87.
	(i)	Write down general electronic configuration and any two uses of block elements	. 3
			-
	(ii)	Copper is regarded as transition metal though it has completely filled d-or	bitals
	(ii)	Copper is regarded as transition metal through it has completely filled d-or $(3d^{10}4s')$ . Explain.	bitals 2
	(ii) • (iii)	Copper is regarded as transition metal though it has completely filled d-or (3d <sup>10</sup> 4s <sup>1</sup> ). Explain. Draw the structure of chromate ion.	bitals 2 1
26.	(ii) • (iiii) Writ	Copper is regarded as transition metal though it has completely filled d-or (3d <sup>10</sup> 4s <sup>1</sup> ). Explain. Draw the structure of chromate ion. e the following reactions :	bitals 2 1
26.	(ii) • (iiii) Writ (i)	Copper is regarded as transition metal though it has completely filled d-or (3d <sup>10</sup> 4s'). Explain. Draw the structure of chromate ion. e the following reactions : Wurtz reaction	bitals 2 1 1
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26.	(ii) • (jiji) • Writ (i) (ii) (iii)	Copper is regarded as transition metal though it has completely filled d-or (3d <sup>10</sup> 4s <sup>1</sup> ). Explain. Draw the structure of chromate ion. e the following reactions : Wurtz reaction Sandmeyer's reaction Hunsdiecker reaction	bitals 2 1 1 1 1
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26.	(ii) (iii) (iii) (ii) (iii) (iv) (v)	Copper is regarded as transition metal though it has completely filled d-or (3d <sup>10</sup> 4s <sup>1</sup> ). Explain. Draw the structure of chromate ion. e the following reactions : Wurtz reaction Sandmeyer's reaction Hunsdiecker reaction Reimer-Tiemann reaction Friedel Craft's acylation	bitals 2 1 1 1 1 1 1 1
26.	<ul> <li>(ii)</li> <li>(iii)</li> <li>(ii)</li> <li>(ii)</li> <li>(iii)</li> <li>(iv)</li> <li>(v)</li> <li>(vi)</li> </ul>	Copper is regarded as transition metal though it has completely filled d-or (3d <sup>10</sup> 4s <sup>1</sup> ). Explain. Draw the structure of chromate ion. e the following reactions : Wurtz reaction Sandmeyer's reaction Hunsdiecker reaction Reimer-Tiemann reaction Friedel Craft's acylation Ullman reaction	bitals 2 1 1 1 1 1 1 1 1 1 1
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26.	<ul> <li>(ii)</li> <li>(iii)</li> <li>(ii)</li> <li>(ii)</li> <li>(iv)</li> <li>(v)</li> <li>(vi)</li> <li>(i)</li> </ul>	Copper is regarded as transition metal through it has completely filled d-or (3d <sup>10</sup> 4s'). Explain. Draw the structure of chromate ion. e the following reactions : Wurtz reaction Sandmeyer's reaction Hunsdiecker reaction Reimer-Tiemann reaction Friedel Craft's acylation Ullman reaction or	bitals 2 1 1 1 1 1 1 1 1 3

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## SOLUTION

## 1. Under what conditions the van't Hoff factor is less than one ?

## Answer:

 $i = \frac{observed value of C.P}{calculated value of C.P}$  (when i > 1)

when the solute undergoes dissociation in the solution.

## 2. Define molecularity of a reaction.

#### Answer:

It's defined as the number of molecules or ions that participate in the rate determining step.

## 3. Write down IUPAC name of

ÇH₂-CH₃ CH3-NH

## Answer:

N-Methylmethanamine.

## 4. Complete the following reaction : -



## Answer:

-4		a ben Breat		
(0)-coong	+ NOOH	613K My Stell	(0)	+ N92 003
		after part	chlorobe	inzene)

## 5. Write down the chain Isomer of



## Answer:

CH<sub>3</sub> CH<sub>2</sub> COCH<sub>2</sub> CH<sub>3</sub>

Pentan - 3 - One

## 6. Write down name of one antiseptic.

## Answer:

Hydrogen Peroxide.

## 7. What are artificial sweetners?

## Answer:

Artificial sweetners agents are chemicals that sweeten food. Unlike natural sweetners they do not add calories to our body. Some artificial sweetners are saccharin, sucrolose.

## 8. What are polysaccharides ?

## Answer:

These are polymers of monosaccharides.

Eg. Starch, Glycogen etc.

# 9. The two ions A+ and B- have ready 88 pm and 200 pm respectively. In the close-packed crystal of compound AB, predict the coordination number of A+.

## Answer:

 $\frac{r^+}{r_-} = \frac{88}{200} = 0.44$ 

It lies in the range of 0.414 - 0.723

The co-ordination number of  $A^+ = 6$ 

# 10. A first-order reaction is 20% complete in 10 minutes. Calculate the time for 75% completion of the reaction.

## Answer:

Initial conc. A = 100, final conc. B = 80, T = 10 min, So K = -2.303  $log(BA)/Tlog(\frac{B}{A})/T$ = -2.303  $log(80100)/10log(\frac{80}{100})/10$ K = 0.0223 => final conc. C = 25 (because 75 of reaction finished) New Reaction T = -2.303  $log(CA)/Klog(\frac{C}{A})/K$ = -2.303  $log(25100)/0.0223log(\frac{25}{100})/0.0223$ T = 62.17 min.

## 11. What is 'Froth flotation process' for concentration of ore ?

## Answer:

Ore contains rocky impurities which are needed to be separated before processing. This process is called concentration of ore. The principle of froth floatation process is that sulptids ores are preferentially wetted by the pine oil, the particles are wetted by water. In the process a suspension of powdered ore is made with water. The frothis formed which is lighter and skimmed off. The frothis dried for recovery of the ore particles.

## 12. Write down difference between additional and condensation Polymers

## Answer:

Addition Polymer is made when the monomers lose an atom or group of atoms while forming the polymers. A condensation polymer is formed when monomers bond to each other without the loss of atoms.

## 13. Express coordination isomerism in



## Answer:

This type of isomerism is common in hetroleptic complex. It arises due to the different possible geometrical arrangement of ligands.



## 14. What is mutarotation?

## Answer:

Mutarotation is the change in the optical rotation because of the change in equilibrium between two anomers, when the corresponding stereocenter interconvert. Cyclic sugars show mutarotation as  $\alpha$  and  $\beta$  anomeric forms interconvert.

## **15. Write down coupling reaction of amines.**

## Answer:



Palladium – catalysed synthes of aryl amines. Starting materials are aryl halides or pseudohalides and primary or secondary amines.

## 16. Explain how the colour of K<sub>2</sub>Cr2O<sub>7</sub>, solution depends sn PH of the solution

## Answer:

 $K_2Cr_2O_7$  contains dischromate anion.

This  $Cr_2O_7$  is responsible for the change in colour of  $K_2Cr_2O_7$  altogether.

=> When the sol<sup>n</sup> is acidic (pH < 7) = Orange colour.

=> When the sol<sup>n</sup> is alkaline (pH > 7) = Yellow colour.

# 17. Unit cell of an element (atomic mass = 108 amu and density = 10.5 g cm-3) has an edge length of 409 pm. Deduce the type of crystal lattice

## Answer:

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Molar Mass (M) = 108g/mol
```

Density (d) =  $10.5g/cm^3$ 

Edge length (a) 409pm

$$Z = \frac{d * a^{3} * NA}{M}$$
$$Z = \frac{10.5 * (409 * 10^{-10} cm^{3})^{3} * 6.023 * 10^{25}}{108}$$

Number of atoms = 4

Element packed in FCC structure.

18. (i) Prove that depression in freezing point is a colligative property

# (ii)45g of ethylene glycol ( $C_2H_6O_2$ ) is mixed with 600g of water. Calculate the freezing point depression ( $K_f$ for water = 1.86 K Kg mol<sup>-1</sup>

## Answer:

(i) Freezing point of depression is a colligative property observed in sol<sup>n</sup> that result from the introduction solute molecule to the solvents. The freezing point of sol<sup>n</sup> are lower that that of pure solvent and is directly proportional to the molality of the solute.

 $\Delta T_f = T_f (solvent) - T_f (solution) = K_f x m$ 

Where  $\Delta T_f$  is freezing point depression,  $T_f$  (solution) is the freezing point of sol<sup>n</sup>,  $T_f$  (solvent),  $K_f$  is the freezing point of depression constant and mis the molarity.

(ii) Required -> molality

For molality, you need to know the moles of ethylene glycol.

No. Of moles =  $\frac{45}{24+6+32} = \frac{45}{62} = 0.72$  moles Molality =  $\frac{0.72}{0.60} = \frac{no. of moles}{no. of solvent}$ =  $\frac{0.72}{0.60} = 1.2$  molality  $\Delta T_f = m \times K_f$ =  $1.2 \times 1.86$  [i=1 since a = 0] =  $2.232^0$ 

## 19. Explain the variation of molar conductivity of strong and weak electrolytes with dilution.

#### Answer:

#### Variation of motet conductivity with strong electrolytes

**For strong electrolytes the motet conductivity increases slowly with dilution:-** The plot between the motet conductivity& is a straight line having y-intercept equal to E<sup>O</sup>m can be determined from the graph or with the help of kohlrausch law

$$\mathbf{M}_{m}^{c} = \mathbf{M}_{m}^{\infty} - b\sqrt{c}$$

Where A is constant equal to slope of line, the value of 'A' depend on type of electrolytes at particular temp.

#### Variation of molar conductivity with concentration for weak electrolyte:-

For weak electrolyte the graph plotted b/w molar conductivity & c1/2 (where c is concentration) is not straight line weak electrolytes have lower molar conductivites& lower degree of dissociation at higher concentration which increase steepy at lower concentration Emcnnot be molar conductivity to zero concentrations kohlrausch law of independent migration of ions for limiting molar conductivity Em of weak electrolytes.



Conductivity decrease with decrease in concentration as the number of ions per unit volume tha carry in a sol decrease on dilution..... Variation of molaconcentratin is different for strong & weak electrolytes.

## OR

19. Write the Nernst equation and calculate the emf of following cell at 298K:-Mg(s)/Mg<sup>2+</sup> (0.001M) || Cu<sup>2+</sup> (0.0001M)/ Cu(s) Given E<sup>0</sup> Mg<sup>2+</sup>/Mg = -2.37V, E<sup>0</sup>Cu<sup>2+</sup>/Cu= 0.34V

## Answer:

 $E_{cell} = E_{cell}^{0} = \frac{-0.059}{2} \log \frac{Mg^{2+}}{Cu^{2+}} -\dots -(i)$   $E_{cell}^{0} = E_{cell}^{0}(cu^{2+}/cu) - E_{cell}^{0} - E_{cell}^{0}(Mg^{2+}/Mg)$   $E_{cell}^{0}(cu^{2+}/cu) = 0.34V , E_{cell}^{0}(Mg^{2+}/Mg) = -2.37V$   $E_{cell}^{0} = 0.34V - (-2.37) = 2.71$ Substitute equation in 1

E<sub>cell</sub>= 2.71 – 0.0295 = 2.6805 V

# 20. Define coagulation. Differentiate between physical adsorption and chemical adsorption.

## Answer:

**Coagulation** :- The phenomenon of precipitation of the colloidal practice by the addition of excess of an electrolyte is called coagulation for eg:- Milk

#### Difference:-

Physical Adsorption	Chemical Adsorption
It is reversible in nature.	It is a irreversible in nature
It is not specific in nature.	It is specific nature
Decrease of pressure cause desorption.	Decrease of pressure does not cause desorption
Low Enthalpy of adsorption in order of 80 to 240 km/mol	High Enthalpy of adsorption in order of 80 to 240 km/mol
They does not require activation energy.	They does not requires activation energy
It forms multi molecular layers.	It forms molecular layers

## 21. (i) Among noble gases, only Xe is known to form chemical compounds. Why?

## (ii) Sulphur is a solid but oxygen is a gas. Why?

## Answer:

(i) Among the noble gases only Xenon is well known to form chemical compounds-only xenon is known to form chemical compounds because Xenon is large in size & having higher atomic Mass. Due to having large atomic radius the force of attraction b/w the outer electron & the protons in the nucleus is weaker

(ii) Oxygen is smaller in size as compared to sulphur. Also the inter molecular force in Oxygen as weak van der Walls, which cause it to exist gas . On the other hand, sulphur does not form M2 molecular but exist as a puckered structure held tighter by strong covalent bonds. Hence it is solid.

## 22. (i)Alcohols have a higher boiling point than alkanes. Why?

## (ii) Discuss oxidation of primary, secondary and tertiary alcohols.

### Answer:

(i) In alkanes, the only intermolecular forces are van der Walls dispersion forces – Hydrogen bonds are much stronger than these & therefore it takes more energy to separate alcohol molecule than it does a separate alkane molecule. That's the main reason that the boiling points are higher.

(ii) Discuss oxidation of Aldehyde, then Carboxylic Acid. Secondary Alcohol to ketone . Tertiary alcohols?

Primary Alcohalto Aldehyde, then Carboxylic Acid. Secondary Alcohol to ketone. Tertiary Alcohol No reaction. Oxidation is usually with potassium dichromate sol. Which turns from orange to green.

## **Oxidation of Alcohol:-**

1 coHa Crayboxylic K2 (r, Or, heat aldehyde OH D disti 19 tion 6 Minary <sup>o</sup>

Ketone) OH 0 Condanu Tertiony

- 23. (i) Write Cannizzaro reaction.
- (ii) Write aldol condensation.
- (iii) Why aliphatic carboxylic acids are stronger than phenols?

#### Answer:

(i) Cannizzaro reaction:-



This redox disproportional of non-enolizable aldehyde to carboxylic acids & alcohol

L-Keto aldehyde gives the product of intramolecular disproportional.



(ii) Write Adol Condensation:-



(iii) On the other hand in case of phenol are –ve charge is less effectively delocalized over one oxygen atom & less electronegative carbon atom in phenoxide ion

The carboxylate ions exhibit higher stability in compared to Phenoxide ion. Hence the carboxylic acid is more acidic than phenols.

## OR

23. (i) Carboxylic acids do not give characteristic reactions of carbonyl group. Explain.

## (ii) Why do aldehydes and ketones have high dipole moment?

## Answer:

(i) The carbonyl carbon in ketons& aldehydes is more electrophilic than carboxylic acid. Because the lone pair on oxygen atom attached to hydrogen atom in the - COOH group are involved in resonance thereby making the carbon atom less electrophilic

Acids kes onance Carbony Carbor

(ii) Aldehydes &Ketons have high dipole moment due to the presence of oxygen atom in term that is highly electronegative. The bond in the carbonyl group is lesser than carbon-oxygen single bond in alcohols etc leading to more polarity in the carbonyl group.

## 24. (i) PbCl<sub>2</sub> is known but PbCl<sub>4</sub> not known. Explain with inert pair effect.

## (ii) Why is SF<sub>6</sub> is much less reactive than SF<sub>4</sub>?

## (iii) Give Hybridization and draw structure of XeF<sub>2</sub>.

### Answer:

(i) This is due to inner pair effect. Pb has four electrons in its outermost shell, two are in s- orbital & two in p-orbital. Due to d-block contraction the s-orbital are more strongly held than s-electron in upper periods in the same group. The s-electron are inert & are not that easily removed to give the group of valency 4. Therefore, Pb tends to forms 2+ ion instead.

(ii)  $SF_4$  is assymmeterical has a lone pair of electrons on the sulphur atom, which can react further. In  $SF_6$  all of the electrons are paired, giving great stability to the molecule & reducing its reactivity

(iii) The bond angle will be  $90^{0}$  180 in the plane of molecules. Acc to lewis structure, XeF<sub>2</sub> has three lone pairs & two bonds to the central Xe atoms. Five valence atomic orbitals on Xe must hyberdised to form five sp<sup>3</sup>d hybrid orbitals

#### Structure of XeF<sub>2</sub>



These are arranged in trigonal bipyramid geometry 3 non – bonded pair of electrons prefer the equatorial position.

24. (i) Draw flow chart for Haber's process for the manufacture of ammonia.

(ii) Write down the reaction of ozone with potassium nitrite.

(iii) Draw structure of IF<sub>5</sub>.

### Answer:

(i) The Haber Process combines nitrogens form the air with hydrogen derived mainly from natural gas into ammonia Hxn is reversible & product of ammonia is exothermic

 $N_2(g) + 3H_2(g) \leftrightarrow 2NH_3(g) AH = -92KJ mol^{-1}$ 



(ii)  $3KNO_2 + O_3 \rightarrow 3KNO_3$ 

(Potassium Nitrate)

Potassium Nitrate itself strong Oxidising Agent So, it will give potassium Nitrate, or we can say reduce Nitrate. Ozone usually reacts with nitrite to give Nitrate which is less toxis as compared to nitrites.

(iii) Iodine pentafluoride is an interhalogen compound



I<sub>5</sub> contains five bonded & one nonbounded electrons & square pyramidal molecular geometry.

## 25. (i) Why do transition elements exhibit higher enthalpies of atomization?

## (ii) Calculate equivalent weight of KMnO<sub>4</sub> in alkaline medium.

## (iii) What are the consequences of Lanthanoid contraction?

#### Answer:

(i) Transition elements have high effective nuclear charge & number of valence electrons they from very strong metallic bonds. As a result, the enthalpy of atomization of transition netal is high.

(ii) The Mn is KMnO<sub>4</sub> exist in + 7 state

In acidic medium, this Mn+7 goes to Mn+2 state & gain of % electrons

Equivalent weight = Molar mass / No of electrons gain or lost

Equ. weight = 158 / 5 = 31.6g

For alkaline medium, there are two possibilities

#### (1) Alkaline neutral

Mn+7 changes into Mn+4 gain of 3 electrons

Eq.wt = 158/3 = 52.67g

#### (2) Highly alkaline

Mn+7 changes into Mn+6, gain of 1 electrons

#### Eq.wt = 158/1 = 158g

In many cases through alkine medium, it mostly means the neutral one, for the highly alkaline thing.

#### (iii) Consequences of Lanthanoid contraction:-

- **1.** Separation of Lanthanoid is possible due to Lanthanoid Contraction.
- 2. it is due to Lanthanoid contraction that there is variation in the basic strength of Lanthanoid contraction.
- due to Lanthanoid Contraction, size of mions decrease & increase in covalent character in M- OH
   & basic character decrease.
- **4.** The atomic radii of second row transition elements are almost similar the third row transition elements because increase in size on moving down the group

25. (i) Write down general electronic configuration and any two uses of block elements.

(ii) Copper is regarded as transition metal though it has completely filled dorbitals (3d<sup>10</sup>4s<sup>1</sup>). Explain.

(iii) Draw the structure of chromate ion.

## Answer:

(i) General Configuration of elements:-

- S block elements is =  $ns^{1-2}$
- p block element is =  $ns^2$
- d block element =  $(n-1)d^{1-10} ns^{0-2}$
- $f block element = (n-2)^{f1-4} (n-1)d^{0-1}$ ,  $ns^2$

## uses of d-block elements & s-block elements , p elements

## d – block

- 1. iron& amalgam, stell are utilized broadly development industry
- 2. Tungsten comes in use in making electrical fibres
- 3. Magnese dioxide comes in used part of dry battery cells.
- 4. Titanium is part of manufacture of airstrip & spacestup

## S – block

- 5. lithium is used in making electrochemical cells.
- 6. lithium in combination with magnesium. It is used to make armour plates.

## P – block

7. p – elements are commonly used as mutagenic agents.

8. The p – block elements encodes for the protein P transposase & terminal inverted repeat which is important for mobility.

F – block

9. f-block elements are Lanthanide alloys utilized for the creation of instrumental steels and heat resistance

10. Carbides, Borides & nitrides of Lanthanoids in use as refractories.

(ii) Although copper has 3d<sup>10</sup> 4s<sup>1</sup> configuration, it can lose one electron from this arrangement.
 Cu<sup>2+</sup>has 3d<sup>9</sup>configuration. So, according to the transition metal that cations have partially filled (n-

1)d subshell, copper can be regarded as transition metal.

### (iii) structure of chromate ion:-

2 ઉભ ( chromate ion G1042

- **26. Write.the following reactions :**
- (i) Wurtz reaction
- (ii) Sandmeyer'sreaction
- (iii) Hunsdiecker reaction
- (iv) Reimer-Tiemann reaction
- (v) Friedel Craft's acylation
- (vi) Ullman reaction

## Answer:

(i) Wurtz reaction:-

dry X +2NQ Alkani c=0 + PPH2= CH2= c= CH, + Ph >

(ii) Sandmeyer's reaction:-



(iii) Hunsdiecker reaction:-

 $CH_3 CooAg + Br_2 \xrightarrow[ccl_4]{} CH_3Br + AgBr + CO_2$ 

(iv) Reimer-Tiemann reaction:-



(v) Friedel Craft's acylation :-

O=C-AM 0 Anhy Alds + AJIR

(vi) Ullman reaction:-

+ 2 cul Cy (I. NUL HNY bar HNU = NHRR', HOAN , HSR -

## 26. (i) Why are haloarenes more stable than haloalkanes? (ii) Alkyl halides react with AgNO<sub>2</sub> to give R-NO<sub>2</sub> or R-ONO. Explain.

#### Answer:

(i) Haloarenes are more stable because they can donate there lone pair of electrons inside the ring for resonance. Due to resonance, the electron density increase more at ortho & para position the halogen atom I effect & having tendency to withdraw electrons from the benzene ring. As a result the ring gets activated as compared to benzene & electrophillic substitution rxn occur



(ii) Alkyl halides react with AgNo<sub>2</sub> to give R-NO<sub>2</sub> or R-ono Explain?

On treating ethanolic sol of nitroalkane with silver nitrate (Ag-O-N=0, Ag  $NO_{2}$ ), nitroalkane is formed because since the bond b/w Ag- O is covalent, the lone pair on nitrogen act as attacking site for nucleophilic rxn

 $R - x + Ag No_2 \rightarrow R - No_2 + Agx$ 

But on other hand, if haloalkane is treated with potassium nitrite (KNo<sub>2</sub>), alkyl nitrite is formed as major product because the bond b/w K-O ionic nature, -ve charge on Oxygen serve attacking site

 $R-X + KNo_2 \rightarrow R - O - N = O + Kx$