

HIGHER SECONDARY EXAMINATION - 2012

HSE II

Max. Score: 60
Time : 2 hrs

CHEMISTRY

General Instructions to Candidates:

- There is a 'Cool-off time' of 15 minutes in addition to the writing time of 2 hrs.
- Read questions carefully before answering.
- When you select a question, all the sub-questions must be answered from the same question itself.
- Calculations, figures and graphs should be shown in the answer sheet itself.
- Non-programmable calculators only are allowed in the examination Hall.

1. Defects are common in Crystals.

- Compare Schottky and Frenkel defects.
- When pure NaCl crystal is heated in an atmosphere of Sodium vapours, it turns yellow. Account for this.
- Frenkel Defect is not found in NaCl. Why. [4 Scores]

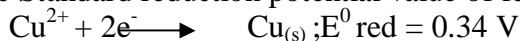
{I nk äenÄ {I aol cW A] ml XI Ä k m[mcWamWv

a) tj mSvl n Un^ I Spw s{^ | Ä Un^ I Spw XmcXayw sNç pl .

b) i p² amb NaCl {I nk äens\ tk mUnbw th, dnsâ k m¶ n² y⁻ nÄ NqSmj pt ¼mÄ AXv aª \ndamI p¶ p. Cu \ncOE W⁻ nV I mcWsaḡpXpl .

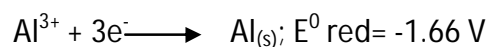
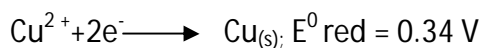
c) NaCl, s{^ | Ä Un^ I äv I mWn; p¶ nÄ. I mcWsa´ ¶ [4 k vt I mÄ]

2. The Standard reduction potential value of few electrodes are given below.



- Represent any 2 cells that can be formed from the above electrodes.
- Predict the Cathode and Anode in each case.
- Predict the e.m.f of the cells constructed. [4 Scores]

Nre Cel vt{SmUpI fpsS k ämtâÄUv dnUI j ³ X¶ ncnj p¶ p.



a) X¶ ncnj p¶ Cel vt{SmUnÄ \n¶ v2 sk Äpl Ä cq] s, Sp⁻ pl .

- b) H_2O is more reactive than H_2S because of the presence of hydrogen bonding in H_2O .
 c) Cu is more reactive than Ag because of the presence of a lone pair of electrons in the d -orbital of Cu . [4 marks]

3. Adsorption isobar plots for Physisorption and Chemisorption are different.

- a) Draw adsorption isobar for Physisorption and Chemisorption.
 b) Though adsorption is exothermic, increase in temperature initially increases the extent of Chemisorptions. Explain. [3 Scores]

Physisorption is reversible and occurs at low temperatures, while chemisorption is irreversible and occurs at high temperatures.

- a) Physisorption is reversible and occurs at low temperatures, while chemisorption is irreversible and occurs at high temperatures.
 b) Chemisorption is exothermic, but the initial increase in temperature increases the extent of chemisorption because of the activation energy barrier. [3 marks]

4. Account for the following.

- a) N_2 is less reactive at room temperature.
 b) ICl is more reactive than I_2 .
 c) NH_3 forms hydrogen bond, while PH_3 does not.
 d) Sketch the structure of XeF_4 indicating lone pair of electrons
 e) ClF_3 exists, but FCl_3 does not
 f) [5 Scores]

XeF_4 has a square planar geometry with two lone pairs of electrons on the Xe atom.

- a) N_2 is less reactive than O_2 because of the presence of a strong triple bond in N_2 .
 b) ICl is more reactive than I_2 because of the presence of a polar bond in ICl .
 c) NH_3 forms hydrogen bond, while PH_3 does not because of the presence of a lone pair of electrons on the N atom.
 d) XeF_4 has a square planar geometry with two lone pairs of electrons on the Xe atom.
 e) ClF_3 exists, but FCl_3 does not because of the presence of a lone pair of electrons on the Cl atom.
 f) [5 marks]

5. Account for the following.

- a) Zinc and Cd are normally not considered as transition elements.
 b) Zr and Hf have almost same size. [2 Scores]

Zr and Hf have almost same size because of the presence of lanthanide contraction.

- a) Zn and Cd are normally not considered as transition elements because they have a completely filled d -orbital.
 b) Zr and Hf have almost same size because of the presence of lanthanide contraction. [2 marks]

6. Certain metals and methods of refining are given below.

Metal	Ti	Ni	Ge	Cu	
Process	Van – Arkel process	Mond's Process	Electrolyte refining	Zone refining	Liquefaction

Correctly match the metal and the process of refining.

[2 Scores]

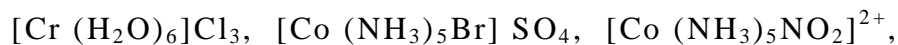
Nne temi § fpw AhbpsS i p² ol cW {} {l nbbpw Xmsg sl mSp⁻ ncnj p¶} p.

Metal	Ti	Ni	Ge	Cu	
Process	Van – Arkel process	Mond's Process	Electrolyte refining	Zone refining	Liquefaction

teml hpw AXnsâ i p² ol cW{} {l nbbpw tNAs⁻ gpXpl .

[2 k vt l mÅ]

7. A list of Co-ordination compounds are given below.



Which type of isomerism do these compounds exhibit?

[2 ½ Scores]

apl fnÂ sl mSp⁻ nj p¶} t l mÅUnt\j³ k wbp l X§ Ä l mWnj p¶} sF tk msadnk w hni Zamj pl . [2½ k vt l mÅ]

8. The geometry and magnetic properties of complexes can be explained by V.B. Theory.

The octahedral complex $[\text{Co}(\text{NH}_3)_6]^{3+}$ is diamagnetic while the octahedral complex $[\text{CoF}_6]^{3-}$ is diamagnetic. Explain using V.B. Theory.

[2½ Scores]

t l mw¹ l k pl fpsS PymanXnbpw amKNänl v KpW§ fpw hn. __n. Xnbdn D] t b mKn[·] v hni Zol cnj mhp¶} XmW.v

$[\text{Co}(\text{NH}_3)_6]^{3+}$ UbmamKNänl v B Wv F ¶} mÅ $[\text{CoF}_6]^{3-}$] mcmamKNänl v B Wv hn. __n. Xnbdn D] t b mKn[·] v hni Zol cnj pl . [2½ k vt l mÅ]

9. Give short notes on.(any two)

a) Williamson's ether synthesis

b) Reimer – Tiemann Reaction.

c) Coupling reaction

[4 Scores]

Xmsg_s dbp¶} hbpsS eL phnhcWw X₂ mdmj pl .

a) hneywk – kvCuYÄ kn[·] knk v

b) doaÄ p Soam³ dnbmE³

c) l¹ nMv dnbmE³

[4 k vt l mÅ]

10. The following reagents are available in laboratory.

H-CHO, CH₃CHO, CH₃-CO-CH₃, CH₃-Mg Br and distilled water.

- Give reaction for the preparation of a Primary alcohol,
- Which of the above reagents give iodoform test?
- HCHO is allowed to react with NaOH. Predict the product and name the reaction?

[4 Scores]

em_ nÄ Xmsg] dbp¶ cmk hk vxpj Ä e`yamWv.

H-CHO, CH₃CHO, CH₃-CO-CH₃, CH₃-Mg Br and distilled water.

- 1°, B Ä; tl mÄ F ¶ nh X₂mdm; p¶ {} hÄ⁻ \ S Ä F gpXpl
- GsXms; cmk hk vxpj Ä A btUmt ^mw sSì v \ÄI p¶ p.
- HCHO, NaOH Dw- B bn {} hÄ⁻ n' mÄ GXv DÄ_s ¶ w l ncpw.
{ } hÄ⁻ \ ^ nsâ-t] cv F gpXpl .

[4 k vt l mÄ]

11. Hinsberg reagent can be used to distinguish three classes of amines.

- Name the reagent used?
- How will you distinguish them?

[3 Scores]

l n³ k v ÄI v cmk hk vxpj Ä D] t b m K n i v 1°, 2°, 3° A ao\pl sf Xncn' dnbmw.

- GsXms; cmk hk vxpj fmWvD] t b m K n i p¶ Xv
- Cu A ao\pl sf apl fnÄ] d^a ncn; p¶ cmk hk vxpj Ä .
D] t b m K n i v F S s \ Xncn' dnbmw.

[3 k vt l mÄ]

12. Complete the following reactions.

- CH₃-NH₂ + CHCl₃+alc.KOH →
- CH₃-CO-NH₂+Br₂+NaOH →
- C₆H₅N₂Cl+H₂O $\xrightarrow{\text{warm}}$
- C₆H₅-NO₂ $\xrightarrow{\text{Sn/Hcl}}$

[4 Scores]

apl fnÄ-sI mSp⁻ ncn; p¶ cmk {} hÄ⁻ \ S Ä] qÄ⁻ nbm; pl .[4 k vt l mÄ]

13. Arrange the following in the decreasing order of the basic strength and justify your answer.

C₆H₃-NH₂, C₂H₃-NH₂, NH₃, (C₂H₅)₂NH [2½ Scores]

apl fnÄ-sI mSp⁻ ncn; p¶ k w bpl v S sf A h b p s t _ k n l v k z` m h w .
l pd^a phcp¶ {l a⁻ nsegpXpl . D⁻ cw k m [q l cn; pl . [2½ k vt l mÄ]

14. a) How will you prepare Nylon-6,6 [2 Scores]

b) Classify the following in to homopolymer or Co – polymer. [1 Scores]

Nylon – 6, HDPE.

c) What is Vulcanisation? How does it modify the properties of rubber? [2 Scores]

[2 Scores]

- a) Nylon-6,6 $F S s \setminus \setminus \hat{A} 1/2 n_i$ mw? [2 k vt l mÅ]
- b) $t l m t a m t] m f n a \hat{A}, t l m t] m f n a \hat{A} F t \uparrow m X c w X n c n_i$ pl
Nylon – 6, HDPE. [1 k vt l mÅ]
- c) $h \hat{A}_i s s \setminus t k j^3 F \uparrow m s e ' \hat{P} A X v d _ d n s \hat{a} K p W S s f F S s \setminus$
 $s a ' s _ S p^- p \uparrow p?$ [2 k vt l mÅ]

15. Explain the following terms giving a suitable example in each case.

- a) Shape selective catalyst. [3 Scores]
- b) Homogenous catalyst. [3 Scores]

Xmsg sl mSp⁻ ncn_i p[↑]] ZS sf Hcp DZml cWk l nXw hni Zol cn_i pl .

- a) $t j _ v s k e l \hat{S} o h v l m \hat{a} e n \hat{i} v$
- b) $t l m t a m P o \setminus n b k v l m \hat{a} e n \hat{i} v$ [3 k vt l mÅ]

16. Complete the table.

] «nl] qcn_s n_i pl .

Reactant $A \setminus n l m c l w$	Reagent $d o t b P \hat{a} v$	Organic Product $D \hat{A}] \uparrow w$	Name of reaction
$CH_3-CH_2 Br$	Na + ether		
$C_6 H_5-NH_2$	$NaNO_2/HCl$ at $<5^0 C$		
CH_3-COCl	$H_2+Pd/BaSO_4$		
$CH_3-CH_2-CH= CH_2$	HBr/ Benzoyl Peroxide		

[3 Scores]

17. Your Chemistry lab was shifted to another room. Then two bottles of methanol and ethanol lose their label. Label them by means of Chemical tests. [2 Scores]

$\setminus n S f p s S s l a n k \{ S n e m _ v a s \hat{a} m c p a p d n b n t e_j v a m \hat{a} p \uparrow X n \setminus n S b n \hat{A}$
 $s a X t \setminus m f n s \hat{a} b p w B \hat{A}_i t l m f n s \hat{a} b p w t e _ \hat{A} \setminus j \hat{S} s _ \hat{p} . s l a n_i \hat{A}$
 $s S \hat{i} p l f p] t b m K n \hat{i} v t _ m \hat{a} n e p l \hat{A} t e _ \hat{A} s N \hat{c} p l .$

[2 k vt l mÅ]

18. Polymers are giant molecules with large molecular mass.

- a. Name the monomers of Buna –S and write the reaction showing its formation. (2)
- b. Give an example for a biodegradable polymer. (1)

19. a. Allosteric sites of enzymes play an important role in drug-enzyme inhibition. Illustrate. (2)

b. Some substances can act as antiseptic as well as disinfectant by varying the concentration. Suggest example.

(1)