P. P. SAVANI UNIVERSITY

Third Semester of B.Sc. Examination

December-2021

SSCH2030–Periodic properties of s & d block elements

08.12.2021, Wednesday Time: 09:00 a.m. to 11:30 a.m. Maximum Marks: 60

Instructions:

1. The question paper comprises of two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make suitable assumptions and draw neat figures wherever required.
4. Use of scientific calculator is allowed.

Section-I (Total Marks - 30)

Q.1 Short Questions **[10]**

1.1 Objectives **[05]**

1.1a Which elements in d-block have low melting and boiling point?

A Hg, Zn

B Cr, Cu

C Mn, Mo

D Ti, V

1.1b Plaster of Paris?

A $CaCO_3$

B $CaSO_4.H_2O$

C $Ca(OH)_2$

D CaO

1.1c Which one of the pair is more stable

A Cr^{2+}, Cr^{3+}

B Fe^{2+}, Fe^{3+}

C Mn^{2-}, MnO^{4-}

D Co^{2+}, Co^{+3}

1.1d Quick lime

A CaO

B $CaCO_3$

C $Ca(OH)_2$

D $CaSO_4.H_2O$

1.1e Which one of the alkaline earth metal carbonates is thermally the most stable?

A $MgCO_3$

B $CaCO_3$

C $SrCO_3$

D $BaCO_3$

1.1f What is the lowest and highest oxidation state of Cr?

A 0, +6

B +2,+3

C +1,+2

D +2, +6

1.1g Order of atomic and ionic radii of d-block elements from left to right in the periodic table?

A Increases from left to right
B Decreases from left to right
C Decreases then increases from left to right
D Both C and B are correct

1.1h Formula of washing soda?

A $Na_2CO_3.10H_2O$
B CaO
C NaCl
D HCl

1.1i The Symbol Ra stands for

A Radium
B Radon
C Rhodium
D Rutherfordium

1.1j Alkali metal is having least melting point?

A Na
B K
C Rb
D Cs

1.2 Answer the Following: (MCQ/Short Question/Fill in the Blanks) **[05]**

1.2a The hydration enthalpies of alkali metal ions ----------with ---------- in ionic sizes

1.2b S block elements have ----------tendency to form complexes

1.2c Metallic character of S block elements ---------from top to bottom in the periodic tale.

1.2d Base strength of alkali metals ---------- from top to bottom?

1.2e What is milk of magnesia?

Q.2 Short Notes (Attempt any two) **[06]**

A Give the explanation how Beryllium is diagonally related with Aluminium?

B Write the structure of $BeCl_2$?

C State how lithium is different from other alkali metals?

Q.3 Explain in detail (Attempt any two) **[14]**

A Which of the following ions are expected to be colored and why? Cu^+, Fe^{2+}, Mn^{2+}, Cr^{3+}, Sc^{3+}, Ti^{4+}, Co^{2+}?

B (i) Transition elements form alloys easily, state the reason?
(ii) Why Fe^{3+} compounds are more stable?
(iii) What is lanthanide contraction?

C (i)Why alkali metals are not found in nature?
(ii) What is diagonal relationship, give one example of it and explain it?
(iii) What are the common physical and chemical features of alkali metals?

Section-II (Total Marks - 30)

Q.1 Short Questions **[10]**

1.1 Objectives **[05]**

1.1a Symbol of Potassium ferrocyanide is

A $K_4[Fe(CN)_6]\cdot 3H_2O$
B $CaK_2[Fe(CN)_6]$
C $Ca_2[Fe(CN)_6]\cdot 11H_2O$
D $[Fe(CN)_6]^{4-}$

1.1b Symbol of chromite ore

A $FeO\cdot Cr_2O_3$
B $Na_2Cr_2O_7$
C $CuSO_4$
D $TiCl_4$

1.1c Name of chemical compound, K2Cr207

A Caustic Soda
B Potassium Dichromate
C Methyl Orange
D Chromyl Chloride

1.1d Symbol of Potassium Permanganate

A $KMnO_4$
B K_2MnO_4
C MnO_2
D Mn_2O_7

1.1e Formula of Green vitriol

A NaCl
B H_2SO_4
C $FeSO_4.7H_2O$
D H_2O_2

1.1f Oxidation of Co in Sodium hexanitrocobaltate (III).

A 3+
B 2+
C 0
D 1+

1.1g Formula of petigot's salt

A $KCrO_3Cl$
B K_2CO_3
C $K_2Cr_2O_7$
D CrO_5

1.1h Name of the compound which is used for detection of cysteine

A Nitroprusside
B ferricyanide
C Cobalt acetate
D Sodium cobaltnitrite

1.1i Write the common name of $[Co(NH_3)_6Cl_3]$

A Hexaaminecobalt (III)chloride
B Magnetite
C Sodium nitroprusside
D Potassium ferrocyanide

1.1j Symbol of Magnetite

A Fe_3O_4
B FeS_2
C $FeCO_3$
D Fe_2O_3

1.2 Answer the Following: (MCQ/Short Question/Fill in the Blanks) **[05]**

1.2a $K_2Cr_2O_7 + 2HCl \rightarrow$ _____ + _____

1.2b Draw the structure of permanganate ion?

1.2c $2FeO + 2\ O_2 \rightarrow$ _____

1.2d stainless steel = Cr _____% + Ni _____%

1.2e Write one use of sodium nitroprusside?

Q.2 Short Notes (Attempt any two) **[06]**

A Draw the structure of chromate and dichromate ions with formula?

B Discuss about the chromyl chloride test with equations?

C Write the formula of sodium nitroprusside and Calculate the oxidation state of Fe in sodium nitroprusside?

Q.3 Explain in detail (Attempt any two) **[14]**

A Discuss the types of Iron in detail?

B Discuss the structure, synthesis, properties and uses of about the Hexaaminecobalt (III) chloride

C Discuss about chemical reactions of ferrochrome and chromite ore and write down the applications of chromium?