2015
MATRICULATION EXAMINATION
DEPARTMENT OF MYANMAR EXAMINATION
CHEMISTRY   **Time Allowed: 3 Hours**
WRITE YOUR ANSWERS IN THE ANSWER BOOKLET
The symbols in this paper have their usual significance

SECTION (A)
(Answer ALL questions)

1. Write **TRUE** or **FALSE** for each of the following statements.   **(7 marks)**
   (a) Energy is required to remove electrons from an atom.
   (b) All measurements of gas volume depend upon temperature and pressure.
   (c) A standard solution is the reagent of exactly known concentration.
   (d) Non-electrolytes contain ions.
   (e) Three methods have been developed for balancing redox equations.
   (f) The concentration of reactants is increased, the reaction time increases.
   (g) When sulphuric acid is slowly poured into water, the flask becomes hot.

2. Fill in the blanks with the correct word(s), phrase(s), term(s), unit(s), etc.,   **(7 marks)**
   as necessary.
   (a) Sodium hydrogencarbonate is sold as -------.
   (b) Stainless is an ------ of iron, chromium and nickel.
   (c) A valuable fertilizer can be obtained by neutralizing the acid with -------.
   (d) Sulphates which are normal salts of sulphuric acid are all ------.
   (e) Chlorine is about ------- times as dense as air.
   (f) A buffer solution resists the change of ------.
   (g) ------- were formed in the Earth's crust from material that was once living.

3. Select the correct word(s), notation(s), term(s), unit(s), etc., given   **(7 marks)**
   in the brackets.
   (a) The ionic compounds have [low; medium; high] melting point.
   (b) Gas pressure is defined as [force per unit area; force per unit volume; force per unit length].
   (c) One cubic centimeter of a molar solution contains [1 mole; 1 milimole; 1 amu].
   (d) At sufficiently [high; low; medium] temperature, NaCl may be melted.
   (e) Electrolytic process involves [oxidation; reduction; redox] reaction.
   (f) The larger the surface area, the [slower; faster; same] the reaction.
   (g) The composition of [silica; urea; limestone] according to its formula is $CO(NH_2)_2$.

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4. Match each of the items in **List A** with the appropriate items   (7 marks)
   given in **List B**.

	List A		**List B**
(a)	Melting of ice	(i)	$CaSO_4.2H_2O$
(b)	Chile salt-petre	(ii)	salt of a weak acid and a weak base
(c)	Zinc blende	(iii)	Na/Hg
(d)	Dinitrogen oxide is also known as	(iv)	sodium nitrate
(e)	Gypsum	(v)	heat absorbing process
(f)	Amalgam	(vi)	zinc sulphide
(g)	Ammonium ethanoate	(vii)	laughing gas

5. Define the following: (8 marks)
   (a) Isotopes
   (b) Absolute zero temperature
   (c) Stoichiometry
   (d) Insulator
   (e) Reduction in term of electron transfer
   (f) Activation energy
   (g) Potential energy
   (h) A dilute acid

SECTION (B)

6. Answer **ALL** questions.   (12 marks)
   (a) Draw the electron dot-cross structures of PF_5 and $NaCl$.

   (b) State the Gay-Lussac's law of combining volumes of gases both in words and mathematical expression.

   (c) Give the names of cathode and anode in chromium plating and write down the cathode reaction of it.

   (d) What are the oxidation number of sulphur from H_2SO_4 and $Na_2S_2O_3$.

   (e) Write down the relevant equation in words and symbols for the preparation of superphosphate.

   (f) Express NPK requirements for flowering and fruiting.

7. Answer any **FIVE** questions. (20 marks)

   (a) 10 g of calcium carbonate is treated with dilute hydrochloric acid. The liberated gas measured at STP is 1.661 dm^3. Find the percentage purity of calcium carbonate. (C = 12, O = 16, H = 1, Ca = 40)

   (b) (i) What are the factors influencing the reaction rates? (Any four factors)
      (ii) Predict the effect of decreasing the temperature on the following equilibrium.
      $$PCl_3(g) \quad + \quad Cl_2(g) \quad \rightleftharpoons \quad PCl_5(g) \quad + \quad heat$$

   (c) A compound is formed between $_{11}X$ and $_{16}Y$.
      (i) Write down the complete electronic structures of the elements X and Y.
      (ii) Write down the valences of the elements X and Y.
      (iii) Classify the elements X and Y as metal and non-metal.
      (iv) What type of bonding exist between X and Y? Write down the most likely formula of this compound using the symbol X and Y.

   (d) Write equations in **words** and **symbols** for the following reactions.
   (i) Sodium hydrogencarbonate reacts with dilute nitric acid.
      (ii) Copper is treated with concentrated nitric acid.

   (e) Calculate the mass of silver in grams deposited by passing a steady current of 0.8 A for two hours through an excess of silver nitrate solution.
      (Ag = 108, 1 Faraday = 96500 C)

   (f) (i) Describe the ways to prevent iron rusting. (Any four ways)
      (ii) Complete the following equations in **symbols only**.
      $$P(s) \quad + \quad O_2(g) \quad \longrightarrow \quad ?$$
      $$Fe_2O_3(s) \quad + \quad CO(g) \quad \longrightarrow \quad ?$$
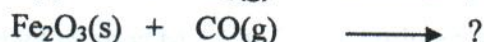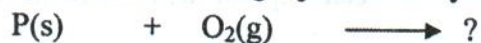
   (g) Balance the following redox reactions using either oxidation number method or ion electron (half reaction) method.
      (i) $H_2SO_4 \quad + \quad HI \quad \longrightarrow \quad I_2 \quad + \quad H_2S \quad + \quad H_2O$
      (ii) $MnO_2 \quad + \quad HCl \quad \longrightarrow \quad MnCl_2 \quad + \quad H_2O \quad + \quad Cl_2$

   (h) (i) What is bittern? What compounds can be extracted from bittern?
      (ii) Express the uses of growth substances in agriculture.

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8. Answer any **FOUR** questions.   **(32 marks)**

   (a) (i) How did Bronsted and Lowry define acid and base?
       (ii) Calculate the pH values of the aqueous solutions containing 0.93 g of HNO_3 per dm^3 and 2.8 g of KOH per dm^3. (H = 1,N = 14, O = 16,K = 39)

   (b) (i) Define "Heat of neutralization". Give an example.
       (ii) Calculate the heat of combustion of $CS_2(l)$, if heat of formation of $CS_2(l)$, carbon dioxide and sulphur dioxide are + 121 $kJmol^{-1}$,-393 $kJmol^{-1}$ and -297 $kJmol^{-1}$ respectively.

   (c) (i) What happens when ethyne reacts with liquid bromine?
       (ii) What products would you expect when ethyl chloride is heated under reflux with an aqueous solution of sodium?
       (iii) How does ethanoic acid react with ethanol?
       (iv) How would you obtain ethylene chloride from ethene?

   (d) (i) Distinguish between 2-methyl propane and 2-methyl propene?
       (ii) A gas " X "can be formed by hydrogenation of 2-butene using nickel catalyst at 300°C. What is gas " X " ? Write down the equation.
       (iii) What is zeolite? Convert methanol to gasoline (hydrocarbons) by using ZSM-5 catalyst.
       (iv) What are the sources of biodiesel? Explain the uses of biodiesel in Myanmar.

   (e) Describe the Manufacturing of ammonia by Haber process .

   (f) Describe the laboratory preparation of hydrogen sulphide with a labelled diagram.

   (g) 10 cm^3 of hydrochloric acid solution required 8 cm^3 of 0.1 M sodium hydroxide to neutralize it. Calculate the molarity of hydrochloric acid and convert the concentration into gdm^{-3}.(H = 1,Cl = 35.5)

   (h) Write a process for the extraction of silver from silver glance by the cyanide process.

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