2019
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) Sulphur dioxide can turn acidified potassium dichromate paper orange.
    (b) CaO is made by slaking lime with water.
    (c) Molarity represents the quantity in millimoles of solute per cm^3 of solvent.
    (d) The higher the metal is in the reactivity series, the more rapidly it will corrode.
    (e) The presence of lone pair electrons is the characteristic of an acid.
    (f) Electropositive elements may be reducing agents.
    (g) The most reactive halogen is fluorine.

2. Fill in the blanks with the correct word(s), phrase(s), term(s), unit(s), etc.,   **(7 marks)**
    as necessary.
    (a) Electrolytes can conduct electricity due to the movement of ------------.
    (b) Covalent compounds are usually soluble in ---------- organic solvents.
    (c) A change in pressure causes a change in ------------ of reacting gases.
    (d) 8.0 g of oxygen gas occupies --------- at STP. (O=16)
    (e) Hydride of nitrogen, NH_3, can be formed by decomposition of ----------- materials.
    (f) Dissolving glucose in water is a (an) ------------ process.
    (g) Liquid petroleum gas is composed of propane and -----------.

3. Select the correct word(s), notation(s), term(s), unit(s), etc., given   **(7 marks)**
    in the brackets.
    (a) The particles of the [solid; liquid; gas] are free to move in any direction.
    (b) [Pure calcium; Aluminium; Lead] is a silvery-white metal.
    (c) Ionic compounds are [electrolytes; non- electrolytes; molecules].
    (d) A standard solution is the reagent of exactly known [composition; mass; concentration]
        that is used in a titration.
    (e) Under ordinary conditions, [alkanes; alkenes; alkynes] are unreactive towards acids,
        alkalis, oxidizing reagents and reducing reagents.
    (f) [Thermal; Potential; Chemical] energy is the energy due to the position of a body.
    (g) The iron ore is reduced by [carbon monoxide; hydrogen; chlorine].

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

List A		List B	
(a)	Liquid Br_2	(i)	used to suppress an unwanted reaction
(b)	Copper	(ii)	poor conductor of heat
(c)	Liquid NH_3	(iii)	used as reducing agent
(d)	Polystyrene	(iv)	causes burns on the flesh
(e)	Inhibitor	(v)	colourless, oily, heavy liquid
(f)	Aqueous SO_2	(vi)	good conductor of electricity
(g)	Pure H_2SO_4	(vii)	used in refrigerators

5. Define the following: **(8 marks)**
   (a) One mole of a substance
   (b) Standard enthalpy change
   (c) Relation between temperature and pressure of gases
   (d) Hydrolysis
   (e) Transition state
   (f) Reduction in terms of oxygen
   (g) Conductor
   (h) Electronegative elements

SECTION (B)

6. Answer ALL questions.   **(12 marks)**

   (a) Calculate the pOH of a solution in which pH is 9. Is the resulting solution acidic or basic?

   (b) State and explain (with equation) which of the metals Na, Pb, K, Mg, Ca will react very slowly with cold water, but vigorously with steam.

   (c) Name the oxide of nitrogen which is used as anaesthetic for minor surgical operations. Write equation in **symbols** only for its laboratory preparation.

   (d) Explain why powdered aluminium reacts much more readily than aluminium foil of same mass.

   (e) What are insecticides? Write down the chemical formula of Gammexane and mention its uses.

   (f) Give the graphic representation of the structural formulae of propane and propanol.

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

(a) (i) Write down the type of element and the valence of $_{12}Ca$.

(ii) What elements are most likely to form covalent bonds? Give an example.

(iii) From the following elements, select the one which has the highest ionization energy.

$_4Be$, $_6C$, $_8O$, $_{10}Ne$

(iv) Draw the electron dot-cross formula of the compound formed between $_{13}Al$ and $_{17}Cl$.

(b) How many grams of calcium carbonate will have to be treated with dilute hydrochloric acid to liberate $1.5 \, dm^3$ of carbon dioxide at 27 °C and 750 mmHg? (C=12, O=16, Ca=40)

(c) A current of 2A is passed through a solution of 0.1 M copper (II) sulphate solution using copper electrode. How long would a current of 2A need to pass the cell, so as to deposit 0.127 g of copper? (1 F= 96500C, Cu= 63.5)

(d) Balance the following redox reactions using either oxidation number method or ion-electron (half-reaction) method.

(i) $K_2Cr_2O_7 + H_2SO_4 + FeSO_4 \longrightarrow Cr_2(SO_4)_3 + Fe_2(SO_4)_3 + K_2SO_4 + H_2O$

(ii) $Cl_2 + NaOH \longrightarrow NaCl + NaClO_3 + H_2O$

(e) (i) In the following reversible reaction, explain how you would move to the right hand side (products) of the equation.

$NH_4Cl(s) + heat \rightleftharpoons NH_3(g) + HCl(g)$

(ii) Give suitable chemical equations in **words** and **symbols** to show the bleaching action of chlorine.

(f) (i) Give the typical composition and uses of Brass alloy.

(ii) Write balanced equations in **symbols only** for the following reactions.

$Ag(s) + NaCN(aq) + H_2O(l) + O_2(g) \longrightarrow$?

$ZnS(s) + O_2(g) \longrightarrow$?

(g) Give equations in **words** and **symbols** for the following reactions.

(i) Reaction of iodine with hot concentrated nitric acid

(ii) Action of concentrated sulphuric acid on sugar

(h) (i) What is the long form of POP? How would you obtain it?

(ii) Draw the structural formula of tetrafluoroethene and suggest the name of the polymer formed from it. Write down the equation.

[P.T.O.

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

   (a) (i) Mention appropriate buffer solution for moderately acidic conditions.

      (ii) The heats of formation of $CH_4(g)$, $CO_2(g)$ and $H_2O(l)$ are -75 kJ mole^{-1}, -393 kJ mole^{-1} and -286 kJ mole^{-1}, respectively. Calculate the heat of combustion of methane.

   (b) (i) Outline an example to illustrate the dehydrohalogenation of alkyl halide.

      (ii) Complete the following equation and name the organic compounds.
$$CH_3CH_2OH + PCl_5 \longrightarrow ?$$

      (iii) Write down the relevant equation for the reaction of methyl iodide with molecular hydrogen in the presence of platinum and palladium.

      (iv) What product would you expect when ethylene is passed into cold dilute $KMnO_4$ solution?

   (c) (i) How would you differentiate between 1-butyne and 2-butyne?

      (ii) A gas X is liberated by adding a piece of sodium to ethanol at room temperature. What is gas X? Write down the chemical equation.

      (iii) What is crude oil? Explain its uses.

      (iv) What happens when decane is cracking? Write equations in **words** and **symbols.**

   (d) (i) Write the balanced equations (**words** and **symbols**) for the laboratory preparation of ammonia gas. Explain how you would collect a sample of dry ammonia.

      (ii) Write equations representative of the reaction of dilute sulphuric acid with metallic oxides and hydroxides.

   (e) (i) Calculate the pH and pOH of an aqueous solution containing 0.73 g of HCl per 400 cm^3. (H=1, Cl= 35.5)

      (ii) How many cubic centimeters of 2 M hydrochloric acid are needed to react with 0.18 g of magnesium? (Mg = 24)

   (f) (i) Give equations in **words and symbols** for the manufacture of sodium carbonate by Solvay process.

      (ii) Write balanced chemical equations (**words and symbols**) involved in the extraction of copper from copper pyrites.

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