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) Nitrogen is obtained in industry by the vacuum distillation of liquid air.
   (b) Light is a source of energy.
   (c) Kinetic energy is the energy due to the position of a body.
   (d) Each electron shell can contain a limited number of electrons.
   (e) Chlorine is used to sterilize water for domestic and industrial use.
   (f) At any temperature, K_w will have a different value.
   (g) The main metals which are recycled include zinc and chromium.

2. Fill in the blanks with the correct word(s), phrase(s), term(s), unit(s), etc.,   **(7 marks)**
   as necessary.
   (a) Except -----------, conductors are usually solids at room temperature.
   (b) In volumetric analysis, an indicator exhibits a change in color as a result of
       ---------------- changes near the equivalence points.
   (c) At any temperature, the particles of a gas are moving with a --------- speed.
   (d) The most toxic alcohol is ---------.
   (e) The alkali metals tarnish rapidly in air, forming a layer of -----------.
   (f) Plants get --------- and oxygen from air.
   (g) A molecule of sulphur consists of --------- atoms joined together to form a ring.

3. Select the correct word(s), notation(s), term(s), unit(s), etc., given   **(7 marks)**
   in the brackets.
   (a) Sulphur does not react with non-oxidizing acid such as (dilute sulphuric acid,
       hot concentrated sulphuric acid, nitric acid).
   (b) Strength of an acid can be indicated by the value of (K_w, K_a, K_b).
   (c) Covalent compounds consist of (positive ions, negative ions, molecules).
   (d) At above 150°C, nitrogen dioxide begins to dissociate into the colourless
       (dinitrogen oxide, nitrogen oxide, nitrogen) and oxygen.
   (e) (Every collision, Collision with enough energy, Collision with low energy) leads to
       the chemical reaction.
   (f) Bromine is a heavy, red, volatile (gas, liquid, solid).
   (g) Metallic conductance decreases with increase in (pressure, temperature, mass).

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

List A		List B	
(a)	Glauber's salt	(i)	Oxidizing agent
(b)	Fossil plant material	(ii)	Hydrated iron (III) oxide
(c)	Anhydrous sodium carbonate	(iii)	Exothermic
(d)	Endrin	(iv)	Coal
(e)	Electron acceptor	(v)	$Na_2SO_4.10H_2O$
(f)	Rust	(vi)	Primary standard
(g)	Heat of neutralization	(vii)	An insecticide

5. Define the following: **(8 marks)**
   - (a) Transesterification
   - (b) Insulator
   - (c) Isotopes
   - (d) Basicity
   - (e) Avogadro's Theory
   - (f) Hydrolysis
   - (g) Negative catalyst
   - (h) Standardization

SECTION (B)

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

   (a) Freshly produced copper is pink in colour. It soon turns brown. Why?

   (b) Explain that the noble gases have the highest first ionization energies.

   (c) Why is a steel object plated first with nickel or copper in chromium plating?

   (d) Give appropriate equation (**words and symbols**) to show that concentrated nitric acid cannot be used in the preparation of hydrogen sulphide from metal sulphides.

   (e) In the dehydration of alcohols, metaphosphoric acid (HPO_3) may be used instead of concentrated sulphuric acid. Give reasons.

   (f) Explain why powdered aluminium reacts with sodium hydroxide solution much more readily than aluminium foil.

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

(a) Atom 'A' has an atomic number 10 and atom 'B' has an atomic number 17.
   (i) Write down the complete electronic structure of A and B.
   (ii) Give the group numbers of A and B.
   (iii) What is the valence of each element?
   (iv) What is the type of each element?

(b) Find out the relative molecular mass of the gas that diffuses 4 times as fast as sulphur dioxide. What is the molar mass of the gas?(S = 32, O = 16)

(c) On passing a steady current of 0.35 A for 45 minutes through a copper (II)sulphate solution, 0.311 g of copper is deposited. Calculate the relative atomic mass of copper. (one Faraday = 96500 C)

(d) Balance the following redox reactions using either oxidation number method or ion electron (half reaction) method.
   (i) H_2SO_4 + HI $\longrightarrow$ H_2S + I_2 + H_2O
   (ii) MnO_4^- + Fe^{2+} + H^+ $\longrightarrow$ Mn^{2+} + Fe^{3+} + H_2O

(e) The dissociation of calcium carbonate is accompanied by the absorption of heat.
   $$CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g)$$
   What will be the effect of
   (i) increasing the temperature?
   (ii) increasing the pressure on the equilibrium?

(f) (i) Give the balanced equation (**words and symbols**) for the reaction of sulphur with aqueous sodium hydroxide solution.
   (ii) Explain that some metals, such as gold and silver, occur in a native form as the free metal.

(g) Write balanced equations (**words and symbols**) for the following oxidizing reactions:
   (i) hot concentrated nitric acid with carbon
   (ii) hot concentrated sulphuric acid with sulphur

(h) (i) Calculate the percentage of nitrogen in ammonium sulphate, $(NH_4)_2SO_4$. (N = 14, H = 1, S = 32, O = 16)
   (ii) What are the long forms of the polymers, PTFE and PS? Mention their monomers.

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

(a) (i) Calculate the hydrogen ion concentration of the solution having pH value of 5.5.

(ii) Calculate the heat of formation of $CH_3COOH(l)$. Its heat of combustion is -872 kJ mol^{-1}. The heats of combustion of carbon (graphite) and hydrogen are -393 kJ mol^{-1} and -286 kJ mol^{-1}, respectively.

(b) (i) How would you prepare diethyl ether from ethanol?

(ii) What happen when sodium ethanoate is heated with soda-lime?

(iii) Illustrate the dehydrohalogenation reaction of *iso*-propyl chloride.

(iv) How does ethyne react with aqueous bromine?

(c) (i) Ditinguish between ethene and ethyne.

(ii) What product would you expect when a stream of ozonized oxygen is passed into solution of ethene in chloroform?

(iii) Arrange the substances that dissolve in sea water according to their increasing solubilities.

(iv) What type of polymerization would $CH_3CH=CH_2$ undergo? Write down the equation.

(d) (i) Write balanced equations(**words and symbols**) for the laboratory preparation of hydrogen sulphide and sulphur dioxide. (Any **one method** for each gas)

(ii) Give balanced equations (**words and symbols**) for two reactions which show the oxidizing property of chlorine.

(e) (i) State the acid-base concepts of S.A. Arrhenius.

(ii) 28 cm³ of 0.15 M sodium carbonate solution required 24 cm³ of hydrochloric acid to neutralize it. (A) Calculate the molar concentration of hydrochloric acid.
(B) What volume of water should be added to 24 cm³ of hydrochloric acid so that the concentration becomes exactly 0.2 M?
(Na = 23, C = 12, O = 16, H = 1, Cl = 35.5)

(f) Describe the extraction of the following elements.

(i) aluminium by electrolysis of the fused oxide

(ii) zinc from the ore that contains 55-75% zinc sulphide

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