2020
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) Methanol and ethanol have similar chemical properties, but methanol is extremely toxic.
   (b) A catalyst is used up at the end of a chemical reaction.
   (c) Atoms form the covalent bonds by gaining or losing electrons.
   (d) Calcium hydride is used as a drying agent in the laboratory.
   (e) Nylon is a ployamide.
   (f) Rusting occurs in the presence of both oxygen and hydrogen.
   (g) An acid is a substance that produces hydrogen ions in aqueous solution.

2. Fill in the blanks with the correct word(s), phrase(s), term(s), unit(s), etc.,   **(7 marks)**
   as necessary.
   (a) Dinitrogen oxide is formally called _____ gas.
   (b) Oxidation number of metals in pure form is _____ .
   (c) Many metals react with oxygen to form _____ .
   (d) In halogens, _____ exists as solid at room temperature.
   (e) Plastics are _____ polymer.
   (f) The hydrogen ion is extremely small consisting of a _____ only.
   (g) An _____ is the product formed when hydrogen reacts with an ethene.

3. Select the correct word(s), notation(s), term(s), unit(s), etc., given   **(7 marks)**
   in the brackets.
   (a) An anode is a(an) [electron donor; electron acceptor; source of electron].
   (b) Aluminium cannot react with [acid; alkali; water].
   (c) [Lime; Urea; Gypsum] is added to the soil to neutralize soil alkali.
   (d) [Electrolytic; Reduction; Oxidation] technique gives the metals of the highest purity.
   (e) Aqueous solution of [sodium chloride; sugar; urea] conducts electricity.
   (f) [H and H^+; Ne and Na^+; Li and K^+] have the same total number of electron.
   (g) The [amount of solute; volume; molarity] increases when evaporation take place.

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

List A	List B
(a) Ethyne	(i) used in insulation, pipes and guttering
(b) Alloys	(ii) most electronegative element
(c) Slaked lime	(iii) an important starting material in the manufacture of plastics
(d) Sulphates	(iv) by a moving body
(e) Fluorine	(v) majority of metallic substances
(f) Kinetic energy	(vi) calcium hydroxide
(g) Polyvinyl chloride	(vii) normal salts of sulphuric acid

5. Define the following: **(8 marks)**
   (a) Atomic number
   (b) Titration
   (c) One Faraday
   (d) Oxidation in term of hydrogen
   (e) Reactant
   (f) Gas pressure
   (g) A strong acid
   (h) Soaponification

SECTION (B)

6. Answer **ALL** questions.   **(12 marks)**
   (a) Give the two uses of sodium hydroxide (Caustic soda).

   (b) Which Law represents each of the following statements?
       (i) A volume of gas expands when it is heated.
       (ii) A lighter gas diffuses faster than the heavier one.

   (c) Write down the two uses of iodine.

   (d) What is the hydrogen ion concentration of a solution with pOH = 6.02?

   (e) Write graphic formulae for the following:
       (i) propane   (ii) ethanol   (iii) methanal   (iv) ethene

   (f) Common salt obtained by the traditional method is not pure. Why?

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

(a) There are four elements: A(2.8.1), B(2.8.5), C(2.8.7), D(2.8.8)
   (i) Which elements have a valence of 1?
   (ii) Which element is a halogen?
   (iii) Which element has the highest ionization energy?
   (iv) Name the type of bonding that exit between A and C?

(b) At 27°C and 750 mmHg a gas occupies 380cm^3. What is the volume of the gas at STP?

(c) On passing a steady current of 0.75A for 30 minutes through a metal(III) sulphate solution, 0.202 g of metal is deposited. Calculate the relative atomic mass of that metal. (1F= 96500C)

(d) Balance the following redox reactions using either oxidation number method or ion electron (half reaction) method.
   (i) $H_2SO_4 + C \longrightarrow SO_2 + CO_2 + H_2O$
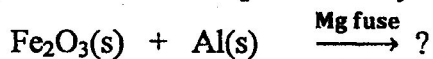   (ii) $H_2O_2 + H^+ + I^- \longrightarrow H_2O + I_2$
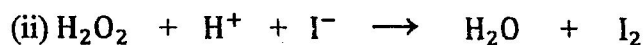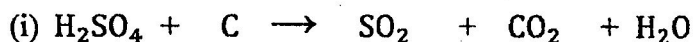
(e) (i) What are the factors affecting the rate of reaction?
   (ii) Using Le-Chatelier's principle, predict the effect of increasing pressure on the following equilibrium.
   $$2H_2O_{(g)} + heat \rightleftharpoons 2H_{2(g)} + O_{2(g)}$$
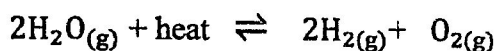
(f) (i) Descibe the properties and uses of stainless steel.
   (ii) Write balanced equations in **symbols** only for the following two equations.
   $$Fe_2O_3(s) + Al(s) \xrightarrow{\text{Mg fuse}} ?$$
   $$Zn(s) + Cu(NO_3)_2(aq) \longrightarrow ?$$

(g) Give equations in **words** and **symbols** for the following reactions.
   (i) Nitrogen oxide is soluble in iron (II) sulphate solution.
   (ii) Nitrogen oxide combines directly with chlorine in the presence of charcoal.

(h) (i) Discuss the cleaning properties of the soap.
   (ii) Write down the chemical equation for the formation of a soap in **words** and **symbols**.

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

(a) (i) What are meant by the terms "the conjugate acid" and "the conjugate base".

(ii) Calculate the heat of formation of butane gas, if its heat of combustion is -2878 kJmol^{-1}. The heat of formation of $CO_2(g)$ and $H_2O(l)$ are -393 kJmol^{-1} and -286 kJmol^{-1}, respectively.

(b) What happens when

(i) acetylene is passed into dilute sulphuric acid containing mercurry (II) sulphate at 60°C?

(ii) ethanol reacts with ethanoic acid at the presence of small of sulphuric acid?

(iii) methane is mixed with chlorine in diffused sunlight?

(iv) a piece of sodium is added to ethanol?

(c) (i) Distinguish between acetylene and dimethyl acetylene.

(ii) A gas X is obtained by heating calcium carbide with water. What is gas X? Write down the chemical equation.

(iii) What are the sources of biodiesel? Give the two uses of biodiesel in Myanmar.

(iv) Name the chemical which can be obtained from coal and their one use.

(d) (i) Write the balanced equations (in **words and symbols**) for the laboratory preparations of nitrogen oxide and dinitrogen oxide gases. (Any one method for each gas)

(ii) State the collection methods and their respective reasons.

(e) (i) In aqueous solution of acide HA, the equilibrium is represented as:

$$HA\,(aq) + H_2O(l) \rightleftharpoons H_3O^+(aq) + A^-(aq)$$

Write down the mathematical equation for dissociation constant of acid. What is it unit?

(ii) How many grams of sulphur would be precipitated on mixing 5dm^3 of sulphur dioxide with 15 dm^3 of hydrogen sulphide if both gases were originally at 750 mmHg pressure and 25°C ? (S = 32)

(f) (i) Write a process for the extraction of lead from its ore.

(ii) The copper roofs and pipes quickly become covered with a green coating when exposed to the atmosphere whereas gold and platinum do not. Explain why.

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