

2016
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) A chemical equilibrium is said to be a dynamic state.
 - (b) Phenolphthalein is red color in alkali solution.
 - (c) Oxidation number of element in pure form is one.
 - (d) The vertical columns are called periods.
 - (e) Metallic conductance is inversely proportional to its temperature.
 - (f) One mole of hydrogen weighs 2 amu.
 - (g) Heat is liberated by a chemical reaction is assigned by a positive sign.

2. Fill in the blanks with the correct word(s), phrase(s), term(s), unit(s), etc., **(7 marks)**
as necessary.
 - (a) ----- alkene gives one product by the reaction with HBr .
 - (b) Nitrogen dioxide gas has a ----- color.
 - (c) Tincture of Iodine is a dilute solution of iodine in -----.
 - (d) The formula of silver glance is -----.
 - (e) pH of the 0.01M hydrochloric acid solution is ----- .
 - (f) Alkaline earth metals are the members of group -----.
 - (g) Concentrated sulphuric acid is a very powerful ----- agent.

3. Select the correct word(s), notation(s), term(s), unit(s), etc., given **(7 marks)**
in the brackets.
 - (a) Chlorine has oxidation number +5 in [NaClO ; NaClO₃ ; NaClO₄] .
 - (b) If the relative molecular mass of gas is 24, the relative density of gas is [12 ; 24 ; 48].
 - (c) Increase of [reactant particle size ; reactant particle pressure ; temperature] decrease the rate of reaction .
 - (d) For N shell, the maximum number of electrons it can contain in [8; 18 ; 32] .
 - (e) The percentage of nitrogen in urea is [32% ; 46% ; 64%] .
 - (f) A standard solution is the reagent of exactly known [mass ; volume ; concentration].
 - (g) [Ag ;Na ; K] has the highest conductance among the metals .

[P.T.O.]

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

List A	List B
(a) Froth flotation	(i) an important nitrogenous fertilizer
(b) Carbohydrate	(ii) colored dye to colorless
(c) Enthalpy change	(iii) accepts electron pair
(d) CaCN_2	(iv) the color turns green
(e) Lewis acid	(v) zinc ore is first concentrated by a process
(f) Hypochlorous acid	(vi) ΔH
(g) Sulphur dioxide test by potassium dichromate paper	(vii) starch

5. Define the following: (8 marks)

- (a) Primary standard
- (b) Photochemical reaction
- (c) Boyle's law
- (d) A calorie
- (e) Essential electronic structure
- (f) Conjugate base
- (g) Electroplating
- (h) Oxidation in terms of electron transfer

SECTION (B)

6. Answer ALL questions. (12 marks)

- (a) Explain why "B" has lower ionization energy than "Be".
- (b) What is the relative molecular mass of the gas that diffuses four times as fast as oxygen? (O=16)
- (c) Draw the diagrams of electron flow and current flow for conduction in metal wire.
- (d) Calculate the oxidation numbers of phosphorous in PO_4^{3-} and PCl_3 .
- (e) Give the structural formulae of the following compounds.
 - (i) 4-methyl-2-heptene
 - (ii) 2-methyl propan -2-ol
- (f) Name the **four** insecticides you have studied.

7. Answer any FIVE questions.

(20 marks)

- (a) (i) Describe the arrangement of the following elements in order of their increasing electronegativity. ${}_7\text{N}$, ${}_9\text{F}$, ${}_8\text{O}$, ${}_6\text{C}$
- (ii) Element Y contains 2 electrons in K shell , 8 electrons in L shell and 8 electrons in M shell. Give the name of that element Y.
- (iii) From the following elements:
 ${}_3\text{A}$ (2.1) , ${}_7\text{B}$ (2.5) , ${}_9\text{C}$ (2.7) , ${}_{10}\text{D}$ (2.8)
 Which elements have a valence of 1 ?
- (iv) Write down the electron dot-cross structure of NH_4^+ .
- (b) One mole of a gas occupies 25.0 liters and its density is 1.82 g l^{-1} at a particular temperature and pressure .What is the molecular weight of a gas? What is the density of that gas at STP?
- (c) What mass of aluminium and silver will be liberated using electrolysis by a charge of one Faraday? ($\text{Ag}=108$, $\text{Al}=27$, $1\text{F}=96500 \text{ C}$)
- (d) Balance the following redox reactions using either oxidation number method or ion electron (half reaction) method.
- (i) $\text{MnO}_4^- + \text{S}^{2-} \rightarrow \text{S} + \text{Mn}^{2+}$
- (ii) $\text{H}_2\text{O} + \text{Cl}_2 \rightarrow \text{HCl} + \text{O}_2$
- (e) (i) Explain the terms: activated complex and catalyst
 (ii) What will be the effect of increasing pressure on the following equilibrium?
 Give reason for your answer.
- $$2 \text{Cl}_2(\text{g}) + 2 \text{H}_2\text{O}(\text{g}) \rightleftharpoons 4\text{HCl}(\text{g}) + \text{O}_2(\text{g}) \quad \Delta\text{H}^\theta = +115\text{kJ}$$
- (f) (i) Describe the usual methods used to extract sodium and copper from the corresponding ore.
 (ii) Give balanced equations in symbols only for the following reactions.
 (A) when calcium oxide reacts with silicon(IV)oxide
 (B) pieces of zinc are placed in an aqueous solution of copper (II) sulphate
- (g) (i) What will happen nitrogen dioxide is absorbed in aqueous alkali?
 (ii) Write down the equation for the following reaction in words and symbols.
 copper reacts with cold dilute nitric acid
- (h) (i) What is the reason for the addition of urea to the soil? Give symbol equation for the reaction of urea in the soil.
 (ii) Why is gypsum mixed with clinker and ground in the final stage of cement production?

[P.T.O.]

8. Answer any **FOUR** questions.

(32 marks)

- (a) (i) What is meant by the term “basicity of an acid”?
Describe the basicity of hydrochloric acid.
- (ii) Calculate the pH of a buffer solution containing 0.10 mole of methanoic acid, ($K_a = 1.8 \times 10^{-4}$) and 0.05 mole of sodium methanoate.
- (b) (i) How do they differ between electrical energy and mechanical energy?
- (ii) Calculate the heat of combustion of gasoline, $C_8H_{18}(l)$, if its heat of formation is -285 kJmol^{-1} . The heat of formation of $CO_2(g)$ and $H_2O(l)$ are -392 kJmol^{-1} and -283 kJmol^{-1} respectively.
- (c) (i) How do you prepare ethyne from coke?
- (ii) Illustrate the hydroxylation of an alkene.
- (iii) Complete the following equation and name the organic compounds of this reaction.
- $$CH_3COOH + CH_3CH_2OH \xrightarrow{\quad ? \quad} \quad ?$$
- (iv) What happens when glucose is treated with zymase which is in yeast?
- (d) (i) Distinguish between two isomeric compounds of C_4H_6 .
- (ii) Gas “Y” can be obtained by hydrogenation of ethyl iodide using a palladium catalyst. What is gas “Y”? Write down the equation.
- (iii) Arrange the following crude oils according to the increasing of their boiling points and viscosities. Write down their uses giving an example for each.
Lubricating oil, Paraffin oil, Gasoline
- (iv) State the advantage and disadvantage of diesel engines.
- (e) Describe the manufacturing of chlorine by electrolytic process giving with a labelled diagram.
- (f) Write the balanced equations (**words and symbols**) for the laboratory preparations of ammonia and hydrogen sulphide gases. (**Any one method** for each gas)
State the collection method of each gas and their respective reasons.
- (g) How many cubic centimeters of 2.00M HCl must be diluted with water to make 2 dm^3 of 0.25M solution? If 25.0 cm^3 of sodium hydroxide neutralizes with 22.0 cm^3 of dilute acid solution, calculate the concentration of sodium hydroxide in (i) Molarity (ii) g dm^{-3} . (H= 1, O= 16, Na= 23, Cl= 35.5)
- (h) Discuss the extraction of the following elements by electrolysis.
(i) calcium (ii) aluminium.
