

**2018**  
**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) Electrons move round the nucleus in definite orbits or shells.
  - (b) Charles' law shows the relation of volume and celcius temperature.
  - (c) The substances used in a chemical reaction are called products.
  - (d) Aqueous solutions of the inorganic salts conduct electricity.
  - (e) Negative values of  $\Delta H^\theta$  indicate heat gain by the system.
  - (f) Bromine is not as strong an oxidizing agent as chlorine.
  - (g) Sulphuric acid is monobasic acid.
  
2. Fill in the blanks with the correct word(s), phrase(s), term(s), unit(s), etc., **(7 marks)**  
as necessary.
  - (a) The anhydrous sodium carbonate can be regarded as a ----- standard.
  - (b) Discharge of negative ions at an anode is an -----.
  - (c) Both ----- and potassium have to be stored under kerosene.
  - (d) The aqueous ----- of calcium hydroxide is known as lime water.
  - (e) When liquid air is distilled, ----- boils off at  $-196^\circ\text{C}(77\text{K})$ .
  - (f) ----- sulphur is the most stable form of sulphur.
  - (g) The general formula of alcohol is -----.
  
3. Select the correct word(s), notation(s), term(s), unit(s), etc., given **(7 marks)**  
in the brackets.
  - (a) The shell nearest to the nucleus has the (lowest: same: highest) energy.
  - (b) The total pressure of a gas mixture is related to the partial pressure of each gas if the individual gas is (inert; reacted; combined) to one another.
  - (c) Methyl orange is yellow colour in (acid; water; alkali).
  - (d) (Peat; Lignite; Anthracite) is the first step in the coal-forming process.
  - (e) Light can influence the (volume; rate; pressure) of some chemical reactions.
  - (f) Sulphur is found in the (ion; compound; free) state in deposits below the surface of the earth.
  - (g) Large  $\text{pK}_b$  values indicate (strong; concentrated; weak) bases.

**[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) Soda feldspar	(i) laughing gas
(b) Rust	(ii) the hardest coal
(c) Chlorine	(iii) pyrolysis
(d) Dinitrogen oxide	(iv) Pt
(e) Anthracite	(v) $\text{Na}_2\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 6\text{SiO}_2$
(f) Incineration	(vi) hydrated iron(III)oxide
(g) Inert electrode	(vii) sterilize water

5. Define the following: (8 marks)
- Electron affinity
  - Dalton's law of partial pressure
  - Molar solution of a compound
  - Non-electrolyte
  - Reducing agent
  - Ignition temperature
  - Copolymer
  - Bases by G.N.Lewis

### SECTION (B)

6. Answer **ALL** questions. (12 marks)
- Sulphuric acid is manufactured by making use of the equilibrium reaction.  

$$2\text{SO}_2(\text{g}) + \text{O}_2(\text{g}) \rightleftharpoons 2\text{SO}_3(\text{g})$$
 Explain why an excess of air is necessary for the manufacturing.
  - Write the balanced equation in words and symbols for the reaction of sodium with water.
  - Describe two substances which are essential for iron to rust.
  - Why does plastic sulphur possess elasticity?
  - Give the structural formulae of the following compounds.
    - 3,4-dimethyl-1-pentyne
    - 3-methyl butan-2-ol
  - Write the thermochemical equation indicating the sign of the enthalpy change for the addition of  $\text{H}_2\text{SO}_4$  to water to form 2.0 M solution.



7. Answer any **FIVE** questions.

**(20 marks)**

- (a) Atom A has an atomic number 12 and B has an atomic number 18.
- Write down their essential electronic structures.
  - What is the chief valence of each element?
  - Give the group numbers of A and B.
  - 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 that gas? (O=16, S=32)
- (c) Calculate the time required to discharge 0.835 g of copper by passing a current of 0.3 A through an excess of copper (II) sulphate solution.  
(Cu=63.54, one Faraday=96500Coulombs)
- (d) Balance the following redox reactions using either oxidation number method or ion electron (half reaction) method.
- $\text{SO}_2 + \text{Br}_2 + \text{H}_2\text{O} \longrightarrow \text{H}_2\text{SO}_4 + \text{HBr}$
  - $\text{K}_2\text{Cr}_2\text{O}_7 + \text{HI} + \text{HClO}_4 \longrightarrow \text{KClO}_4 + \text{Cr}(\text{ClO}_4)_3 + \text{I}_2 + \text{H}_2\text{O}$
- (e) (i) State Le Chatelier's principle.  
(ii) Using Le Chatelier's principle, predict the effects of increasing the pressure on the following equilibrium system.
- $$4\text{NH}_3(\text{g}) + 5\text{O}_2(\text{g}) \rightleftharpoons 4\text{NO}(\text{g}) + 6\text{H}_2\text{O}(\text{g})$$
- (f) (i) Describe the uses of manganese steel.  
(ii) Write balanced equations in symbols only for the following reactions.  
(A) magnesium and steam (B) calcium and oxygen
- (g) Write equations in words and symbols for the following reactions.
- reaction of hydrogen iodide with dilute nitric acid
  - reaction of phosphorous with dinitrogen oxide
- (h) (i) Calculate the percentage of nitrogen in ammonium nitrate,  $\text{NH}_4\text{NO}_3$ .  
(N=14, H=1, O=16)  
(ii) What is the long form of each of the following substances?  
(A) IAA (B) NAA (C) PVC (D) PTFE

**[P.T.O.]**



8. Answer any **FOUR** questions.

**(32 marks)**

- (a) (i) Explain the terms strong and weak as applied to acids.  
 (ii) Calculate the pH of a buffer solution containing 0.03 mole of ethanoic acid ( $K_a = 1.8 \times 10^{-5}$ ) and 0.40 mole of sodium ethanoate per  $\text{dm}^3$ .
- (b) (i) State kinetic energy and chemical energy.  
 (ii) Calculate the heat of formation of  $\text{CH}_3\text{COOH(l)}$ , if its heat of combustion is  $-872.0 \text{ kJ mol}^{-1}$ . The heat of formation of carbon dioxide and liquid water are  $-393.5 \text{ kJ mol}^{-1}$  and  $-285.8 \text{ kJ mol}^{-1}$  respectively.
- (c) (i) What products would you expect when the vapours of ethanol is passed over alumina heated at  $350^\circ\text{C}$ ?  
 (ii) Illustrate the fermentation of maltose in the presence of yeast(maltase).  
 (iii) What happens when ethylidene chloride is heated with an alcoholic solution of potassium hydroxide?  
 (iv) How do you prepare ethyl iodide from ethanol?
- (d) (i) Distinguish between propene and propyne.  
 (ii) A gas X is obtained by hydrogenation of ethene using nickel catalyst at  $200\text{-}300^\circ\text{C}$ . What is gas X? Write down the equation.  
 (iii) Describe two types of products of cracking reactions.  
 (iv) What is meant by the term a zerolite?
- (e) Describe the Haber process for the manufacture of ammonia.
- (f) Write the balanced equations(in words and symbols) for the laboratory preparations of sulphur dioxide and chlorine gases.(Any one method for each gas)  
 Write equations for the reduction of chlorine and bromine by sulphur dioxide.
- (g) 5 g of mixture of anhydrous sodium carbonate and sodium chloride were made up to  $250 \text{ cm}^3$  with distilled water.  $25 \text{ cm}^3$  of this solution required  $18 \text{ cm}^3$  of  $0.2 \text{ M}$  hydrochloric acid. Calculate the percentage by mass of sodium chloride in the mixture. ( $\text{Na}=23$ ,  $\text{C}=12$ ,  $\text{O}=16$ )
- (h) Describe the extraction of zinc from zinc blende.

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