နိုင်ငံခြားစာစစ်ဌာနများတွင်စစ်ဆေးသည့်မေးခွန်းလွှာ

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) Neutral atoms must contain the same number of neutrons as protons.
   (b) The amount of solute does not change due to dilution.
   (c) Oxidation number of oxygen in hydrogen peroxide is –2.
   (d) The reaction is completely stop at the equilibrium.
   (e) The surrounding temperature is decreased by an endothermic process.
   (f) Ammonium chloride salt is derived from a strong acid and a weak base.
   (g) Iodine readily dissolves in water.

2. Fill in the blanks with the correct word(s), phrase(s), term(s), unit(s), etc., as necessary. **(7 marks)**
   (a) One mole of oxygen gas occupies ---------- at STP. (O = 16).
   (b) Cations are ----------at the cathode.
   (c) The plant or animal oil has to be converted to biodiesel by the chemical process known as ----------.
   (d) Sodium nitrate is decomposed on strong heating to the ---------- and oxygen.
   (e) Lead(II) sulphate is---------- in water.
   (f) ---------- forms the major constituent of the atmosphere, being present about 79 percent by volume of the air.
   (g) Nylon is a copolymer of two different monomers, a ---------- and a dicarboxylic acid.

3. Select the correct word(s), notation(s), term(s), unit(s), etc., given in the brackets. **(7 marks)**
   (a) A catalyst [decreases; increases; alters] the rate of reaction.
   (b) Galvanization is the term for deposition of thin layer of [iron on copper; iron on silver; zinc on iron].
   (c) Aqueous solution of [sodium chloride; urea; sugar] conducts electricity.
   (d) [Alkanes; Alkynes; Alkenes] may undergo addition reaction.
   (e) The essential electronic structure of $_{19}K$ is [$3s^1$; $2s^1$; $4s^1$].
   (f) Standard enthalpy change is measured at [0 °C; 298 K; 20 °C] and 760 mmHg.
   (g) The percent composition of nitrogen present in the $Mg(NO_3)_2$ is [18.91 %; 16.21 %; 64.86 %]. (N = 14, O = 16, Mg = 24)

[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) Galena	(i) manufacture of nitric acid
(b) Alkaline earth metals	(ii) $CaSO_4.\ 2H_2O$
(c) Ammonia-Oxidation Process	(iii) PbS
(d) A weak acid	(iv) iodine
(e) Halogen in solid form	(v) extraction of sulphur
(f) Frasch Process	(vi) oxidation number of +2
(g) To neutralize soil alkali	(vii) CH_3COOH

5. Define the following: **(8 marks)**
   (a) Electron Affinity
   (b) Graham's law of gaseous diffusion
   (c) Faraday's first law of electrolysis
   (d) Oxidation in terms of electron transfer
   (e) The rate of a reaction
   (f) Buffer solution
   (g) A molar solution
   (h) Structural isomers

SECTION (B)

6. Answer **ALL** questions. **(12 marks)**
   (a) Which of the oxides of nitrogen could be confused with oxygen? Why? How can you distinguish between a jar of this gas and a jar of oxygen?

   (b) Di lead(II) lead(IV) oxide behaves as a mixture of lead(II) oxide and lead(IV) oxide. Explain this statement.

   (c) Explain why $_7N$ has higher ionization energy than that of $_8O$.

   (d) Which element N (or) P (or) K is the most suitable for growing sweet potatoes? Give reasons.

   (e) Why is tetraethyl lead added to gasoline? What are the effects of it on environment?

   (f) What happens when a piece of zinc metal is placed in a solution of copper(II) nitrate?

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

(a) You are provided with three elements: X (2.8), Y (2.8.1) and Z (2.8.7).

(i) Which element has the highest electron affinity?

(ii) Give the group numbers and period numbers of the given elements.

(iii) Which element has the lowest ionization energy?

(iv) Which element is a noble gas?

(b) (i) What will be the volume of hydrogen chloride gas when 100 cm^3 of hydrogen and 50 cm^3 of chlorine are mixed? (all gases are measured at the same conditions)

(ii) At 27 °C and 750 mmHg a gas occupies 480 cm^3. What is the volume of the gas at STP?

(c) Calculate the mass of silver in grams deposited by passing a steady current of 1.3 A for 35 minutes through an excess of silver nitrate solution. (Ag = 108, 1 F = 96500 C)

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

(i) $MnO_4^- + S^{2-} \longrightarrow S + Mn^{2+}$

(ii) $FeCl_2 + Cl_2 \longrightarrow FeCl_3$

(e) (i) Why is a chemical equilibrium referred to as a "dynamic equilibrium"?

(ii) Complete the following equations in words and symbols.

I_2 (g) + H_2S (g) $\longrightarrow$?

Br_2 (l) + KOH(aq) (cold dil) $\longrightarrow$?

(f) (i) How would you prepare alumina starting from aluminium foil?

(ii) Explain how to prevent iron rusting by using "Sacrificial protection".

(g) (i) What happens when barium chloride solution is added to a solution of iron(II) sulphate?

(ii) How would you prepare nitrogen oxide from the starting material, nitrogen?

(h) (i) Ammonium fertilizers should never be stored with lime, $Ca(OH)_2$, nor should they be put in empty lime containers. Explain with a relevant equation.

(ii) How can the plastic wastes be recycled?

[P.T.O.

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

(a) (i) Calculate the pH of 0.05 M HCl solution.

(ii) Calculate the heat of formation of ethane (C_2H_6) gas if its heat of combustion is -1560 kJ mol^{-1}. The heats of formation of $CO_2(g)$ and $H_2O(l)$ are -393 kJ mol^{-1} -286 kJ mol^{-1}, respectively.

(b) (i) A gas X is obtained by heating a mixture of *n*-propyl alcohol with concentrated sulphuric acid at 160 °C . What is gas X? Write down the chemical equation.

(ii) Gas X could also be obtained by dehydrohalogenation of an alkyl halide. Name the alkyl halide. Write down the chemical equation.

(iii) Is the gas X saturated or unsaturated hydrocarbon? Write down the general formula.

(iv) Can the gas X decolourize 1 % $KMnO_4$ solution? Explain your answer.

(c) (i) A gas Y is obtained by treating calcium carbide with water. What is gas Y? Write down the chemical equation.

(ii) How would you prepare ethyl ethanoate from ethanol?

(iii) Name the chemicals which can be obtained from coal and mention their uses.

(iv) How would you prepare hydrocarbons (gasoline) from methane?

(d) (i) In the laboratory, a gas G is obtained by heating sodium chloride, manganese(IV) oxide and concentrated sulphuric acid. What is gas G? Write balanced equation in words and symbols. How does manganese(IV) oxide behave in this reaction?

(ii) Explain why concentrated sulphuric acid cannot be used as a drying agent for hydrogen sulphide. Name the reagent used to dry it. What happens when hydrogen sulphide reacts with zinc?

(e) (i) Would the pH of a solution of sodium methanoate be greater or less than 7? Give an explanation for this.

(ii) 25cm^3 of a sodium carbonate solution required 24.5 cm^3 of 0.25 M hydrochloric acid solution to neutralize it. Calculate the molarity of sodium carbonate solution and convert the concentration into g dm^{-3}. (C = 12, O = 16, Na = 23)

(f) (i) Discuss the extraction of magnesium from sea water.

(ii) How and under what conditions do the metals iron and zinc react with (A) oxygen (B) dilute sulphuric acid?

****