THE OPEN UNIVERSITY OF SRI LANKA

FOUNDATION COURSE IN SCIENCES– 2014/2015

Assignment Test (CAT) II

CMF 2205 - CHEMISTRY

Date: (Sunday) 16. 11. 2014 **Time: 9.30 am – 11.00 am**

Instruction to candidates අපේක්ෂකයන් සඳහා උපදෙස් :

ANSWER ALL QUESTIONS ප්‍රශ්න සියල්ලටම පිළිතුරු සපයන්න.

Planck's constant / ප්ලාන්ක්ගේ නියතය h $= 6.63 \times 10^{-34}$ Js

Velocity of light C / ආලෝකයේ ප්‍රවේගය C $= 3 \times 10^{8}$ ms^{-1}

Avogadro constant L / ඇවගාඩ්රෝ නියතය L $= 6.023 \times 10^{23}$ mol^{-1}

Mass of a electron/ ඉලෙක්ට්‍රෝනයේ ස්කන්ධය $= 9.11 \times 10^{-31}$ kg

Charge of an electron/ ඉලෙක්ට්‍රෝනයේ ආරෝපනය $= 1.61 \times 10^{-19}$ C

- The paper consist of two parts ,Part A (20 MCQ) and Part B (2-structured essay)
  ප්‍රශ්න පත්‍රය කොටස් දෙකකින් සමන්විත වේ. Part A(බහුවරණ 20) හා Part B (ව්‍යුහගත රචනා ප්‍රශ්න)

- The use of a non programmble electronic calculator is permitted
  ප්‍රකමණය කල නොහැකි ගණක යන්ත්‍ර භාවිතා කල හැක.
- Write your Registration number in both papers.
  ප්‍රශ්න පත්‍ර දෙකෙහිම ශිෂ්‍ය ලියාපදිංචි අංකය ලියන්න.
- Submit your answers scripts separately./ පිළිතුරු පත්‍ර වෙන වෙනම බාර දෙන්න.

Part A

- Choose the most correct answer to each question and mark a cross " X " over the answer on the answer sheet.
  ප්‍රශ්නයට අදාළ නිවැරදි පිළිතුර තෝරා පිළිතුරු පත්‍රයේ ඊට අදාල අංකය මත " X " යොදන්න.
- Any answer with more than one cross will not be counted.
  පිළිතුරු එකකට වඩා ලකුණු කර තිබේ නම් එය වැරදි පිළිතුරක් ලෙස ගනු ලැබේ.
- Each correct answer will get 3 marks.
  සෑම නිවැරදි පිලිතුරක් සඳහාම ලකුණු 3 ක් ලැබේ.
- 0.5 marks will be deducted for each incorrect answer.
  සෑම වැරදි පිලිතුරක් සඳහාම 0.5 ලකුණු අඩුකරනු ලැබේ.

01 . How is dynamic equilibrium defined?
ගතික සමතුලිතතාවය අර්ථ දක්වන්නේ කෙසේ ද?

(1) It is the point at which a reaction stops moving in either the forward or the reverse directions. ප්‍රතික්‍රියාවක ඉදිරි ප්‍රතික්‍රියාව හා පසු ප්‍රතික්‍රියාව සිදුවීම නතරවන ස්ථානය වේ.
(2) It is the point at which the forward reaction continues, while the reverse reaction stops. ප්‍රතික්‍රියාවක පසු ප්‍රතික්‍රියාව නැවති ඉදිරි ප්‍රතික්‍රියාව සිදුවන අවස්ථාව.
(3) It is the point at which the concentrations of the products equal the concentrations of the reactants. ඵලවල සාන්ද්‍රණය ප්‍රතික්‍රියකවල සාන්ද්‍රණයට සමාන වන ස්ථානය.
(4) It is the point at which the rate of the forward reaction equals the rate of the reverse reaction. ප්‍රතික්‍රියාවක ඉදිරි ප්‍රතික්‍රියාවේ වේගය පසු ප්‍රතික්‍රියාවේ වේගයට සමාන වන ස්ථානය වේ.
(5) It is the point at which the reaction does not take in any direction. ප්‍රතික්‍රියාවක ඉදිරි හා පසු ප්‍රතික්‍රියා කිසිම දිසාවකට නොවන ස්ථානය වේ.

02. The density of a gas is 0.075 g cm^{-3}. The density of a gas in SI units
වායුවක ඝනත්වය 0.075 g cm^{-3} වේ නම් එම වායුවේ ඝනත්වය SI ඒකක වලින්

(1) 7.5×10^{-3} (2) 7.5×10^{3} (3) 7.5×10 (4) 7.5×10^{-6} (5) 1.50×10^{2}

03. Which of the following statements are correct? පහත කුමන වගන්ති සත්‍ය වේ ද?

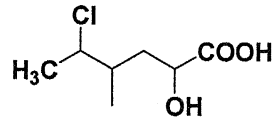
(a) Primary C-atom is bonded to one carbon atom.
ප්‍රාථමික C පරමාණුවක් යනු කාබන් පරමාණු එකක් බැඳුණු කාබන් පරමාණුවකි.

(b) Secondary C-atom is bonded to two other carbon atoms.
ද්විතියික C පරමාණුවක් යනු කාබන් පරමාණු දෙකක් බැඳුණු කාබන් පරමාණුවකි.

(c) Tertiary C-atom is bonded to three other carbon atoms.
තෘතියික C පරමාණුවක් යනු කාබන් පරමාණු තුනක් බැඳුණු කාබන් පරමාණුවකි.

(1) a, and b only. (2) b, and c only. (3) a, and c only.
(4) a, b, and c all. (5) a, b, and c all incorrect.

04. The correct IUPAC name of the compound is, සංයෝගයේ නිවැරදි IUPAC නම වනුයේ



(1) 5-choloro-2-hydroxy-4-methylpentanoic acid.

(2) 2-choloro-5-hydroxy-3-methylhexanoic acid.

(3) 2-hydroxy-5-choloro- 4- methylhexanoic acid

(4) 5-choloro-2-hydroxy-4- methylhexanoic acid .

(5) 2-hydroxy-4- methyl-5-cholorohexanoic acid

05. Geometrical isomerism is exhibited by, ජ්‍යාමිතික සමාවයවිකතාව පෙන්නුම් කරනුයේ

(a) 2-Pentene. 2-පෙන්ටීන්
(b) 2-bromopropene. 2-බ්‍රෝමොප්‍රොපීන්
(c) 1-phenylpropene. 1-ෆිනයිල්ප්‍රොපීන්
(d) 2-hydroxy-2-butene. 2-හයිඩ්‍රොක්සි-2-බියුටීන්

(1) (a) (b),(c) and (d) all
(2) (a) and (d) only.
(3) (b),(c) and (d) only.
(4) (a),(b) and (c) only.
(5) (a), (c) and (d) only

06. The group of compounds with the correct order of acidity is. ආම්ලිකතාව වැඩිවන පිළිවෙල නිවැරදිව

(1) $HClO_3 < HClO < HClO_2 < HClO_4$
(2) $HClO < HClO_3 < HClO_2 < HClO_4$
(3) $HClO_4 < HClO < HClO_2 < HClO_3$
(4) $HClO < HClO_2 < HClO_4 < HClO_3$
(5) $HClO < HClO_2 < HClO_3 < HClO_4$

07. A sample of 2 mol of NO_2 was placed in an empty 3 dm^3 container and allowed to reach equilibrium according to the following equation . පරිමාව 3 dm^3 වූ භාජනයක NO_2මෝල 2 ක් පහත පරිදි සමතුලිතතාවයට එළැඹීමට ඉඩහරින ලදී.

$$2NO_{2(g)} \rightleftharpoons N_2O_{4(g)}$$

At equilibrium, y mol of $NO_{2(g)}$ had reacted. What is the value of equilibrium constant, K_C at the temperature of the experiment. සමතුලිතතාවය සඳහා $NO_{2(g)}$ මෝල y ප්‍රතික්‍රියා කලේ නම් එම උෂ්ණත්වයේදී පද්ධතියේ සමතුලිතතා නියතය K_C අගය කුමක් ද?

(1) $\frac{3y}{2(2-y)^2}$
(2) $\frac{4y^2}{4-y^2}$
(3) $\frac{3y}{2(2-y)}$
(4) $\frac{3y^2}{2(2-y)}$
(5) $\frac{2(2-y)^2}{3y}$

08. 0.66 g of an organic compound containing C,H,O gave on combustion 0.99 g of CO_2 and 0.77 g of H_2O The percentage of O in the compound is.
කාබනික සංයෝගයක C,H හා O පමණක් තිබේ. සංයෝගයේ 0.66 g ප්‍රමාණයක් දහනය කලවිට CO_2 වායුව 0.99 g ප්‍රමාණයක් ද, H_2O 0.77 g ප්‍රමාණයක් ද, ලැබේ නම් සංයෝගයේ අඩංගු O ප්‍රතිශතය කවරේ ද?

(1) 46.04 %
(2) 40.99 %
(3) 59.01 %
(4) 45.50 %
(5) 53.95 %

Question number 9 and 10 based on given equilibrium

ප්‍රශ්න අංක 9 සහ 10 සඳහා පහත සමතුලිතතාවය සලකන්න.

The reaction below reaches equilibrium in a closed reaction vessel of volume 2.50 dm^3
පහත සමතුලිත ප්‍රතික්‍රියා පරිමාව 2.50 dm^3 සංවෘත භාජනයක් තුල සිදුවුනි නම්

$$2NO_{(g)} + O_{2(g)} \rightleftharpoons 2NO_{2(g)}$$

At equilibrium, there are 2.80 moles of NO(g), 3.00 moles of O_2(g), and 8.40 moles of NO_2(g).

සමතුලිතතාවයේ දී NO(g) වායු මෝල 2.80 ක් ද, O_2 වායු මෝල 3.0 ක් NO_2(g). වායු මෝල 8.40 ක් ද පවති නම්

09. What is the equilibrium constant, Kc, for the reaction?
සමතුලිතතාවය සඳහා සමතුලිතතා නියතය Kc වනුයේ

(1) 2.50 (2) 0.13 (3) 0.41 (4) 7.50 (5) 15.01

10. The units for equilibrium constant K_c is

සමතුලිතතා නියතය K_c වල ඒකක වනුයේ

(1) mol dm^{-3} (2) mol^{-1} dm^{-3} (3) mol^2 dm^{-6} (4) mol^2 dm^6 (5) mol^{-1} dm^3

11. Consider the following: පහත වගන්ති සලකන්න.

(**A**) Constant temperature. උෂ්ණත්වය නියත විට

(**B**) Equal concentrations of reactants and products. ප්‍රතික්‍රියක හා ඵලවල සාන්ද්‍රණ සමාන විට.

(**C**) Equal rates of forward and backward reaction. ඉදිරි හා පසු ප්‍රතික්‍රියාවල වේග සමාන විට.

A system at equilibrium must have. පද්ධතියේ සමතුලිතතාවය සඳහා

(1) (**A**) and (**B**) only (2) (**A**) and (**C**) only (3) (**B**) and (**C**) only

(4) (A), (**B**) and (**C**) (5) None of the above

12. How many moles of H_2SO_4 are present in 2.50 L of a 4.20 mol dm^{-3} aqueous solution?
සාන්ද්‍රණය 4.20 mol dm^{-3} වූ H_2SO_4 අම්ල ද්‍රාවණයක 2.50 L ක් සෑදීමට අවශ්‍ය H_2SO_4 මෝල ගණන කොපමණ ද?

(1) 10.50 (2) 1.68 (3) 5.25 (4) 2.63 (5) 0.61

13. A solution of HNO_3 of unknown concentration was titrated with 0.95 mol dm^{-3} KOH. 21.35 mL of the base was required to neutralize a 10.0 mL sample of acid. Find the concentration of the acid in mol dm^{-3}. The reaction is:
සාන්ද්‍රණ නොදන්නා HNO_3 අම්ල ද්‍රාවණයක 10.0 mL ක් සාන්ද්‍රණය 0.95 mol dm^{-3} ක් වූ KOH. ද්‍රාවණයක් සමඟ අනුමාපනයේ දී භෂ්මය 21.35 mL ප්‍රමාණයක් අවශ්‍ය වුනි නම් අම්ලයේ සාන්ද්‍රණය ගණනය කරන්න.

$$HNO_{3\,(aq)} + KOH_{(q)} \longrightarrow H_2O_{\,(l)} + KNO_{3\,(aq)}$$

(1) 0.20 (2) 2.24 (3) 9.20 (4) 2.02 (5) 0.04

14. 24.0 mL of a 0.1 mol dm^{-3} HNO_3 solution is added to 25.0 mL of a 0.1 mol dm^{-3} NaOH solution. What is the pH of the resultant solution? සාන්ද්‍රණය 0.1 mol dm^{-3} වූ HNO_3 අම්ල ද්‍රාවණය 24.0 mL ක් සාන්ද්‍රණය 0.1 mol dm^{-3} වූ NaOH භෂ්ම ද්‍රාවණයකට එක් කලේ නම් ලැබෙන්නා වූ ද්‍රාවණයේ pH අගය වනුයේ

(1) 2.4 (2) 13.4 (3) 7.4 (4) 10.4 (5) 8.4

15. Solubility product of AgCl in water at 298K is 1.56×10^{-10} mol^2 dm^{-6} What is the weight of AgCl remaining not dissolved when 1.00 g of AgCl is dissolved in 4500 cm^3 of water ? (Ag=108, Cl=35.5)

298K දී AgCl හි ජලයේ ද්‍රාව්‍යතා ගුණිතය 1.56×10^{-10} mol^2 dm^{-6} නම් ජලය4500 cm^3 තුල AgCl 1.00 g ක් දියකලවිට දියනොවී ඉතිරිවන AgCl ස්කන්ධය වනුයේ

(1) 0.56 (2) 0 .92 (3) 0.87 (4) 0.13 (5) 0.08

16. What would you expect to happen when propene is bubbled in to Br_2 water ?
ප්‍රොපේන් තුලින් Br_2 දියර බුබුලනය කලවිට ලබන නිරීක්ෂණ මොනවාද?

(1) Evolution of gas/ වායුවක් පිටවේ.
(2) Formation of a white precipitate/ සුදු අවක්ෂේපයක් ඇති වේ.
(3) Decolourization of Br_2 water / බ්‍රෝමින් දියර අවර්ණ කරයි.
(4) Red colour solution/ රතු ද්‍රාවණයක් ලැබේ.
(5) Producing heat /තාපය පිටකරයි.

17. Acidified MnO_4^- reacts with H_2O_2 producing O_2, Mn^{2+} and H_2O only. Using the relevant balance equation. The number of moles of MnO_4^- required for the complete reaction of one mole of H_2O_2 in an acidified medium is / ආම්ලික මාධ්‍යයේ වූ MnO_4^- H_2O_2 සමඟ ප්‍රතික්‍රියාවෙන් O_2, Mn^{2+} හා H_2O ලබාදෙයි. ආම්ලික මාධ්‍යයේ වූ H_2O_2 මෝල එකක් හා ප්‍රතික්‍රියා කිරීමට අවශ්‍ය MnO_4^- මෝල ප්‍රමාණය වනුයේ,

(1) 0.4 (2) 0.8 (3) 2.5 (4) 2.0 (5) 5.0

18. The solubility of A_2X_5 is y mole dm^{-3} solubility product of A_2X_5
A_2X_5 හි ද්‍රාව්‍යතාවය y mole dm^{-3} නම් එහි ද්‍රාව්‍යතා ගුණිතය

(1) $3.6 \times 10^2 y^6$ (2) $1.26 \times 10^2 y^7$ (3) $1.25 \times 10^4 y^7$ (4) $6.4 \times 10^5 y^7$ (5) $7.2 \times 10^5 y^7$

19. Select the suitable indicator in the titration of NaOH against oxalic acid.

NaOH හා ඔක්සලික් අම්ලය අතර අනුමාපනයට සුදුසු දර්ශකය වනුයේ

(1) Methyl red / මෙතිල් රෙඩ් (2) Phenolphthalein / ෆිනොප්තලීන්
(3) Starch-iodine/ පිෂ්ඨයන අයඩින් (4) Methyl Orange / මෙතිල් ඔරේන්ජ්
(5) Self indicator / ස්වභාවික දර්ශක

20. Ozone is most likely to react with (add in to)

පහත අණුවලින් කුමන අණුව O_3 සමඟ ප්‍රතික්‍රියා කරයිද?

(1) $C_2H_4Cl_2$ (2) $C_2H_4Cl_4$ (3) C_2H_6 (4) C_2H_4 (5) $C_2H_4Br_2$

THE OPEN UNIVERSITY OF SRI LANKA

FOUNDATION COURSE IN SCIENCES -2014/ 2015

CMF 2205 – Chemistry I

Assignment Test II Name :- .....

Registration No. | | | | | | | | | |

This question paper consists of 2 **PARTS A & B.**
PART A carries 20 multiple choice questions
PART B carries **two** structured type questions.
ANSWER ALL QUESTIONS

INSTRUCTIONS:

Each item is a statement or question that may be answered by one of the five responses given.

There is only **one best** answer to every question. Mark a cross (**X**) over the most suitable answer. For each correct response, **03** marks will be awarded. For each incorrect response, **0.5** marks will be deducted.

1.	1	2	3	4	5	2.	1	2	3	4	5	3.	1	2	3	4	5
4.	1	2	3	4	5	5.	1	2	3	4	5	6.	1	2	3	4	5
7.	1	2	3	4	5	8.	1	2	3	4	5	9.	1	2	3	4	5
10.	1	2	3	4	5	11.	1	2	3	4	5	12.	1	2	3	4	5
13.	1	2	3	4	5	14.	1	2	3	4	5	15.	1	2	3	4	5
16.	1	2	3	4	5	17.	1	2	3	4	5	18.	1	2	3	4	5
19.	1	2	3	4	5	20.	1	2	3	4	5						

Unattempte Questions		Correct Answers		Wrong Answers		Marks	

Registration No

PART- B

(Answers should be only in the space provided) **(40 Marks)**

01. (a) Calculate the resultant pH when 200 mL of an aqueous solution of HCl (pH. = 2.0) is mixed with 300 mL of an aqueous solution of NaOH ((pH. = 12.0)?
pH අගය 2.0 වූ HCl අම්ල ද්‍රාවණයක 200 mL ක් හා pH අගය 12.0 වූ NaOH භෂ්ම ද්‍රාවණයක 300 mL ක් මිශ්‍ර කිරීමෙන් ලැබෙන ද්‍රාවණයේ pH අගය ගණනය කරන්න.

(b) At 298 K Calculate the minimum amount of water required to completely dissolve 4.66 g of $BaSO_4$? 298 K දී $BaSO_4$ 4.66 g ක් සම්පූර්ණයෙන්ම ජලයේ දියකිරීම සඳහා අවශ්‍ය අවම ජලය ප්‍රමාණය කොපමණ ද? (K_{sp} of $BaSO_4$= 1.6×10^{-9} mol^2 dm^{-6} Ba =137, S=32 O=16)

(c) Write the IUPAC name of each of the compounds given below .
පහත දී ඇති සංයෝගවල IUPAC නම් ලියන්න.

(i) $CaHPO_4$ (ii) N_2O_5 (iii) Li_2O (iv) $Cr_2(SO_4)_3$

02. (a) Nitrogen react with hydrogen to give ammonia. A mixture of nitrogen and hydrogen is placed in a closed container. The initial concentrations of nitrogen and hydrogen are 0.500 mol dm^{-3} and 1.50 mol dm^{-3} respectively. At equilibrium at 723 K, 25.0% of the original nitrogen has been reacted are consumed.

N_2 වායුව H_2 වායුව ප්‍රතික්‍රියා කිරීමෙන් ඇමෝනියා වායුව ලබා දෙයි. සංවෘත බඳුනක් තුල N_2 වායුව H_2 වායුව සාන්ද්‍රණ පිළිවෙලින් 0.500 mol dm^{-3} 1.50 mol dm^{-3} තබා 723 K දී සමතුලිතතාවය ඇතිවීමට ඉඩ හරින ලදී. 25.0% ක් ප්‍රතික්‍රියා කලේ නම්

(i) Calculate the respective concentrations of nitrogen, hydrogen and ammonia at equilibrium/ සමතුලිත මිශ්‍රණයේ වූ නයිට්‍රජන්, හයිඩ්‍රජන් හා ඇමෝනියා වායුවල සාන්ද්‍රණ ගණනය කරන්න.

(ii) Calculate K_c for the reaction at 723 K / 723 K දී K_c ගණනය කරන්න.

(b) A pure organic substance contained 10.06 %carbon 0.84 % hydrogen and chlorine only
කාබනික සංයෝගයක කාබන් 10.06 % ක් ද හයිඩ්‍රජන් 0.84 % ක්ද ප්‍රතිශතයක් පවතිනම් හා ක්ලෝරීන් පමණක් ඇත්නම් (C=12.0, H=1.0, Cl = 35.5)

(i) Determine the empirical formula of the substance.
කාබනික සංයෝගයේ ආණුභවික සූත්‍රය සොයන්න.

(ii) If the relative molecular mass =119.5 determine the molecular formula ?
සාපේක්ෂ අණුක ස්කන්ධය =119.5 ක් නම් අණුක සූත්‍රය සොයන්න.

(c) Draw the structures of geometrical isomers for the compound of formula C_4H_8
C_4H_8 අණුක සූත්‍රය ඇති සංයෝගය සඳහා ජ්‍යාමිතික සමාවයවිකතාව පෙන්වන වයුහ සමාවයවික අඳින්න.

THE OPEN UNIVERSITY OF SRI LANKA
FOUNDATION COURSE IN SCIENCES – 2014/2015
Assignment Test (CAT) II
CMF 2205 – CHEMISTRY

Date: (Sunday) 16. 11. 2014 Time: 9.30 am – 11.00 am

Instruction to candidates/ பரீட்சார்த்திகளுக்கான அறிவுறுத்தல்கள்

ANSWER ALL QUESTIONS/ எல்லா வினாக்களுக்கும் விடை தருக.

Planck's constant /பிளாங்கின் மாறிலி *(h)* = 6.63×10^{-34} J s

Velocity of light C /ஒளியின் வேகம் *(c)* = 3×10^{8} m s^{-1}

Avogadro constant L /அவகாதரோ மாறிலி *(L)* = 6.022×10^{23} mol^{-1}

Mass of an electron /இலத்திரன் ஒன்றின் திணிவு = 9.11×10^{-31} kg

Charge of an electron/இலத்திரன் ஒன்றின் ஏற்றம் = 1.61×10^{-19} C

- The paper consist of two parts ,Part A (20 MCQ) and Part B (2-structured essay)
  இவ்வினாத்தாள் இரண்டு (02) பகுதிகளைக் கொண்டுள்ளது. பகுதி A (20 MCQ) உம் பகுதி B (2 அமைப்புக் கட்டுரை வகை வினாக்கள்) உம் ஆகும்.
- The use of a non programmble electronic calculator is permitted
  செய்நிரற்படுத்தப்படாத இலத்திரனியல் கணிப்பானைப் பயன்படுத்துவதற்கு அனுமதிக்கப்பட்டுள்ளது.
- Write your Registration number in both papers.
  இரு வினாத்தாள்களிலும் மாணவர் பதிவு இலக்கத்தை எழுதவும்.
- Submit your answers scripts separately.
  உங்களுடைய விடைத்தாள்களைத் தனித்தனியாகச் சமர்ப்பிக்குக.

Part A

- Choose the most correct answer to each question and mark a cross " X " over the answer on the answer sheet.
  ஒவ்வொரு வினாவுக்குமான மிகச்சரியான விடையைத் தெரிவுசெய்து விடைத்தாளின் சரியான விடையின் மேல் புள்ளடி 'X' இடுக.
- Any answer with more than one cross will not be counted.
  ஒன்றிற்கு மேற்பட்ட புள்ளடி இடப்பட்டிருப்பின் அது மதிப்பிடப்படாது.
- Each correct answer will get 3 marks.
  ஒவ்வொரு சரியான விடைக்கும் 03 புள்ளிகள் வழங்கப்படும்.
- 0.5 marks will be deducted for each incorrect answer.
  ஒவ்வொரு பிழையான விடைக்கும் 0.5 புள்ளிகள் கழிக்கப்படும்.

01 . How is dynamic equilibrium defined?
மாறும் சமநிலை எவ்வாறு வரையறுக்கப்படும்.

(1) It is the point at which a reaction stops moving in either the forward or the reverse directions. தாக்கமானது, முன்னோக்கியோ அல்லது பின்னோக்கியோ அசையாது நிறுத்தப்படும் புள்ளியாகும்.
(2) It is the point at which the forward reaction continues, while the reverse reaction stops. முன்னோக்கிய தாக்கம் தொடரவும், பின்நோக்கிய தாக்கம் நிறுத்தப்படும் புள்ளியாகும்.
(3) It is the point at which the concentrations of the products equal the concentrations of the reactants. விளைவுகளினது செறிவு, தாக்கிகளினது செறிவிற்குச் சமமாகக் காணப்படும் புள்ளியாகும்.
(4) It is the point at which the rate of the forward reaction equals the rate of the reverse reaction. முன்னோக்கிய தாக்க வீதம், பின்னோக்கிய தாக்க வீதத்திற்குச் சமமாகக் காணப்படும் புள்ளியாகும்.
(5) It is the point at which the reaction does not take place in any direction. எத்திசையிலும் தாக்கம் நிகழாத புள்ளியாகும்.

02. The density of a gas is 0.075 g cm^{-3}. The density of the gas (in SI units) is வாயுவொன்றின் அடர்த்தியானது 0.075 g cm^{-3} இவ்வடர்த்தியை SI அலகில் தருக.

(1) 7.5×10^{-3} (2) 7.5×10^{3} (3) 7.5×10 (4) 7.5×10^{-6} (5) 1.50×10^{2}

03. Which of the following statements are correct? பின்வரும் கூற்றுக்களில் சரியானது?

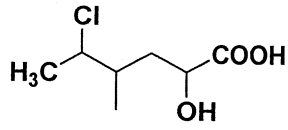
(a) Primary C-atom is bonded to one carbon atom.
முதன்மை காபன் அணுவானது ஒரு காபன் அணுவுடன் பிணைக்கப்பட்டுள்ளது.

(b) Secondary C-atom is bonded to two other carbon atoms.
இரண்டாம் நிலை காபன் அணுவானது வேறு இரு காபன்களுடன் பிணைக்கப்பட்டுள்ளது.

(c) Tertiary C-atom is bonded to three other carbon atoms.
மூன்றாம் நிலை காபன் அணுவானது, வேறு மூன்று காபன்களுடன் பிணைக்கப்பட்டுள்ளது.

(1) a, and b only. (2) b, and c only. (3) a, and c only.
(4) a, b, and c all. (5) a, b, and c all incorrect.

04. The correct IUPAC name of the compound is,
பின்வரும் சேர்வையின் IUPAC பெயரீடு யாது?



(1) 5-choloro-2-hydroxy-4-methylpentanoic acid.

(2) 2-choloro-5-hydroxy-3-methylhexanoic acid.

(3) 2-hydroxy-5-choloro- 4- methylhexanoic acid

(4) 5-choloro-2-hydroxy-4- methylhexanoic acid .

(5) 2-hydroxy-4- methyl-5-cholorohexanoic acid

05. Geometrical isomerism is exhibited by, கட்டமைப்புச் சம பகுதியத்தை காண்பிப்பவை.

(a) 2-Pentene. 2- பென்ரீன் (b) 2-bromopropene. 2- புரோமோபுரோபின்
(c) 1-phenylpropene. 1-பினயில்புரோபின் (d) 2-hydroxy-2-butene. 2-ஹயிட்ரோக்ஸி-2-பியுரின்

(1) (a) (b),(c) and (d) all (2) (a) and (d) only. (3) (b),(c) and (d) only.
(4) (a),(b) and (c) only. (5) (a), (c) and (d) only

06. The group of compounds with the correct order of acidity is.
சரியான அமில வரிசையைக் காண்பிக்கும் சேர்வைகளின் கூட்டம்

(1) $HClO_3 < HClO < HClO_2 < HClO_4$ (2) $HClO < HClO_3 < HClO_2 < HClO_4$

(3) $HClO_4 < HClO < HClO_2 < HClO_3$ (4) $HClO < HClO_2 < HClO_4 < HClO_3$

(5) $HClO < HClO_2 < HClO_3 < HClO_4$

07. A sample of 2 mol of NO_2 was placed in an empty 3 dm^3 container and allowed to reach equilibrium according to the following equation . 2 மூல் NO_2 வானது 3 dm^3 வெற்றுக் கொள்கலன் ஒன்றினுள் இடப்பட்டு, பின்வரும் தாக்கச் சமன்பாட்டிற்கு அமைய சமநிலை அடைய விடப்பட்டது.

$$2NO_{2(g)} \rightleftharpoons N_2O_{4(g)}$$

At equilibrium, y mol of $NO_{2(g)}$ had reacted. What is the value of equilibrium constant, K_C at the temperature of the experiment. சமநிலையில் Y மூல் $NO_{2(g)}$ வானது தாக்கமுற்றது எனின், பரிசோதனை வெப்ப நிலையில் சமநிலை மாறிலி K_C யின் பெறுமானம் யாது?

(1) $\frac{3y}{2(2-y)^2}$ (2) $\frac{4y^2}{4-y^2}$ (3) $\frac{3y}{2(2-y)}$ (4) $\frac{3y^2}{2(2-y)}$ (5) $\frac{2(2-y)^2}{3y}$

08. 0.66 g of an organic compound containing C,H,O gave on combustion 0.99 g of CO_2 and 0.77 g of H_2O The percentage of O in the compound is.
0.66 g சேதனச் சேர்வையானது, C, H, O என்பவற்றை கொண்டது. தகனத்தின் பொழுது 0.99 g CO_2 மற்றும் 0.77 g H_2O விளைவிக்கப்படின், அச்சேர்வையின் O சதவீதம்.

(1) 46.14 % (2) 40.56 % (3) 45.80 % (4) 45.50 (5) 59.44 %

Question number 9 and 10 based on given equilibrium

வினா 9 மற்றும் 10 தரப்பட்ட சமநிலையை அடிப்படையாகக் கொண்டது.

The reaction below reaches equilibrium in a closed reaction vessel of volume 2.50 dm^3
கீழ்வரும் தாக்கமானது 2.50 dm^3 கனவளவு கொண்ட மூடிய குடுவையினுள் சமநிலையடைந்தது.

$$2NO_{(g)} + O_{2(g)} \rightleftharpoons 2NO_{2(g)}$$

At equilibrium, there are 2.80 moles of NO(g), 3.00 moles of O_2(g), and 1.80 moles of NO_2(g). சமநிலையில் 2.80 மூல் NO(g), 3.00 மூல் O_2(g) மற்றும் 1.80 மூல் NO_2(g) காணப்படின்,

09. What is the equilibrium constant, Kc, for the reaction?
இத்தாக்கத்திற்குரிய சமநிலை மாறிலி Kc யாது?

(1) 0.222 (2) 0.183 (3) 0.134 (4) 0.344 (5) 0.337

10. The units for equilibrium constant K_c is சமநிலை மாறிலி K_c யின் அலகு.

(1) mol dm^{-3} (2) mol^{-1} dm^{-3} (3) mol^2 dm^{-6} (4) mol^2 dm^6 (5) mol^{-1} dm^3

11. Consider the following: பின்வருவனவற்றைக் கருதுக.

(**A**) Constant temperature. மாறா வெப்ப நிலை

(**B**) Equal concentrations of reactants and products. சம செறிவுள்ள தாக்கிகள் மற்றும் விளைவுகள்

(**C**) Equal rates of forward and backward reaction. சம வீத முற்தாக்கம் மற்றும் பிற்தாக்கம்

A system at equilibrium must have. சமநிலையிலுள்ள தொகுதி கொண்டிருக்க வேண்டியவை?

(1) (**A**) and (**B**) only (2) (**A**) and (**C**) only (3) (**B**) and (**C**) only

(4) (A), (**B**) and (**C**) (5) None of the above

12. How many moles of H_2SO_4 are present in 2.50 L of a 4.25 mol dm^{-3} aqueous solution?
2.50 L, 4.25 mol dm^{-3} நீர்க்கரைசலிலுள்ள H_2SO_4 வினது மூல் அளவு யாது?

(1) 10.62 (2) 1.75 (3) 6.75 (4) 1.75 (5) 0.11

13. A solution of HNO_3 of unknown concentration was titrated with 0.98 mol dm^{-3} KOH. 22.25 mL of the base was required to neutralize a 10.0 mL sample of acid. Find the concentration of the acid in mol dm^{-3}. The reaction is:
செறிவு அறியப்படாத HNO_3 கரைசல், 0.98 mol dm^{-3} KOH உடன் நியமிக்கப்பட்டது. 10.0 mL அமிலத்தை நடுநிலையாக்குவதற்கு 22.25 mL மூலம் தேவைப்பட்டது எனின், அமிலத்தினது செறிவை mol dm^{-3} யில் தருக. தாக்கமானது,

$$HNO_{3\,(aq)} + KOH_{(q)} \longrightarrow H_2O_{\,(l)} + KNO_{3\,(aq)}$$

(1) 0.21 (2) 2.81 (3) 9.48 (4) 2.18 (5) 0.04

14. 24.0 mL of a 0.1 mol dm^{-3} HNO_3 solution is added to 25.0 mL of a 0.1 mol dm^{-3} NaOH solution. What is the pH of the resultant solution?
24.0 mL , 0.1 mol dm^{-3} HNO_3 கரைசலானது, 25.0 mL, 0.1 mol dm^{-3} NaOH கரைசலினுள் இடப்பட்டால் விளைவுக் கரைசலின் pH யாது?

(1) 1.4 (2) 13.1 (3) 7.4 (4) 10.4 (5) 8.4

15. Solubility product of AgCl in water at 298K is 1.56×10^{-10} mol^2 dm^{-6} What is the weight of AgCl remaining not dissolved when 1.00 g of AgCl is dissolved in 1250 cm^3 of water ?
நீரினுள் 298K ல் AgCl இன் கரைதிறன் விளைவு 1.56×10^{-10} mol^2 dm^{-6} எனின், 1.00 g AgCl ஆனது 1250 cm^3 நீரினுள் கரைக்கப்படுகையில், கரையாது மீதமாகக் காணப்படும் AgCl யின் நிறை யாது?

(1) 0.899 (2) 0 .998 (3) 0.125 (4) 0.156 (5) 0.789

16. What would you expect to happen when propene is bubbled in to Br_2 water ?
புரொப்பீன் ஆனது Br_2 நீரினுள் செலுத்தப்படும் போது யாது நிகழும் என எதிர்பார்க்கின்றீர்கள்?

(1) Evolution of gas/ வாயு வெளிவிடப்படும்
(2) Formation of a white precipitate/ வெண்ணிற வீழ்படிவு உருவாக்கம்
(3) Decolourization of Br_2 water / Br_2 நீரின் நிற நீக்கம்
(4) Red colour solution/ சிவப்பு நிற கரைசல்
(5) Producing heat / வெப்ப உருவாக்கம்

17. Acidified MnO_4^- reacts with H_2O_2 producing O_2, Mn^{2+} and H_2O only. Using the relevant balance equation. The number of moles of MnO_4^- required for the complete reaction of one mole of H_2O_2 in an acidified medium is / அமிலமாக்கப்பட்ட MnO_4^- ஆனது H_2O_2 உடன் தாக்கமடைந்து O_2, Mn^{2+} மற்றும் H_2O வை மட்டுமே விளைவிக்கும். பொருத்தமான சமப்படுத்தப்பட்ட தாக்கத்தைக் கொண்டு ஒரு மூல் H_2O_2 உடன் அமில் ஊடகத்தில் தாக்கமடைய தேவையான MnO_4^- மூல் அளவு யாது?

(1) 0.4 (2) 0.8 (3) 2.5 (4) 2.0 (5) 5.0

18. The solubility of A_2X_5 is y mol dm^{-3} solubility product of A_2X_5
A_2X_5 இனது கரைதிறன் y mol dm^{-3} எனின், A_2X_5 வின் கரைதிறன் விளைவு யாது?

(1) 36 y^6 (2) 126 y^7 (3) 1.25×10^4 y^7 (4) $64 \times 10^4 y^7$ (5) $72 \times 10^4 y^7$

19. Select the suitable indicator in the titration of NaOH against oxalic acid./ NaOH ஆனது ஒட்சாலிக்கமிலத்துடன் (oxalic acid) நியமிக்கப்படுகையில், பயன்படுத்தக்கூடிய மிகப் பொருத்தமான காட்டி யாது?

(1) Methyl red / மெதைல் சிவப்பு (2) Phenolphthalein / பினோப்தலின்
(3) Starch-iodine/ மாப்பொருள் அயடீன் (4) Methyl Orange / மெதைல் இளஞ்சிவப்பு
(5) Self indicator / சுயமான காட்டி

20. Ozone is most likely to react with (add in to)
ஒசோனானது இலகுவாக தாக்கமடையக்கூடியது

(1) $C_2H_4Cl_2$ (2) $C_2H_4Cl_4$ (3) C_2H_6 (4) C_2H_4 (5) $C_2H_4Br_2$

THE OPEN UNIVERSITY OF SRI LANKA

FOUNDATION COURSE IN SCIENCES -2014/ 2015

CMF 2205 – Chemistry I

Assignment Test II Name :- .....

Registration No. | | | | | | | | | |

This question paper consists of 2 **PARTS A & B.**
PART A carries 20 multiple choice questions
PART B carries **two** structured type questions.
ANSWER ALL QUESTIONS

INSTRUCTIONS:

Each item is a statement or question that may be answered by one of the five responses given.

There is only **one best** answer to every question. Mark a cross (**X**) over the most suitable answer. For each correct response, **03** marks will be awarded. For each incorrect response, **0.5** marks will be deducted.

1.	1	2	3	4	5	2.	1	2	3	4	5	3.	1	2	3	4	5
4.	1	2	3	4	5	5.	1	2	3	4	5	6.	1	2	3	4	5
7.	1	2	3	4	5	8.	1	2	3	4	5	9.	1	2	3	4	5
10.	1	2	3	4	5	11.	1	2	3	4	5	12.	1	2	3	4	5
13.	1	2	3	4	5	14.	1	2	3	4	5	15.	1	2	3	4	5
16.	1	2	3	4	5	17.	1	2	3	4	5	18.	1	2	3	4	5
19.	1	2	3	4	5	20.	1	2	3	4	5						

Unattempte Questions		Correct Answers		Wrong Answers		Marks	

Registration No | | | | | | | | | | |

PART- B(Answers should be only in the space provided) (40 Marks)

பகுதி B தரப்பட்ட இடைவெளியில் பதிலளிக்குக.

1(a) Calculate the resultant pH when 200 mL of an aqueous solution of HCl (pH. = 2.0) is mixed with 300 mL of an aqueous solution of NaOH (pH. = 12.0)?

200 mL HCl நீர்க்கரைசலானது (pH. = 2.0) 300 mL NaOH நீர்க்கரைசலுடன் (pH. = 12.0) கலக்கப்படும் பொழுது விளைவுக் கரைசலின் pH பெறுமானத்தைக் கணிக்குக.

(b). At 298 K Calculate the minimum amount of water required to completely dissolve 4.66 g of $BaSO_4$? (K_{sp} of $BaSO_4$= 1.6 x 10^{-9} mol^2 dm^{-6} Ba =137, S=32 O=16)

4.66 g $BaSO_4$ஐ 298 K ல் முற்றாகக் கரைப்பதற்கு தேவையான குறைந்தளவு நீரைக் கணிக்குக. (K_{sp} of $BaSO_4$= 1.6 x 10^{-9} mol^2 dm^{-6} Ba =137, S=32 O=16)

(c) Write the IUPAC name of each of the compounds given below

பின்வரும் சேர்வைகளின் IUPAC பெயரை எழுதுக.

(i) $CaHPO_4$ (ii) N_2O_5 (iii) Li_2O (iv) $Cr_2(SO_4)_3$

2.(a). Nitrogen react with hydrogen to give ammonia. A mixture of nitrogen and hydrogen is placed in a closed container. The initial concentrations of nitrogen and hydrogen are 0.500 mol dm^{-3} and 1.50 mol dm^{-3} respectively. At equilibrium at 723 K, 25.0% of the original nitrogen has been reacted are consumed.

நைதரசனானது, ஐதரசனுடன் தாக்கமுற்று அமோனியாவைத் தரும். நைதரசன் மற்றும் ஐதரசன் கலவையானது ஒரு மூடிய குடுவையில் இடப்பட்டது. ஆரம்பத்தில் நைதரசன் மற்றும் ஐதரசன் செறிவானது முறையே 0.500 mol dm^{-3} மற்றும் 1.50 mol dm^{-3} சமநிலையில் 723 K ல் 25.0% நைதரசன் தாக்கத்திற்குப் பயன்படுத்தப்பட்டது.

(i) Calculate the respective concentrations of nitrogen, hydrogen and ammonia at equilibrium
சமநிலையில் நைதரசன், ஐதரசன் மற்றும் அமோனியாவின் உரிய செறிவைக் கணிக்குக.

(ii) Calculate K_c for the reaction at 723 K
723 K ல் தாக்கத்தின் K_c ஐ கணிக்குக.

(b) A pure organic substance contained 10.06 % carbon, 0.84 % hydrogen and chlorine only (C=12.0, H=1.0, Cl = 35.5)

தூய சேதன பதார்த்தமானது, 10.06% காபன், 0.84% ஐதரசன் மற்றும் குளோரினை மட்டும் கொண்டது. (C=12.0, H=1.0, Cl = 35.5)

(i) Determine the empirical formula of the substance.
பதார்த்தத்தின் அனுபவச் சூத்திரத்தை கண்டறிக.

(ii) If the relative molecular mass =119.5 determine the molecular formula ?
சார்மூலக்கூற்றுத் திணிவு = 119.5 எனின் மூலக்கூற்று சூத்தரம் யாது?

(c) Draw the structures of geometrical isomers for the compound of formula C_4H_8
பின்வரும் சூத்திரச் சேர்வைக்குரிய கட்டமைப்புச் சமபகுதியங்களை வரைக.