

The Open University of Sri Lanka
Foundation Course in Open University of Sri Lanka – 2014/2015
CMF 2206 – CHEMISTRY - Assignment Test (CAT) II



Date: (Sunday) 26th April . 2015

Time: 9.30 am - 11.00 am

Instruction to candidates

- The paper consist of two parts ,Part A (20 MCQ) and Part B (2-structured essay)
- Choose the most correct answer to each question and mark a cross "X" over the answer on the answer sheet.
- Any answer with more than one cross will not be counted.
- Each correct answer will get 3 marks
- 0.5 marks will be deducted for each incorrect answer.
- The use of a non programmable electronic calculator is permitted
- Mobile phones must be switched off and kept away during examination.

විභාග අපේක්ෂකයන් සඳහා උපදෙස්

- ◆ මෙම ප්‍රශ්න පත්‍රය Part A (බහුවරණ 20) සහ Part B (ව්‍යුහගත රචනා 2) යන කොටස් දෙකකින් සමන්විතය.
- ◆ වඩාත්ම සුදුසු පිළිතුර තෝරා උත්තර පත්‍රයේ "X" මගින් සලකුණු කරන්න.
- ◆ එක් පිළිතුරකට වඩා සලකුණු කර ඇති පිළිතුරු සලකා බලනු නොලැබේ.
- ◆ සෑම නිවැරදි පිළිතුරක් සඳහා ලකුණු 3 ක් ලැබේ.
- ◆ සෑම වැරදි පිළිතුරක් වෙනුවෙන් ලකුණු 0.5 ක් අඩු කරනු ලැබේ.
- ◆ ප්‍රක්‍රමණය කළ නොහැකි ගණක යන්ත්‍ර භාවිතා කළ හැක.
- ◆ ජංගම දුරකථන ලග තබා ගැනීම තහනම් වේ.

ANSWER ALL QUESTIONS

සියලුම ප්‍රශ්න සඳහා පිළිතුරු සපයන්න.

PART - A

1. Which one of the following statements **best describes** the standard enthalpy of formation of any element?

පහත දක්වා ඇති කිහිම ප්‍රකාශය මගින් ඕනෑම මූල ද්‍රව්‍යයක උත්පාදන එන්තැල්පිය වඩාත්ම හොඳින් විස්තර කරනු ලබයිද?

- (1) The value of ΔH_f° (element) depends on temperature.
 ΔH_f° (මූල ද්‍රව්‍ය) හි අගය උෂ්ණත්වය මත රඳා පවතී.
- (2) The value of ΔH_f° (element) is zero only for elements in the solid state.
 ΔH_f° හි අගය සහ අවස්ථාවේ පවතින මූල ද්‍රව්‍ය සඳහා ශුන්‍ය වේ.
- (3) The value of ΔH_f° (element) is zero for any element in the standard state.
සම්මත අවස්ථාවේ පවතින මූල ද්‍රව්‍ය සඳහා ΔH_f° (මූල ද්‍රව්‍ය)හි අගය ශුන්‍ය වේ.
- (4) The value of ΔH_f° (element) is zero only at absolute zero temperature.
නිරපේක්ෂ ශුන්‍ය උෂ්ණත්වයේ දී පමණක් ΔH_f° (මූල ද්‍රව්‍ය) හි අගය ශුන්‍ය වේ.
- (5) The value of ΔH_f° (element) depends on S° for that element.
 ΔH_f° (මූල ද්‍රව්‍ය)හි අගය එම මූල ද්‍රව්‍යයේ S° මත රඳා පවතී.

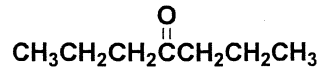
2. Calculate the resistance (in Ω) of a copper wire that is 0.84 km long and has a cross section are of $2.1 \times 10^{-2} \text{ cm}^2$ at 25°C (Resistivity $\rho_{\text{cu}} = 1.6 \times 10^{-8} \Omega \text{ m}$). 25°C දී හරස්කඩ ක්ෂේත්‍රඵලය $2.1 \times 10^{-2} \text{ cm}^2$ සහ දිග 0.84 km වන තඹ කම්බියක ප්‍රතිරෝධය සොයන්න. (විශිෂ්ඨ ප්‍රතිරෝධය $\rho_{\text{cu}} = 1.6 \times 10^{-8} \Omega \text{ m}$)

- (1) 2.2 (2) 6.4 (3) 4.8 (4) 4.0 (5) 6.3

3. The solubility product of the ionic hydroxide $Y(OH)_2$ at room temperature is $5 \times 10^{-10} \text{ mol}^3 \text{ dm}^{-9}$. The OH^- ion concentration in mol dm^{-3} of a saturated aqueous solution of $Y(OH)_2$ at room temperature is කාමරයේ උෂ්ණත්වයේදී $Y(OH)_2$ අයනික හයිඩ්‍රොක්සයිඩයේ ද්‍රාව්‍යතා ගුණිතය $5 \times 10^{-10} \text{ mol}^3 \text{ dm}^{-9}$ වේ. කාමරයේ උෂ්ණත්වයේදී $Y(OH)_2$ සංතෘප්ත ද්‍රාවණයක OH^- අයන සාන්ද්‍රණය (mol dm^{-3}) වන්නේ

- (1) 5×10^{-4} (2) 125×10^{-30} (3) 2.5×10^{-5} (4) 1×10^{-3} (5) 5×10^{-3}

4. The number of signals expected in ^1H NMR spectra for the following compound **P** is



P

ඉහත දක්වා ඇති P සංයෝගයේ ^1H NMR වර්ණාවලියේ බලාපොරොත්තු විය හැකි සංඛ්‍යා ගණන වන්නේ

- (1) 2 (2) 3 (3) 4 (4) 5 (5) None

5. When 25.00 cm^3 of a Na_2CO_3 solution is titrated with an HCl solution (in burette), using phenolphthalein as indicator, the end point was observed at 25.00 cm^3 . When titration was repeated using 25.00 cm^3 of the same HCl solution and the same Na_2CO_3 solution (in burette) and using the same indicator, what will be the observed end point?

Na_2CO_3 ද්‍රාවණයක 25.00 cm^3 ක් බියුරෙට්ටුවක ඇති HCl ද්‍රාවණයක් මගින් පිනොල්ෆ්තලීන් දර්ශකය යොදා අනුමාපනය කළ විට අන්තලක්ෂ්‍යය 25.00 cm^3 දී නිරීක්ෂනය කරන ලදී. එම HCl ද්‍රාවණයේම 25.00 cm^3 ක් භාවිතා කරමින් එම Na_2CO_3 ද්‍රාවණ ය බියුරෙට්ටුවේ යොදා එම දර්ශකය භාවිතා කර අනුමාපනය නැවත සිදුකළ විට ලැබෙන අන්තලක්ෂ්‍යය කුමක්ද?

- (1) 12.50 cm^3 (2) 37.50 cm^3 (3) 50.00 cm^3 (4) 25.00 cm^3
(5) end point cannot be obtained (අන්තලක්ෂ්‍යයක් නොලැබේ)

6. When an electric current is passed through a cell having an electrolyte, the cations move towards the cathode and the anions towards the anode. If the cathode is withdrawn from the solution.

විද්‍යුත් විච්ඡේදයක් අඩංගු කෝෂයක් තුළින් විද්‍යුත් ධාරාවක් ගමන් කරවූ විට කැටායන කැතෝඩය දෙසටද ඇනායන ඇනෝඩය දෙසටද චලනය වේ. කැතෝඩය ද්‍රාවණයෙන් ඉවතට ගත් විට

- (1) Cations will start moving towards the anode : anion will stop moving
කැටායන ඇනෝඩය දෙසට චලනය වීම ආරම්භ කරයි. ඇනායන චලනය වීම නවතී.
(2) Anions will continue to move towards the anode : cations will stop moving
ඇනායන ඇනෝඩය දෙසට චලනය වීම නොකඩවා සිදුවේ. කැටායන චලනය වීම නවතී.
(3) Both cations and the anions will move towards the anode
කැටායන සහ ඇනායන දෙවර්ගයම ඇනෝඩය දෙසට චලනය වේ.
(4) Both cations and anions will start moving randomly
කැටායන සහ ඇනායන දෙවර්ගයම අහඹු ලෙස චලනය වීම ආරම්භ කරයි.
(5) Both cations and the anions will stop moving
කැටායන සහ ඇනායන දෙවර්ගයම චලනය වීම නවතී.

7. 75.0 mL of a 0.2M HCl solution is added to 25.0 mL of a 0.2M NaOH solution. The pH of the resulting solution is about.

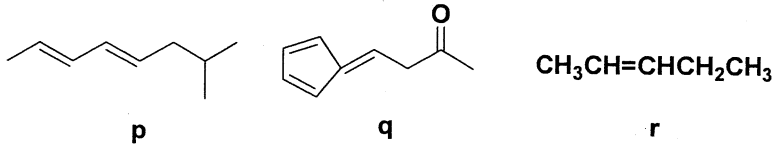
0.2M HCl ද්‍රාවණ 75.0 mL ක් 0.2M NaOH ද්‍රාවණ 25.0 mL කට එකතු කරන ලදී. ලැබෙන ද්‍රාවණයේ pH අගය ආසන්න වශයෙන්

- (1) 13 (2) 0.5 (3) 2.0 (4) 1.5 (5) 1.0

8. Which of the following is a bulk sweetener? පහත දක්වා ඇති කිනම් ද්‍රව්‍යය **bulk sweetener** යක් වේද?

- (1) Sucralose (2) Alitame (3) Cyclamate (4) Acesulfame (5) Xylitol

9. Arrange the following molecules in the decreasing order of their $\lambda_{\max}$.



ඉහත දක්වා ඇති p, q, r අණු ඒවායේ $\lambda_{\max}$ අගය අඩුවනු අනුපිළිවෙලට සකස් කරන්න.

- (1) $q > r > p$ (2) $q > p > r$ (3) $p > q > r$ (4) $r > p > q$ (5) $p > r > q$

10. The dependence of rate constant K of a reaction on the activation energy E is expressed as

ප්‍රතික්‍රියාවක සීඝ්‍රතා නියතය K සක්‍රියතා ශක්තිය E මත රඳා පවතින අන්දම ප්‍රකාශ වන්නේ

- (1) $k = Ae^{E_a/RT}$ (2) $k = Ae^{-E_a/RT}$ (3) $k = Ae^{-E_a/2RT}$ (4) $k = Ae^{-E_a/4RT}$ (5) $k = Ae^{E_a/2RT}$

11. Which of the following is first order reaction ?

පහත දක්වා ඇති කිනම් ප්‍රතික්‍රියාව 1වන පෙළ වන්නේද?

- (1) $2\text{HI} \rightarrow \text{H}_2 + \text{I}$ (2) $2\text{NO}_2 \rightarrow 2\text{NO} + \text{O}_2$
 (3) $2\text{NO} + \text{O}_2 \rightarrow 2\text{NO}_2$ (4) $\text{NH}_4\text{NO}_2 \rightarrow \text{N}_2 + 2\text{H}_2\text{O}$
 (5) None of the above

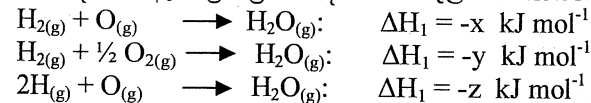
12. Select the **incorrect** statement regarding some apparatus used to carry out titration

අනුමාපණයක් සඳහා භාවිතා කරන උපකරණ වලට සම්බන්ධව සාවද්‍ය ප්‍රකාශය තෝරන්න.

- (1) Pipette is used to transfer a fixed amount of a solution accurately
 පිපෙට්ටුව නියත ද්‍රාවණ ප්‍රමාණයක් නිවැරදිව මාරුකිරීම සඳහා භාවිතා කරනු ලබයි.
 (2) Electronic balance is used for fast and accurate weighing.
 නිවැරදිව සහ කඩිනමින් බර මැනීම සඳහා ඉලෙක්ට්‍රොනික තරාදිය භාවිතා කරනු ලබයි.
 (3) Measuring cylinder is used to deliver variable volumes of a solution accurately.
 විවිධ පරිමා නිවැරදිව නිදහස් කිරීම(deliver) සඳහා මිනුම් සරාච භාවිතා කරනු ලබයි.
 (4) Burette is used to transfer variable amount of a solution up to 50 mL accurately. ද්‍රාවණයක විවිධ ප්‍රමාණයන් 50 mL දක්වා නිවැරදිව මාරුකිරීම සඳහා බියුරෙට්ටුව භාවිතා කරනු ලබයි.
 (5) Volumetric flask is used to make up a certain solution to a specific volume accurately. යම් ද්‍රාවණයක නියමිත පරිමාවක් සාදා ගැනීම සඳහා පරිමාමිතික ප්ලාස්ක්කුව භාවිතා කරනු ලබයි.

13. Consider the enthalpy changes for the three reaction given below.

පහත දක්වා ඇති ප්‍රතික්‍රියා සඳහා එන්තැල්පි වෙනස්වීම් සලකා බලන්න.



The decreasing order of the numerical value of the three enthalpy changes is

එන්තැල්පි වෙනස්වීම් තුනෙහි සංඛ්‍යාත්මක අගයන්ගේ අඩුවීමේ අනුපිළිවෙල වන්නේ

- (1) $z > x > y$ (2) $x > y > z$ (3) $z > y > x$ (4) $x > z > y$ (5) $y > x > z$

14. The pH of a monobasic weak acid solution is 3.0. The pH of the same solution upon dilution of 100 times (at the same temperature) could be.

ඒක භාෂ්මික දුබල අම්ලයක pH අගය වේ. එම ද්‍රාවණය එම උෂ්ණත්වයේදීම 100 වාරයක් තනුකකළ විට pH අගය විය හැක්කේ

- (1) 3 (2) 2.5 (3) 2.0 (4) 5 (5) 6.0

15. Mass spectrum of butane (C_4H_{10}) gives a major peak at $m/e = 43$ What is the fragment responsible for this peak.

(C_4H_{10}) හි ස්කන්ධ වර්ණාවලිය $m/e = 43$ දී major peak ලබාදේ. පහත දක්වා ඇති කිහිපම බන්ධය ඒ සඳහා දායක වේද?

- (1) $[CH_3CH_2CH_2CH_3]^{++}$ (2) $CH_3CH_2CH_2^+$ (3) $CH_3CH_2^+$
(4) $CH_2CH_2CH_3$ (5) $CH_3CH_2CH_3$

16. What is the short hand notation of the fatty acid given below

$CH_3(CH_2)_4CH=CHCH_2CH=CH(CH_2)_7COOH$ දක්වා ඇති මේද අම්ලයේ ලඝු අංකනය වන්නේ කුමක්ද?

- (1) (18:2) 9,12 (2) (18:1) 9,12 (3) (18:3) 6,9,12, (4) (18:2) 6,9 (5) (18:1) 9

17. $-d[A]/dt = k[A][B]^2$ is the rate expression found experimentally at a constant temperature (T) for the reaction $A + B \rightarrow P$, What is the order of the reaction with respect to B

$A + B \rightarrow P$ නම් ප්‍රතික්‍රියාව සඳහා නියත (T) උෂ්ණත්වයේදී සීඝ්‍රතා ප්‍රකාශනය $-d[A]/dt = k[A][B]^2$ බව පරීක්ෂණාත්මකව සොයා ගන්නා ලදී. B ට සාපේක්ෂව ප්‍රතික්‍රියාවේ පෙල කුමක්ද?

- (1) 3 (2) 2 (3) 1 (4) 0 (5) -2

18. Which of the compound react/reacts separately with (i) 2,4-dinitrophenylhydrazine and (ii) ammoniacal $AgNO_3$

(i) 2,4-dinitrophenylhydrazine සහ (ii) ඇමෝනියා $AgNO_3$ සමඟ වෙන් වෙන් වශයෙන් ප්‍රතික්‍රියා කරන සංයෝගය කුමක්ද?

- (1) CH_3COCH_3 (2) $CH_3C \equiv CH$ (3) CH_3COH (4) $CH_3C \equiv CCH_3$
(5) None of the above (ඉහත දක්වා ඇති කිසිවක් නොවේ.)

19. A 0.33g of sample of $Pb(NO_3)_2$ contaminated with $NaNO_3$ was dissolved in 100.0 cm^3 of water. Excess H_2S gas was then bubbled through this solution until the precipitation was complete. The mass of the dried precipitate was 0.20 g The percent purity (w/w) of the sample is approximately, (N=14, O=16, S=32, Pb=207)

$NaNO_3$ අපද්‍රව්‍ය වශයෙන් ඇති $Pb(NO_3)_2$ නියැදියක 0.33g ක් ජලය 100.0 cm^3 ක ද්‍රාවණය කරන ලදී. අවක්ෂේපණය වීම සම්පූර්ණවන තුරු මෙම ද්‍රාවණය තුළින් වැඩිපුර H_2S වායුව බුබුලනය කරන ලදී. විශලන ලද අවක්ෂේපයේ ස්කන්ධය 0.20 g විය. නියැදියේ සංශුද්ධතාවය(w/w) ආසන්න වශයෙන්

- (1) 16 (2) 47 (3) 68 (4) 79 (5) 84

20. Out of the following, which is least likely to affect the conductivity of a solution of

electrolyte? පහත දැක්වෙන දෑ අතරින් ද්‍රාවණයක සන්නායකතාවය සඳහා අවම බලපෑමක් කරන්නේ කුමක්ද?

- (1) Size of the ions අයනයේ තරම (2) Pressure පීඩනය (3) Temperature උෂ්ණත්වය
(4) Concentration සාන්ද්‍රණය (5) Nature of electrolyte විද්‍යුත් විච්ඡේදනයේ ස්වභාවය

The Open University of Sri Lanka
Foundation Course in Open University of Sri Lanka – 2014/ 2015
CMF 2206 – Chemistry
Assignment Test II



Index No.

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Name :-

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.

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
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| 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | |
| 10. <table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr></table> | 1 | 2 | 3 | 4 | 5 | 11. <table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr></table> | 1 | 2 | 3 | 4 | 5 | 12. <table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr></table> | 1 | 2 | 3 | 4 | 5 |
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| 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | |
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| 16. <table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr></table> | 1 | 2 | 3 | 4 | 5 | 17. <table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr></table> | 1 | 2 | 3 | 4 | 5 | 18. <table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr></table> | 1 | 2 | 3 | 4 | 5 |
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| 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | |
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| 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | |

Unattempted
Questions

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Correct
Answers

--

Wrong
Answers

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Marks

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PART - B

1.(a) .Consider the electrochemical cell containing standard Cu and the Au electrodes at 298 K when the e.m.f. of the two electrodes are $E_{Cu^{2+}/Cu(s)}^{\theta} = +0.34V$, $E_{Au^{2+}/Au(s)}^{\theta} = +1.50V$

298 K දී සම්මත Cu සහ Au ඉලෙක්ට්‍රෝඩ අන්තර්ගත විද්‍යුත් රසායනික කෝෂයක් සලකා බලන්න. ඉලෙක්ට්‍රෝඩ දෙකෙහි වි.ගා.බ වන්නේ $E_{Cu^{2+}/Cu(s)}^{\theta} = +0.34V$ $E_{Au^{2+}/Au(s)}^{\theta} = +1.50V$

(i) Draw the cell diagram. කෝෂ සටහන අඳින්න.

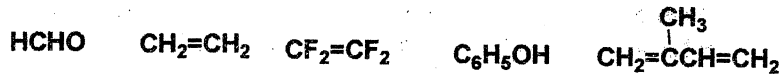
(ii) What is the anode? ඇනෝඩය කුමක්ද?

(iii) What is the cathode ? කැතෝඩය කුමක්ද?

(iv) Write down the half cell reactions and the overall reaction for above cell. ඉහත කෝෂය සඳහා අර්ධ කෝෂ ප්‍රතික්‍රියා සහ සම්පූර්ණ කෝෂ ප්‍රතික්‍රියා ලියා දක්වන්න.

(v) Calculate the electromotive force (e.m.f) at 298 K. දී විද්‍යුත් ගාමක බලය ගණනය කරන්න.

(b) Some chemical compounds relevant to the environment industry are listed below. පරිසර කර්මාන්ත වලට අදාළ වන ඇතැම් සංයෝගවල ලේඛනයක් පහත දක්වා ඇත.



Considering only the polymers manufactured from one or more of these compounds answer the following ඉහත දක්වා ඇති ද්‍රව්‍ය එකක් හෝ වැඩි ගණනකින් පමණක් නිෂ්පාදනය කරනු ලබන බහු අවයවික සලකා බලමින් පහත දක්වා ඇති ප්‍රශ්න වලට පිළිතුරු ලියන්න.

- Give the names of **three** commonly used polymers. සාමාන්‍යයෙන් භාවිතයට ගනු ලබන බහු අවයවික තුනක් නම් කරන්න.
- Give one example of thermosetting polymer. තාපස්ථාපන බහු අවයවිකයක් සඳහා උදාහරණයක් දෙන්න.
- Draw the structure of a repeat unit of the polymer which is most resistant to heat. වැඩිම තාප ප්‍රතිරෝධකතාවය දක්වන බහු අවයවිකයේ පුනරාවර්ත ඒකකයේ (repeat unit) ව්‍යුහය අඳින්න.
- According to the collision theory name two (2) factors that must be satisfied for a chemical reaction to take place. සංඝට්ටන වාදයට අනුව රසායනික ප්‍රතික්‍රියාවක් සිදුවීම සඳහා තෘප්ත කළ යුතු සාධක දෙකක් නම් කරන්න.

- Calculate the standard enthalpy change for the formation enthalpy of $\text{CS}_{2(l)}$ හි උත්පාදන එන්තැල්පිය සඳහා වන සම්මත එන්තැල්පි වෙනස ගණනය කරන්න.

$$\begin{aligned} \text{C}_{(s)} + \text{O}_{2(g)} &\longrightarrow \text{CO}_{2(g)} & \Delta H &= -395 \text{ kJ mol}^{-1} \\ \text{S}_{(s)} + \text{O}_{2(g)} &\longrightarrow \text{SO}_{2(g)} & \Delta H &= -295 \text{ kJ mol}^{-1} \\ \text{CS}_{2(l)} + 3\text{O}_{2(g)} &\longrightarrow \text{CO}_{2(g)} + \text{SO}_{2(g)} & \Delta H &= -1110 \text{ kJ mol}^{-1} \end{aligned}$$

(b) To a 50 cm³ of 0.01M AgNO₃ solution, 0.01 M K₂CrO₄ was added. Calculate the volume of 0.01 M K₂CrO₄ added to complete the precipitation of Ag₂CrO₄.

0.01M AgNO₃ ද්‍රාවණයක 50 cm³ කට 0.01 M K₂CrO₄ එක් කරන ලදී. Ag₂CrO₄

අවක්ෂේපනය කිරීම සම්පූර්ණව සිදු කිරීම සඳහා අවශ්‍ය වන 0.01 M K₂CrO₄ පරිමාව ගණනය කරන්න.

Registration No :

Name :

Address:

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The Open University of Sri Lanka
Foundation Course in Open University of Sri Lanka – 2014/2015
CMF 2206 – CHEMISTRY - Assignment Test (CAT) II



Date: (Sunday) 26th April. 2015

Time: 9.30 am - 11.00 am

Instruction to candidates

- The paper consist of two parts ,Part A (20 MCQ) and Part B (2-structured essay)
- Choose the most correct answer to each question and mark a cross "X" over the answer on the answer sheet.
- Any answer with more than one cross will not be counted.
- Each correct answer will get 3 marks
- 0.5 marks will be deducted for each incorrect answer.
- The use of a non programmable electronic calculator is permitted
- Mobile phones must be switched off and kept away during examination.

பரீட்சார்த்திகளுக்கான அறிவுறுத்தல்கள்

- இவ்வினாத்தாள் இரு பகுதிகளைக் கொண்டது, பகுதி A(20 MCQ), பகுதி B(2 அமைப்புக் கட்டுரை)
- ஒவ்வொரு வினாவுக்குமான மிகத்திருத்தமான விடையைத் தெரிவுசெய்து விடைத்தாளில் சரியான விடை இலக்கத்தின் மேல் புள்ளி "X" இடுக.
- ஒன்றிற்கு மேற்பட்ட புள்ளி இடப்பட்ட எந்த ஒரு விடையும் கணக்கிடப்படாது.
- ஒவ்வொரு சரியான விடைக்கும் மூன்று புள்ளிகள் வழங்கப்படும்.
- ஒவ்வொரு பிழையான விடைக்கும் 0.5 புள்ளிகள் கழிக்கப்படும்.
- செயல் நிரற்படுத்தப்படாத இலத்திரனியல் கணிப்பானது பாவனை அனுமதிக்கப்படும்.
- பரீட்சையின் போது கையடக்கத் தொலைபேசிகள் நிறுத்தி வைக்கப்படவேண்டும்.

ANSWER ALL QUESTIONS

எல்லா வினாக்களிற்கும் விடையளிக்குக

PART - A

1. Which one of the following statements **best describes** the standard enthalpy of formation of any element?

கீழே தரப்பட்ட தரவுகளில் ஒரு மூலகம் ஒன்றின் நியமத் தோன்றல் வெப்ப உள்ளுறை பற்றி மிகச் சரியாக விபரிப்பது,

- (1) The value of $\Delta H^\circ_f(\text{element})$ depends on temperature.
 ΔH°_f வெப்பநிலையில் தங்கியுள்ளது.
- (2) The value of $\Delta H^\circ_f(\text{element})$ is zero only for elements in the solid state.
 ΔH°_f ன் பெறுமதி திண்ம நிலையில் உள்ள மூலகங்களிற்கு மாத்திரம் 0 ஆகும்.
- (3) The value of $\Delta H^\circ_f(\text{element})$ is zero for any element in the standard state.
நியம நிலையில் உள்ள எந்த ஒரு மூலகத்தினதும் ΔH°_f 0 ஆகும்.
- (4) The value of $\Delta H^\circ_f(\text{element})$ is zero only at absolute zero temperature.
 ΔH°_f ன் பெறுமதி நியம பூச்சிய வெப்பநிலையில் மாத்திரம் 0 ஆகும்.
- (5) The value of $\Delta H^\circ_f(\text{element})$ depends on S° for that element.
 ΔH°_f ன் பெறுமதி அந்த மூலகத்தின் S° ல் தங்கியுள்ளது.

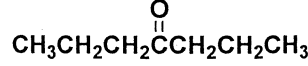
2. Calculate the resistance (in Ω) of a copper wire that is 0.84 km long and has a cross section are of $2.1 \times 10^{-2} \text{ cm}^2$ at 25°C (Resistivity $\rho_{\text{cu}} = 1.6 \times 10^{-8} \Omega \text{ m}$).

25° ல் 0.84 km நீளமும் $2.1 \times 10^{-2} \text{ cm}^2$ குறுக்குவெட்டுப்பரப்பையும் கொண்டுள்ள செப்பு வயர் ஒன்றின் தடையை Ω ல் கணிக்க.

- (1) 2.2 (2) 6.4 (3) 4.8 (4) 4.0 (5) 6.3

3. The solubility product of the ionic hydroxide $Y(OH)_2$ at room temperature is $5 \times 10^{-10} \text{ mol}^3 \text{ dm}^{-9}$. The OH^- ion concentration in mol dm^{-3} of a saturated aqueous solution of $Y(OH)_2$ at room temperature is அறை வெப்பநிலையில் அயன் ஐதரொட்சைட்டு $Y(OH)_2$ ன் கரைதிறன் பெருக்கம் $5 \times 10^{-10} \text{ mol}^3 \text{ dm}^{-9}$ அறைவெப்பநிலையில் $Y(OH)_2$ ன் நிரம்பல் நீர்க்கரைசலில் OH^- ன் செறிவு mol dm^{-3} ல்
 (1) 5×10^{-4} (2) 125×10^{-30} (3) 2.5×10^{-5} (4) 1×10^{-3} (5) 5×10^{-3}

4. The number of signals expected in ^1H NMR spectra for the following compound **P** is



P

கீழே தரப்பட்ட மூலக்கூறு **P** ற்கு ^1H NMR நிறமாலையில் எதிர்பார்க்கப்படும் signal களின் எண்ணிக்கை.

- (1) 2 (2) 3 (3) 4 (4) 5 (5) None

5. When 25.00 cm^3 of a Na_2CO_3 solution is titrated with an HCl solution (in burette), using phenolphthalein as indicator, the end point was observed at 25.00 cm^3 . When titration was repeated using 25.00 cm^3 of the same HCl solution and the same Na_2CO_3 solution (in burette) and using the same indicator, what will be the observed end point?

25.00 cm^3 Na_2CO_3 கரைசல் HCl கரைசலுடன் (குழாயியில்) பிளோப்தலின் காட்டியாக உள்ள போது நியமிக்கப்பட்ட போது முடிவுப்புள்ளி 25.00 cm^3 ஆக இருந்தது. 25.00 cm^3 அதே HCl கரைசலானது அதே Na_2CO_3 கரைசலுடன் (குழாயியில்) அதே காட்டி உபயோகிக்கப்பட்ட போது அவதானிக்கப்பட்ட முடிவுப்புள்ளியானது,

- (1) 12.50 cm^3 (2) 37.50 cm^3 (3) 50.00 cm^3 (4) 25.00 cm^3
 (5) End point cannot be obtained முடிவுப்புள்ளி பெறமுடியாது.

6. When an electric current is passed through a cell having an electrolyte, the cations move towards the cathode and the anions towards the anode. If the cathode is withdrawn from the solution.

மின்பகு பொருளைக் கொண்ட ஒரு கலத்தினூடாக மின்னோட்டம் செலுத்தப்படுகின்ற போது கற்றயன்கள் கதோட்டை நோக்கியும் அன்னயன்கள் அனோட்டை நோக்கியும் அசைகின்றது. நீர்க் கரைசலில் இருந்து கதோட் வெளியேற்றப்படுகின்ற போது

- (1) Cations will start moving towards the anode : anion will stop moving
 கற்றயன்கள் அனோட்டை நோக்கி அசைய ஆரம்பிக்கும் அன்னயன் அசைவு நிறுத்தப்படும்
 (2) Anions will continue to move towards the anode : cations will stop moving
 அன்னயன்கள் கதோட்டை நோக்கி அசைய ஆரம்பிக்கும் கற்றயன்களின் அசைவு நிறுத்தப்படும்
 (3) Both cations and the anions will move towards the anode
 கற்றயன் அன்னயன் இரண்டும் அனோட்டை நோக்கி நகரும்
 (4) Both cations and anions will start moving randomly
 கற்றயன் அன்னயன் இரண்டும் எழுந்தமானமாக அசைய ஆரம்பிக்கும்
 (5) Both cations and the anions will stop moving
 கற்றயன் அன்னயன் இரண்டினதும் அசைவு நிறுத்தப்படும்

7. 75.0 mL of a 0.2M HCl solution is added to 25.0 mL of a 0.2M NaOH solution. The pH of the resulting solution is about.

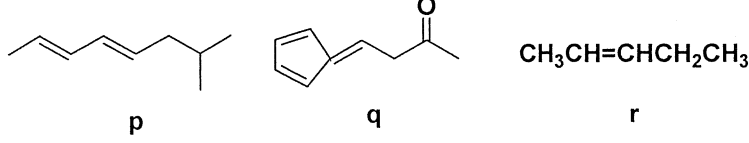
75.0 mL 0.2M HCl கரைசலானது 25.0 mL 0.2M NaOH கரைசலினுள் சேர்க்கப்படுகின்றது விளைவுக் கரைசலின் pH

- (1) 13 (2) 0.5 (3) 2.0 (4) 1.5 (5) 1.0

8. Which of the following is a bulk sweetener? பின்வருவனவற்றுள் **bulk sweetener** எது?

- (1) Sucralose (2) Alitame (3) Cyclamate (4) Acesulfame (5) Xylitol

9. Arrange the following molecules in the decreasing order of their $\lambda_{\max}$.



பின்வரும் மூலக்கூறுகளை $\lambda_{\max}$ குறையும் ஒழுங்கில் ஒழுங்குபடுத்துக

- (1) $q > r > p$ (2) $q > p > r$ (3) $p > q > r$ (4) $r > p > q$ (5) $p > r > q$

10. The dependence of rate constant K of a reaction on the activation energy E is expressed as

ஒரு தாக்கத்திற்கான தாக்க மாறிலி K ஆனது அதனுடைய ஏவற்சக்தி E உடன் தொடர்புபட்டுள்ள சமன்பாடு

- (1) $k = Ae^{E_a/RT}$ (2) $k = Ae^{-E_a/RT}$ (3) $k = Ae^{-E_a/2RT}$ (4) $k = Ae^{-E_a/4RT}$ (5) $k = Ae^{E_a/2RT}$

11. Which of the following is first order reaction ?

பின்வருவனவற்றில் எது முதலாம் வரிசைத் தாக்கம்

- (1) $2HI \rightarrow H_2 + I_2$ (2) $2NO_2 \rightarrow 2NO + O_2$
 (3) $2NO + O_2 \rightarrow 2NO_2$ (4) $NH_4NO_2 \rightarrow N_2 + 2H_2O$
 (5) None of the above

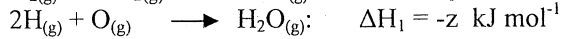
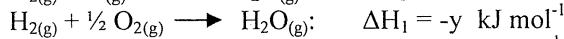
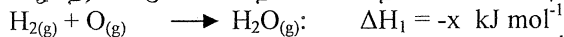
12. Select the **incorrect** statement regarding some apparatus used to carry out titration

நியமித்தல் செயன்முறையின் போது பயன்படுத்தப்படும் உபகரணங்கள் பற்றிய பிழையான கூற்று

- (1) Pipette is used to transfer a fixed amount of a solution accurately
 அளவியானது குறிப்பிட்டளவான கரைசலை திருத்தமாக பரிமாற்றுவதற்குப் பயன்படுகிறது
 (2) Electronic balance is used for fast and accurate weighing.
 இலத்திரனியல் தராசு விரைவானதும் திருத்தமானதுமான அளவீட்டுக்குப் பயன்படுகிறது
 (3) Measuring cylinder is used to deliver variable volumes of a solution accurately.
 அளவுச்சாடியானது வேறுபட்ட கனவளவுகளைக் கொண்ட கரைசல்களைத் திருத்தமாக விநியோகிப்பதற்கு பயன்படுகிறது
 (4) Burette is used to transfer variable amount of a solution up to 50 mL accurately.
 குழாயி வேறுபட்டளவான கரைசல்களை 50ml வரை திருத்தமாகப் பரிமாற்றுவதற்குப் பயன்படுகிறது
 (5) Volumetric flask is used to make up a certain solution to a specific volume accurately. ஐஐ
 கனவளவுக் குடுவையானது ஒரு குறிப்பிட்ட கரைசலை ஒரு குறிப்பிட்ட கனவளவிற்கு திருத்தமாகத் உருவாக்குவதற்கு பயன்படுகிறது

13. Consider the enthalpy changes for the three reaction given below.

கீழே தரப்பட்டுள்ள 3 தாக்கங்களிற்கான வெப்பவளஞ்ஞறை மாற்றங்களைத் கருதுக



The decreasing order of the numerical value of the three enthalpy changes is

3 வெப்பவளஞ்ஞறை மாற்றங்களிற்கான எண் பெறுமதி குறைந்துசெல்லும் ஒழுங்கு

- (1) $z > x > y$ (2) $x > y > z$ (3) $z > y > x$ (4) $x > z > y$ (5) $y > x > z$

14. The pH of a monobasic weak acid solution is 3.0. The pH of the same solution upon dilution of 100 times (at the same temperature) could be.

ஒருகார மென்னமில கரைசலின் PH 3.0 அதே PH உடைய அதே கரைசல் 100 தடவைகள் ஐதாக்கப்படுகின்ற போது(சம வெப்பநிலையில்) அதன் PH ஆனது

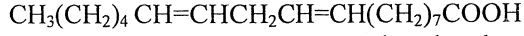
- (1) 3 (2) 2.5 (3) 2.0 (4) 5 (5) 6.0

15. Mass spectrum of butane (C_4H_{10}) gives a major peak at $m/e = 43$ What is the fragment responsible for this peak.

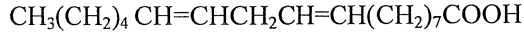
(C_4H_{10}) இனது திணிவு நிறமாலை ஒரு பிரதான peak ஐ $m/e = 43$ ல் கொடுக்கிறது இந்தப் peak ற்கு பொறுப்பான கட்டமைப்பு

- (1) $[CH_3CH_2CH_2CH_3]^+ \cdot$ (2) $CH_3CH_2CH_2^+$ (3) $CH_3CH_2^+$
(4) $CH_2CH_2CH_3$ (5) $CH_3CH_2CH_3$

16. What is the short hand notation of the fatty acid given below



கீழே தரப்பட்ட கொழுப்பமிலத்தின் short hand notation எது?



- (1) (18:2) 9,12 (2) (18:1) 9,12 (3) (18:3) 6,9,12, (4) (18:2) 6,9 (5) (18:1) 9

17. $-d[A]/dt = k[A][B]^2$ is the rate expression found experimentally at a constant temperature (T) for the reaction $A + B \rightarrow P$, What is the order of the reaction with respect to B

$A + B \rightarrow$ இத்தாக்கத்திற்கான தாக்கச் சமன்பாடு (மாறா வெப்பநிலையில்) $-d[A]/dt = k[A][B]^2$ B தொடர்பாக தாக்கத்தின் தாக்கவரிசை

- (1) 3 (2) 2 (3) 1 (4) 0 (5) -2

18. Which of the compound react/reacts separately with (i) 2,4-dinitrophenylhydrazine and (ii) ammoniacal $AgNO_3$

பின்வரும் மூலக்கூறுகளில் 2,4-dinitrophenylhydrazine உடனும் ammoniacal $AgNO_3$ உடனும் தனித்தனியாகத் தாக்கமடையும் மூலக்கூறு

- (1) CH_3COCH_3 (2) $CH_3C \equiv CH$ (3) CH_3COH (4) $CH_3C \equiv CCH_3$
(5) None of the above மேற்கூறிய எதுவுமல்ல

19. A 0.33g of sample of $Pb(NO_3)_2$ contaminated with $NaNO_3$ was dissolved in 100.0 cm^3 of water. Excess H_2S gas was then bubbled through this solution until the precipitation was complete. The mass of the dried precipitate was 0.20 g The percent purity (w/w) of the sample is approximately, (N=14, O=16, S=32, Pb=207)

$NaNO_3$ உடன் கலக்கப்பட்டுள்ள ஒரு $Pb(NO_3)_2$ மாதிரியின் 0.33g ஆனது 100.0 cm^3 நீரில் கரைக்கப்படுகிறது பின்னர் H_2S வாயுவானது வீழ்படிவு முழுமையாகும் வரை இக்கரைசலூடாகச் செலுத்தப்பட்டது வீழ்படிவின் உலர்நிலைவானது 0.20 g ஆக இருந்தது. ஆந்த மாதிரியின் தூய்மை வீதம்(w/w) அண்ணளவாக

- (1) 16 (2) 47 (3) 68 (4) 79 (5) 84

20. Out of the following ,which is least likely to affect the conductivity of a solution of electrolyte ?

கீழ் வருவனவற்றுள் மின்பகுபொருள் கரைசல் ஒன்றின் கடத்து திறனை மிகக்குறைந்தளவில் பாதிக்கும் காரணி

- (1) Size of the ions அயனின் பருமன் (2) Pressure அழுக்கம் (3) Temperature வெப்பநிலை
(4) Concentration செறிவு (5) Nature of electrolyte மின்பகு பொருளின் தன்மை



Index No.

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Name :-

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.

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| 1. <table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr></table> | 1 | 2 | 3 | 4 | 5 | 2. <table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr></table> | 1 | 2 | 3 | 4 | 5 | 3. <table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr></table> | 1 | 2 | 3 | 4 | 5 |
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| 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | |

Unattempted Questions

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Correct Answers

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Wrong Answers

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Marks

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PART – B

1.(a) .Consider the electrochemical cell containing standard Cu and the Au electrodes at 298 K when the e.m.f. of the two electrodes are $E^{\theta}_{Cu^{2+}/Cu(s)} = +0.34V$, $E^{\theta}_{Au^{2+}/Au(s)} = +1.50V$,

298 K ல் மின்னிரசாயனக் கலம் நியம Cu மின்வாயையும் நியம Au மின்வாயையும் கொண்டுள்ள போது இவ்விரு மின்வாயினதும் e.m.f ஆனது $E^{\theta}_{Cu^{2+}/Cu(s)} = +0.34V$ $E^{\theta}_{Au^{2+}/Au(s)} = +1.50V$

எனவும் கருதுக

(i) Draw the cell diagram. கலவரைபடத்தை வரைக

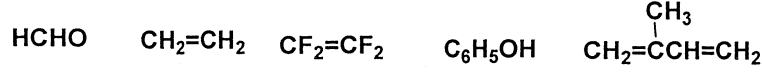
(ii) What is the anode? அனோட்டு எது?

(iii) What is the cathode ? கதோட்டு எது?

(iv) Write down the half cell reactions and the overall reaction for above cell. மேற்கூறப்பட்ட கலத்திற்கான அரைக்கலத் தாக்கங்களையும் முழுத்தாக்கத்தையும் எழுதுக.

(v) Calculate the electromotive force (e.m.f) at 298 K. மின்னசைவு விசை (e.m.f) ஐ 298K ல் கணிக்க

(b) Some chemical compounds relevant to the environment industry are listed below. (சூழல் தொழிற்சாலைகளுடன் தொடர்புபட்ட சில இரசாயன மூலக்கூறுகள் கீழே தரப்பட்டுள்ளன.



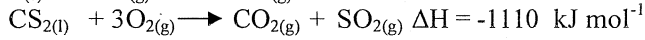
Considering only the polymers manufactured from one or more of these compounds answer the following

தரப்பட்ட மூலக்கூறுகளில் இருந்து உருவாக்கப்படும் பல் பகுதியங்களை மட்டும் கருத்திற்கொண்டு விடையளிக்குக

- (i) Give the names of **three** commonly used polymers. பொதுவாகப் பாவிக்கப்படுகின்ற பல்பகுதியங்கள் 3ன் பெயரைத் தருக
- (ii) Give one example of thermosetting polymer. thermosetting polymer ந்கு ஒரு உதாரணம் தருக
- (iii) Draw the structure of a repeat unit of the polymer which is most resistant to heat. வேப்பத்திற்கு மிகவும் தடைத்திறமான பல்பகுதியத்தின் மீழும் அலகு(repeat unit) ந்குரிய கட்டமைப்பை வரைக
- (c) According to the collision theory name two (2) factors that must be satisfied for a chemical reaction to take place.
மோதல் கொள்கையின்படி ஒரு இரசாயனத் தாக்கம் நிகழ்வதற்கு திருப்தியளிக்க வேண்டிய இரு காரணிகளைப் பெயரிடுக

2. (a) Calculate the standard enthalpy change for the formation enthalpy of $\text{CS}_{2(l)}$

$\text{CS}_{2(l)}$ ன் வெப்பத்தோன்றலிற்கான வெப்ப உள்ளுறை மாற்றத்தைக் கணிக்க



(b) To a 50 cm³ of 0.01M AgNO₃ solution, 0.01 M K₂CrO₄ was added. Calculate the volume of 0.01 M K₂CrO₄ added to complete the precipitation of Ag₂CrO₄.
0.01M 50 cm³ AgNO₃ கரைசலினுள் 0.01M K₂CrO₄ சேர்க்கப்பட்டது. Ag₂CrO₄ வீழ்படிவு முழுமையாக்குவதற்கு நீர்க்கப்பட்ட 0.01 M K₂CrO₄ ன் கனவளவைக் கணிக்க.

Registration No :

Name :

Address:

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