



ශ්‍රී ලංකා විවෘත විශ්වවිද්‍යාලය
විද්‍යාවේදී සහතික පත්‍ර පදනම් පාඨමාලාව - 2012/2013

අඛණ්ඩ ඇගයීම් පරීක්ෂණය - II

CMF 2206 – රසායන විද්‍යාව - II

කාලය - පැය 01 විනාඩි 30 යි.

දිනය - 2013 ජූලි 26 වන සිකුරාදා දින

වේලාව - පෙ.ව. 02.30 - ප.ව. 04.00 දක්වා

This question paper consists of two parts, Part A (MCQ) and Part B (Structured)

Part A (40%)

- ☒ Answer all 20 questions
- ☒ Use a **PEN** (not a PENCIL) in answering.
- ☒ Any answer with more than **one** "X" marked will be considered as an *incorrect* answer.
- ☒ For each correct response 2 marks will be awarded. Marks will be deducted for incorrect answers. (0.3 per wrong answer).

Part B (60%)

- Answer all (02) questions in the space provided.
- ☒ The use of a non-programmable electronic calculator is permitted.
- ☒ You are **NOT allowed** to keep Mobile phones with you during the examination; **Switch off** and leave them out.

Gas constant (R) = $8.314 \text{ J mol}^{-1} \text{ K}^{-1}$, Avogadro constant (L) = $6.023 \times 10^{23} \text{ mol}^{-1}$

සියළුම ප්‍රශ්නවලට පිළිතුරු සපයන්න.

A - කොටස(40%)

01. ස්වභාවික රබර් පිළිබඳ පහත සඳහන් වගන්ති සලකා බලන්න.
- a. ස්වභාවික රබර්වලින් කාදා ඇති වයර් චාතයෙහි දූෂණය කරන විට SO_2 සහ CO_2 යන වායූන් පිටවේ.
 - b. ස්වභාවික රබර් ප්‍රොපිනිවලින් සැදුණු බහු අවයවිකයක් වේ.
 - c. එයට ට්‍රාන්ස් ආකාරයේ ද්විත්ව බන්ධන පවතී.
 - d. චල්කනය කරන ලද රබර්වල හරස් සල්ෆර් දාම පවතී.

නිවැරදි වගන්තිය/වගන්ති වනුයේ,

1. a සහ b 2. b සහ c 3. c සහ d 4. a සහ d 5. a පමණි.

02. පුනරාවර්තන ඒකක අඩංගු පොලි ප්‍රොපිලින් දාමයෙහි මවුලික ස්කන්ධය වනුයේ

1. 4200 g mol^{-1} 2. 28 g mol^{-1} 3. 4000 g mol^{-1} 4. 2800 g mol^{-1} 5. 42 g mol^{-1}

03. න්‍යෂ්ටික අම්ල පිළිබඳ කුමන වගන්තිය නිවැරදි වේද?

1. මහ අණු වේ.
2. නියුක්ලියෝටයිඩ න්‍යෂ්ටික අම්ලවල ඒක අවයවික වේ.
3. නියුක්ලියෝටයිඩවල ග්ලුකෝස්/සීනි හස්ම සහ පොස්පේට් කාණ්ඩයක් අන්තර්ගත වේ.
4. නියුක්ලියෝටයිඩ න්‍යෂ්ටික අම්ලවල පුනරාවර්ත ඒකකය වේ.
5. සෛලයක න්‍යෂ්ටියෙහි අන්තර්ගත න්‍යෂ්ටික අම්ල වනුයේ RNA හා DNA වේ.

04. Bulk sweetener (බිලක්ස්ටිටන්) වනුයේ

1. සැකරින් (Saccharin)
2. ඇස්පාටමී (Aspartame)
3. සෝබිටෝල් (Sorbitol)
4. සුක්‍රලෝස් (Sucralose)
5. සයික්ලමේට් (Cyclamate)

05. ප්‍රෝටීන සහ ඇමයිනෝ අම්ල පිළිබඳ වැරදි වගන්තිය වනුයේ,

1. සියලුම ඇමයිනෝ අම්ල ප්‍රකාශ සක්‍රිය නොවේ.
2. ප්‍රෝටීන හා සම්බන්ධවන්නේ α ඇමයිනෝ අම්ල පමණක් වේ.
3. ප්‍රෝටීනවල ඉහළ සාපේක්ෂ අණුක ස්කන්ධයක් පවතී.
4. ඇමයිනෝ අම්ල ද්වි ක්‍රියාකාරී අණුක වේ.
5. ප්‍රෝටීන -D-ඇමයිනෝ අම්ල සමග පමණක් සම්බන්ධ වේ.

06. මේවායින් ආකලන ඛනුඅවයවිකයක් වනුයේ අංශ දාම නොමැති සහ තාප ස්ථිකාරය ඛනු අවයවික වන

1. නයිලෝන්
2. පොලියස්ටර්
3. PVC
4. ෆිනෝල්ෆෝමැල්ඩිහයිඩ්
5. වල්කනයිස් කරන ලද රබර්

07. $(18:1)_{\omega 9}$ වන මේද අම්ලයේ රසායනික ව්‍යුහය වනුයේ

1. $\text{CH}_3(\text{CH}_2)_7\text{CH}=\text{CH}(\text{CH}_2)_7\text{COOH}$
2. $\text{CH}_2=\text{CH}(\text{CH}_2)_{13}\text{CH}_2\text{CH}_2\text{COOH}$
3. $\text{CH}_3\text{CH}_2(\text{CH}_2)_{13}\text{CH}=\text{CHCOOH}$
4. $\text{CH}_2=\text{CH}(\text{CH}_2)_{13}\text{CH}_2\text{CH}_2=\text{CH}_2$
5. $\text{CH}_2=\text{CH}(\text{CH}_2)_{12}\text{CH}=\text{CHCH}_2\text{COOH}$

08. ඛනු අවයවික පිළිබඳ සත්‍ය වගන්තිය වනුයේ

1. ස්වභාවික රබර්වල ඇති සියලුම පුනරාවර්තන ඒකකයන්හි C-C ද්විත්ව බන්ධන 2 ක් ඇත.
2. PVC යනු තාපස්ථායී ඛනු අවයවිකයක් වේ.
3. පොලිස්ටිරීන් සංඝත ඛනු අවයවකයකි.
4. ද්වි ඇමින සහ ද්විකාබොක්සිලික් අම්ල අතර ප්‍රතික්‍රියාවෙන් ප්‍රෝටීන සෑදේ.
5. නයිලෝන් -6, 6 යනු පොලි ඇමයිනයිඩ් වය සෑදෙනුයේ $\text{HOOC}(\text{CH}_2)_4\text{COOH}$ සහ

$\text{H}_2\text{N}(\text{CH}_2)_6\text{NH}_2$ යන ඛනුඅවයවික වලිනි.

09. සුක්රෝස් හි අඩංගු මොනසැකරයිඩ දෙක වනුයේ

1. α -D glucose, α -D glucose
2. α -D glucose, β -D fructose
3. α -D glucose, α -D fructose
4. β -D galactose, α -D glucose
5. β -D glucose, α -D glucose

10. පහත සඳහන් වගන්ති අතරින් නිවැරදි වගන්තිය තෝරන්න.
1. අධි මධ්‍ය රක්තිය යනු රුධිර ග්ලූකෝස් මට්ටම සාමාන්‍ය මට්ටමට වඩා අවම වීම.
 2. මන්ද මධ්‍ය රක්තිය යනු රුධිර ග්ලූකෝස් මට්ටම සාමාන්‍ය මට්ටමට වඩා අධික වීම.
 3. Juvenile-onset දියවැඩියාවට හේතු වනුයේ දේහයේ ඇති ඉන්සියුලින් දායක නොවීමයි.
 4. හයිපොතර්මියාව වර්ධනය වනුයේ දේහය ඇතුළත ජනනය වන තාපය, සිසිල් පද්ධතියක දී සිදුවන තාප හානිය හා තුලිත නොවීමයි.
 5. වයසට යාමේදී දියවැඩියාවට හේතු වනුයේ අග්න්‍යාසය නිපදවන ඉන්සියුලින් ප්‍රමාණය අවම වීමයි.

11. අනුමාපනය පිළිබඳ නිවැරදි වගන්තිය/වගන්ති වනුයේ,

- a. අම්ල හස්ම අනුමාපනයෙහි සමතුලිතතා ලක්ෂ්‍යය ආසන්නයෙහි සැලකිය යුතු pH වෙනසක් සිදුවේ.
- b. අම්ල හස්ම අනුමාපනය ආරම්භයේදී සැලකිය යුතු pH වෙනසක් සිදුවේ.
- c. ඔක්සිකාරක ඔක්සිකාරක අනුමාපනයෙහි වෙනස් වන සාධකය වනුයේ ඉලෙක්ට්‍රෝඩ විභවයයි.
- d. අයඩොමිතික අනුමාපනයෙහි දර්ශකය වනුයේ පිෂ්ටය

1. a සහ b 2. b සහ c 3. c පමණි. 4. a, b, d පමණි 5. a, c, d පමණි.

12. බෝරික් අම්ලය සහ NH_4OH අතර අනුමාපනයට සුදුසු දර්ශකය වනුයේ

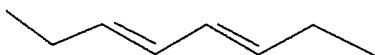
1. මෙතිල් රෙඩ් 2. ෆිනොප්තලින් 3. ෆෙරොසින්
4. මෙතිල් ඔරෙන්ජ් 5. ඉහත සඳහන් කිසිවක් නොවේ.

13. පහත ජලීය ද්‍රාවණ අතරින් ඉහළම pH අගයක් අඩංගු වන්නේ,

1. $0.006 \text{ mol dm}^{-3} \text{ Ca(OH)}_2$ 2. $0.001 \text{ mol dm}^{-3} \text{ CH}_3\text{COOH}$ 3. $0.01 \text{ mol dm}^{-3} \text{ NaOH}$
4. $0.1 \text{ mol dm}^{-3} \text{ NH}_4\text{Cl}$ 5. $0.010 \text{ mol dm}^{-3} \text{ NH}_4\text{OH}$

14. λ_{max} අගය වැඩිවන පිළිවෙලට පහත අණු සකසන්න.

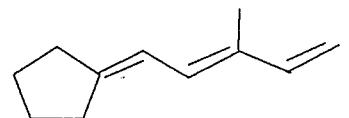
a.



b.



c.



1. $a < b < c$ 2. $c < b < a$ 3. $a < c < b$ 4. $b < a < c$ 5. $c < a < b$

15. පහත පියවර අතරින් NaOH 25.00 cm^3 $\cdot$ HCl සමඟ අනුමාපනය සඳහා වඩාත් නිවැරදි සහ අත්‍යවශ්‍ය පියවර වනුයේ,

1. HCl ද්‍රාවණයෙන් පිපෙට්ටුව සේදීම.
2. අනුමාපන ජලාස්කුව NaOH ද්‍රාවණයෙන් සේදීම
3. HCl ද්‍රාවණයෙන් බියුරෙට්ටුව සේදීම
4. HCl ද්‍රාවණයෙන් බියුරෙට්ටුවේ ගුණ ලක්ෂ්‍ය තෙක් පිරවීම
5. NaOH සහ HCl ද්‍රාවණවල උෂ්ණත්වය මැනීම

16. එතනෝල්වල ස්කන්ධ හේද වර්ණාවලියෙහි $m/e = 31$ වේ. ඊට අදාළ ඛණ්ඩය වනුයේ
1. $[\text{CH}_2\text{OH}]^+$ 2. $[\text{CH}_2=\text{OH}]^+$ 3. $[\text{CH}_3\text{OH}]^+$
 4. $[\text{CH}_2\text{OH}]^\bullet$ 5. $[\text{CHOH}_2]^+$
17. 4.0 g ඛනිජ කාම්පලයකින් කොපමණ Ca ප්‍රතිශතයක් CaCO_3 ලෙස භාරමිතික මගින් අවක්ශේප කළ හැකි ද? CaCO_3 ස්කන්ධය වනුයේ 8.502 g. (Ca = 40.00 g, C = 12.00 g, O = 16.00 g)
1. 85 2. 80 3. 65 4. 60 5. 55
18. පහත දී ඇති පරිමා මැනීමට භාවිතා කළ හැකි වඩාත් සුදුසු මිනුම් උපකරණ පිළිවෙලින් දැක්වෙනුයේ
- 2.00 mL, 50.0 mL, 10 mL
1. පිපෙට්ටුව, බියුරෙට්ටුව, මිනුම් සරාච
 2. බියුරෙට්ටුව, පිපෙට්ටුව, මිනුම් සරාච
 3. බියුරෙට්ටුව, මිනුම් සරාච, පිපෙට්ටුව
 4. මිනුම් සරාච, බියුරෙට්ටුව, පිපෙට්ටුව
 5. මිනුම් සරාච, පිපෙට්ටුව, බියුරෙට්ටුව
19. $0.010 \text{ mol dm}^{-3} \text{ K}_2\text{S}_2\text{O}_8$ $10.0 \text{ cm}^3 \text{ I}^-$ ද්‍රාවණයකට දැමූ විට, පහත සමීකරණයට අදාළව I_2 නිපද වේ. සෑදුණු I_2 $\text{Na}_2\text{S}_2\text{O}_3$ සමඟ අනුමාපනය කරන ලදී. සෑදුණු I_2 අනුමාපනය කිරීම සඳහා අන්ත ලක්ෂ්‍යයේදී වැය වූ $0.01 \text{ mol dm}^{-3} \text{ Na}_2\text{S}_2\text{O}_3$ පරිමාව වනුයේ
- $$\text{S}_2\text{O}_8^{2-} + 2\text{I}^- \longrightarrow 2\text{SO}_4^{2-} + \text{I}_2$$
1. 5.0 2. 15.0 3. 13.0 4. 20.0 5. 20.7
20. 0.1 M NaOH, 15.0 mL, 0.1 M Na_2CO_3 10.0 mL සහ 5.00 mL ජලය භාවිතයෙන් ජලීය ද්‍රාවණයක් සාදා ගන්නා ලදී. එම ද්‍රාවණය ඊතෝක්තලින් දර්ශකය භාවිතා කොට $0.1 \text{ mol dm}^{-3} \text{ HCl}$ ද්‍රාවණය සමඟ අනුමාපනයේ දී අන්ත ලක්ෂ්‍යයේ පරිමාව වනුයේ 25.00 mL වේ. ඒ අනුව දර්ශකය ලෙස මෙහිල් ඔරේන්ජ් භාවිතා කළ විට අන්ත ලක්ෂ්‍යයේ පරිමාව වනුයේ,
1. 20.00 mL 2. 30.00 mL 3. 25.00 mL 4. 35.00 mL 5. 40.00 mL

THE OPEN UNIVERSITY OF SRI LANKA
 CERTIFICATE COURSE IN SCIENCE - CMF2206
 ASSIGNMENT TEST II – 2012/2013



MCQ ANSWER SHEET: Mark a cross (x) over the most suitable answer.

Index No.

Marks

Unanswered		
Correct Answers		
Wrong Answers		
Total		

- | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 |
| 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | |
| 4. <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 | 5. <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 | 6. <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 |
| 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | |
| 7. <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 | 8. <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 | 9. <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 |
| 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | |
| 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 |
| 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | |
| 13. <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 | 14. <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 | 15. <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 |
| 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | |
| 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 |
| 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | |
| 19. <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 | 20. <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 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | |

B - කොටස

1. (a) (i). පහත සඳහන් ඛනුඅවයවිකවලට අදාළ පුනරාවර්තන ඒකකය හා ඒකක අවයවයට අදාළ රසායනික ව්‍යුහ ලියන්න.

පොලිමර් Polymer	පොලිස්ටයරීන් Polystyrene	PVC	ස්වභාවික රබර් Natural rubber
පුනරාවර්තන ඒකකය Repeating Unit			
Monomer ඒකක අවයවය			

- (ii). ටෙරිලීන්වලට අදාළ රසායනික ව්‍යුහය ලියා දක්වන්න. (එතිලීන් ග්ලයිකෝල් සහ benzene-1,4-dicarboxylic acid සංඝතක ඛනු අවයවිකරණයෙන් සෑදේ)

Write down the chemical formula of Terylene (obtained by condensation polymerisation of ethylene glycol and benzene 1,4-dicarboxylic acid)

- (iii) එදිනෙදා ජීවිතයේ දී ටෙරිලීන්වල ප්‍රයෝජන 3 ක් ලියා දක්වන්න.

Write **three** uses of Terylene in our day to day life.

- (iv) HDPE සහ LDPE වලට අදාළ භෞතික ලක්ෂණ හතරක් දක්වන්න.

State **four** physical properties of HDPE and LDPE.

HDPE

LDPE

(80 marks)

(b) (i). පහත සඳහන් සංයෝගයට අදාළ D සහ L ආකාර වලට අදාළ ෆිෂර් ප්‍රක්ෂේපණ සුත්‍ර අඳින්න.

Draw the fisher projection of D and L forms of the following compound.

ලැක්ටික් අම්ලය Lactic acid - $\text{CH}_3\text{CH}(\text{OH})(\text{COOH})$

(ii) ආහාර කර්මාන්තයේදී භාවිතයට ගන්නා ප්‍රතිඔක්සිකාරකයක් යන්නෙන් අදහස් කරන්නේ කුමක් ද? ඒ සඳහා උදාහරණ 3 ක් දක්වන්න.

What do you mean by antioxidants used in food industry? Give 3 examples.

(30 marks)

(c) (i). පහත මේද අම්ලවලට අදාළ රසායනික ව්‍යුහය වනුයේ

Give the chemical formulae of the following fatty acids.

1. ලිනොලිනික් අම්ලය Linolenic acid (18:3)9,12,15

2. ස්ටියරික් අම්ලය Stearic acid (18:0)

(ii). 'සබන්වලට වඩා ක්ෂාලක ප්‍රයෝජනවත් ය.' මෙය පහදන්න.

'Detergents are useful than soap'. Explain this statement.

(iii). සේදීමේදී සබන් අණුවකට අදාළ ක්‍රියාව රූප සටහනක් ආධාරයෙන් පැහැදිලි කරන්න.

With the aid of a diagram, briefly explain the action of soap molecules in the washing process.

(55 marks)

2. (a) $0.1 \text{ mol dm}^{-3} \text{ NaOH}$ 25.0 cm^3 ක් $0.1 \text{ mol dm}^{-3} \text{ HCl}$. සමග අනුමාපනය සලකන්න.

Consider the titration of $0.1 \text{ mol dm}^{-3} \text{ NaOH}$ with $0.1 \text{ mol dm}^{-3} \text{ HCl}$.

(i) මෙම අනුමාපනයට අදාළ ඩලපොරොත්තු වන අන්ත ලක්ෂය වනුයේ
What is the expected “end – point”?

(ii) මාලා සහ සීතා යන ශිෂ්‍යයන් දෙදෙනා ඉහත සඳහන් අනුමාපනය 4 වාරයක් කරන ලදී. එම අනුමාපනයන් 4 ට දෙදෙනාගේ අන්ත ලක්ෂ්‍ය පරිමා වනුයේ

Two students, Mala and Seetha, carried out the above titration, four times each.

The results [volume of HCl used (cm^3) at the end point] are given below.

මාලා Mala = 25.00, 24.95, 25.05, 25.00

සීතා Seetha = 24.50, 24.45, 24.55, 24.50

අදාළ ගණනය කිරීම් භාවිතයෙන් ඉහත ප්‍රතිඵල විශ්ලේෂණය කරන්න.

Comment on their results using relevant calculations

(35 marks)

(b) අයඩෝමිට්‍රික අනුමාපනයේ දී පිණිටය දර්ශකයක් ලෙස යොදා ගනී. පිණිටය දර්ශකයක් ලෙස යොදා ගැනීමේ වාසි 1 ක් සහ අවාසි 2 ක් ලියා දක්වන්න.

Starch is used as an indicator in iodometric titrations. Write **one** advantage and **two** disadvantages of starch as an indicator.

(15 marks)

(c). (i) ජලීය H_3PO_4 ද්‍රාවණය සහ ජලීය $\text{Ba}(\text{OH})_2$ ද්‍රාවණය අතර සිදුවන අවක්ෂේපණ ප්‍රතික්‍රියාවට අදාළ තුලිත සමීකරණය ලියා දක්වන්න.

Write the balanced chemical equation for the precipitation reaction between aqueous H_3PO_4 solution and aqueous $\text{Ba}(\text{OH})_2$ solution.

(ii). 0.12 mol dm^{-3} ජලීය H_3PO_4 අම්ල 25.0 cm^3 ක අඩංගු PO_4^{3-} සම්පූර්ණයෙන් අවක්ෂේප කිරීමට අවශ්‍ය 0.2 mol dm^{-3} ජලීය $\text{Ba}(\text{OH})_2$ පරිමාව ගණනය කරන්න.

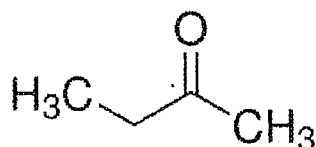
Calculate the required volume of 0.2 mol dm^{-3} aqueous $\text{Ba}(\text{OH})_2$ for the complete precipitation of PO_4^{3-} ions in 25.0 cm^3 of 0.12 mol dm^{-3} aqueous H_3PO_4 acid.

(35 marks)

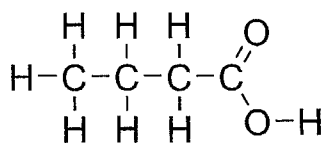
- (d) (i) පහත සඳහන් සංයෝගවලට අදාළ ^1H NMR වර්ණාවලියෙහි සංඥා ගණන කොපමණ ද? ඒවායේ ඔක්කුම්බතාවය සහ තිවුරාවය (integrations) ලියා දක්වන්න.

Identify the number of signals in ^1H NMR spectra of following compounds. Give their **multiplicities** and **integrations**.

a.



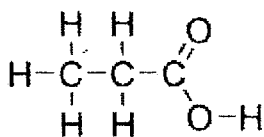
b.



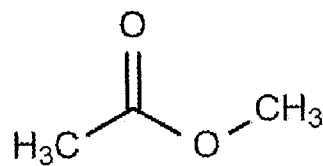
- (ii). පහත දක්වා ඇති $\text{C}_3\text{H}_6\text{O}_2$ වල IR වර්ණාවලීන්ගේ වෙනස්කම් ලියා දක්වන්න.

Identify the differences in the IR spectra of the following isomers of $\text{C}_3\text{H}_6\text{O}_2$.

a.

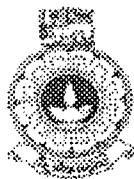


b.



(50 marks)

- නිමිකම් ඇවිරිණි. -



The Open University of Sri Lanka

Foundation Certificate Programme in Science- 2012/2013

CMF 2206- Chemistry II

Assignment test – II

Duration – 1 ½ Hours

Date: 26th July 2013 (Friday)

Time: 2.30p.m- 4.00 p.m.

This question paper consists of two parts, Part A (MCQ) and Part B (Structured)

Part A (40%)

- ⊗ Answer all 20 questions
- ⊗ Use a **PEN** (not a PENCIL) in answering.
- ⊗ Any answer with more than **one** “X” marked will be considered as an *incorrect* answer.
- ⊗ For each correct response 2 marks will be awarded. Marks will be deducted for incorrect answers. (0.3 per wrong answer).

Part B (60%)

- Answer all (02) questions in the space provided.
- ⊗ The use of a non-programmable electronic calculator is permitted.
- ⊗ You are **NOT allowed** to keep Mobile phones with you during the examination; **Switch off** and leave them out.

Gas constant (R) = $8.314 \text{ J mol}^{-1} \text{ K}^{-1}$, Avogadro constant (L) = $6.023 \times 10^{23} \text{ mol}^{-1}$

Part A

- 1) Consider the following statements about natural rubber.
- a. SO_2 and CO_2 gases are evolved when tyre (made of natural rubber) is burnt in air.
 - b. Natural rubber is a polymer made of propene.
 - c. It has trans double bonds.
 - d. Vulcanized rubber contain sulphur cross links.

The correct statement/s is/are

1. a and b 2. b and c 3. c and d 4. a and d 5. a only

- 2) What is the molar mass of a polypropylene chain containing 100 repeating units?
 1. 4200 g mol^{-1} 2. 28 g mol^{-1} 3. 4000 g mol^{-1} 4. 2800 g mol^{-1} 5. 42 g mol^{-1}
- 3) Which one of the following statements about nucleic acids is **incorrect**?
 1. They are macromolecules.
 2. Nucleoside is the monomer of nucleic acids.
 3. Nucleotides are composed of a sugar, a base, and a phosphate group.
 4. Nucleotide can be considered as the repeating unit of nucleic acids.
 5. DNA and RNA are nucleic acids that are found, mainly, in the nucleus of a cell.
- 4) Which of the following is a **bulk** sweetener?.
 1. Saccharin 2. Aspartame 3. Sorbitol 4. Sucralose 5. Cyclamate
- 5) Which of the following statements about proteins and amino acids is **incorrect**?
 1. All amino acids are not optically active. 2. Only α -amino acids are associated with proteins.
 3. Proteins have high relative molecular mass. 4. Amino acids are bi-functional molecules.
 5. Only D-amino acids are associated with proteins.
- 6) The **addition** polymer which is both **unbranched and thermoplastic** is
 1. Nylon 2. Polyester 3. PVC 4. Phenol formaldehyde 5. Vulcanized rubber
- 7) What is the chemical formula of fatty acid (18:1) ω 9?
 1. $\text{CH}_3(\text{CH}_2)_7\text{CH}=\text{CH}(\text{CH}_2)_7\text{COOH}$ 2. $\text{CH}_2=\text{CH}(\text{CH}_2)_{13}\text{CH}_2\text{CH}_2\text{COOH}$
 3. $\text{CH}_3\text{CH}_2(\text{CH}_2)_{13}\text{CH}=\text{CHCOOH}$ 4. $\text{CH}_2=\text{CH}(\text{CH}_2)_{13}\text{CH}_2\text{CH}_2=\text{CH}_2$
 5. $\text{CH}_2=\text{CH}(\text{CH}_2)_{12}\text{CH}=\text{CHCH}_2\text{COOH}$
- 8) Which of the following statements about polymers is **correct** ?
 1. Each repeating unit of natural rubber contain two carbon carbon ($\text{C}=\text{C}$) double bonds
 2. PVC is a thermosetting polymer.
 3. Polystyrene is a condensation polymer.
 4. Protein is formed by reaction between diammine and dicarboxylic acid.
 5. Nylon-6,6 is a polyamide made of $\text{HOOC}(\text{CH}_2)_4\text{COOH}$ and $\text{H}_2\text{N}(\text{CH}_2)_6\text{NH}_2$.
- 9) The two mono-saccharides present in sucrose are
 1. α - D glucose , α - D glucose 2. α - D glucose , β - D fructose
 3. α - D glucose, α - D fructose 4. β - D galactose, α - D glucose
 5. β - D glucose, α - D glucose

10) Which of the following statements is **correct** ?

1. Hyperglycaemia is a condition having blood sugar level below the normal.
2. Hypoglycaemia is a condition having blood sugar level above the normal.
3. Juvenile-onset diabetes is due to non response of the insulin in body.
4. Hypothermia develops when body's internal heat generation is not sufficient to balance heat lost in very cold surroundings.
5. Maturity onset diabetes is due to lack of insulin production from pancreas.

11) What is/are the **correct** statement/s about titrations?

- a. A drastic pH change will occur near the equivalence point of acid base titrations
- b. A drastic pH change will occur at the beginning of acid base titrations.
- c. Electrode potential is the changing parameter in redox titrations.
- d. Starch is used as an indicator in iodometric titration.

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

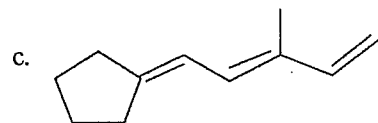
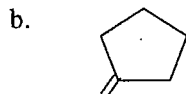
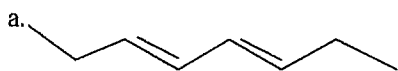
12) Which of the following is the most suitable indicator for the titration of boric acid with NH_4OH ?

1. Methyl red 2. Phenolphthalein 3. Ferroin
4. Methyl orange 5. None of the above

13) Which of the following aqueous solutions has the **highest** pH value?

1. $0.006 \text{ mol dm}^{-3} \text{ Ca(OH)}_2$ 2. $0.001 \text{ mol dm}^{-3} \text{ CH}_3\text{COOH}$ 3. $0.01 \text{ mol dm}^{-3} \text{ NaOH}$
4. $0.1 \text{ mol dm}^{-3} \text{ NH}_4\text{Cl}$ 5. $0.010 \text{ mol dm}^{-3} \text{ NH}_4\text{OH}$

14) Arrange the following molecules in the **increasing order** of their λ_{max} .



1. $a < b < c$ 2. $c < b < a$ 3. $a < c < b$ 4. $b < a < c$ 5. $c < a < b$

15) Out of the following, what is the **most essential and correct step** that has to be followed in order to titrate 25.00 cm^3 of a NaOH solution with HCl ?

1. Wash the pipette with HCl solution.
2. Wash the titration flask with NaOH.
3. Wash the burette with HCl
4. Fill the burette with HCl up to zero mark.
5. Measure the temperature of NaOH and HCl solution

16) Mass spectrum of ethanol gives a base peak at $m/e = 31$. What is the fragment responsible for this peak?

1. $[\text{CH}_2\text{OH}]^+$ 2. $[\text{CH}_2=\text{OH}]^+$ 3. $[\text{CH}_3\text{OH}]^+$ 4. $[\text{CH}_2\text{OH}]^\bullet$ 5. $[\text{CHOH}_2]^+$

- 17) Amount of Ca in a 4.0 g mineral sample was analyzed using gravimetry by precipitating Ca as CaCO_3 . The weight of CaCO_3 obtained was 8.502 g. The % of Ca in the sample is (Ca = 40.00 g, C= 12.00 g, O= 16.00 g)

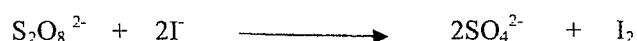
1. 85 2. 80 3. 65 4. 60 5. 55

- 18) The **most suitable** measuring devices to measure the following volumes

2.00 mL, 50.0 mL, 10 mL, respectively, is

- | | |
|---|---|
| 1. Pipette, Burette, Measuring cylinder | 2. Burette, Pipette, Measuring cylinder |
| 3. Burette, Measuring cylinder, Pipette | 4. Measuring cylinder, Burette, Pipette |
| 5. Measuring cylinder, Burette, Pipette | |

- 19) When 10.0 cm^3 of $0.010 \text{ mol dm}^{-3} \text{ K}_2\text{S}_2\text{O}_8$ solution is added to an I^- solution, I_2 is formed as indicated by the following reaction.



The I_2 produced was titrated with $\text{Na}_2\text{S}_2\text{O}_3$. The end -point volume (in cm^3) of $0.01 \text{ mol dm}^{-3} \text{ Na}_2\text{S}_2\text{O}_3$, required to react with the I_2 produced is

a. 5.0 2. 15.0 3. 13.0 4. 20.0 5. 20.7

- 20) An aqueous solution was formed with 15.0 mL of 0.1 M NaOH, 10.0 mL of 0.1 M Na_2CO_3 and 5.00 mL of water. When it was titrated with $0.1 \text{ mol dm}^{-3} \text{ HCl}$ solution using phenolphthelin as an indicator, the end point was 25.00 mL. What is the expected end point reading if you repeat this titration using methyl orange as an indicator?

1. 20.00 mL 2. 30.00 mL 3. 25.00 mL 4. 35.00 mL 5. 40.00 mL

THE OPEN UNIVERSITY OF SRI LANKA
 CERTIFICATE COURSE IN SCIENCE - CMF2206
 ASSIGNMENT TEST II – 2012/2013



MCQ ANSWER SHEET: Mark a cross (x) over the most suitable answer.

Index No.

Marks

Unanswered		
Correct Answers		
Wrong Answers		
Total		

1.

1	2	3	4	5
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2.

1	2	3	4	5
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3.

1	2	3	4	5
---	---	---	---	---
4.

1	2	3	4	5
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5.

1	2	3	4	5
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6.

1	2	3	4	5
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7.

1	2	3	4	5
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8.

1	2	3	4	5
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9.

1	2	3	4	5
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10.

1	2	3	4	5
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11.

1	2	3	4	5
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12.

1	2	3	4	5
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13.

1	2	3	4	5
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14.

1	2	3	4	5
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15.

1	2	3	4	5
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16.

1	2	3	4	5
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17.

1	2	3	4	5
---	---	---	---	---
18.

1	2	3	4	5
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19.

1	2	3	4	5
---	---	---	---	---
20.

1	2	3	4	5
---	---	---	---	---

B - කොටස

1. (a) (i). පහත සඳහන් ඛනුඅවයවිකවලට අදාළ පුනරාවර්තන ඒකකය හා ඒකක අවයවයට අදාළ රසායනික ව්‍යුහ ලියන්න.

පොලිමර් Polymer	පොලිස්ටයරීන් Polystyrene	PVC	ස්වභාවික රබර් Natural rubber
පුනරාවර්තන ඒකකය Repeating Unit			
Monomer ඒකක අවයවය			

- (ii). ටෙරිලීන්වලට අදාළ රසායනික ව්‍යුහය ලියා දක්වන්න. (එඩිලිත් ග්ලයිකෝල් සහ benzene-1,4-dicarboxylic acid සංඝතක ඛනු අවයවිකරණයෙන් සෑදේ)

Write down the chemical formula of Terylene (obtained by condensation polymerisation of ethylene glycol and benzene 1,4-dicarboxylic acid)

- (iii) එදිනෙදා ජීවිතයේ දී ටෙරිලීන්වල ප්‍රයෝජන 3 ක් ලියා දක්වන්න.

Write **three** uses of Terylene in our day to day life.

- (iv) HDPE සහ LDPE වලට අදාළ භෞතික ලක්ෂණ හතරක් දක්වන්න.

State **four** physical properties of HDPE and LDPE.

HDPE

LDPE

(80 marks)

(b) (i). පහත සඳහන් සංයෝගයට අදාළ D සහ L ආකාර වලට අදාළ ෆිෂර් ප්‍රක්ෂේපණ සූත්‍ර අඳින්න.

Draw the fisher projection of D and L forms of the following compound.

ලැක්ටික් අම්ලය Lactic acid - $\text{CH}_3\text{CH}(\text{OH})(\text{COOH})$

(ii) ආහාර කර්මාන්තයේදී භාවිතයට ගන්නා ප්‍රතිඔක්සිකාරකයක් යන්නෙන් අදහස් කරන්නේ කුමක් ද? ඒ සඳහා උදාහරණ 3 ක් දක්වන්න.

What do you mean by antioxidants used in **food industry**? Give 3 examples.

(30 marks)

(c) (i). පහත මේද අම්ලවලට අදාළ රසායනික ව්‍යුහය ව්‍යුහයේ

Give the chemical formulae of the following fatty acids.

1. ලිනොලිනික් අම්ලය Linolenic acid (18:3)9,12,15

2. ස්ටියරික් අම්ලය Stearic acid (18:0)

(ii). 'සබන්වලට වඩා ක්ෂාලක ප්‍රයෝජනවත් ය.' මෙය පහදන්න.

'Detergents are useful than soap'. Explain this statement.

(iii). සේදීමේදී සබන් අණුවකට අදාළ ක්‍රියාව රූප සටහනක් ආධාරයෙන් පැහැදිලි කරන්න.

With the aid of a diagram, briefly explain the action of soap molecules in the washing process.

(55 marks)

2. (a) $0.1 \text{ mol dm}^{-3} \text{ NaOH}$ 25.0 cm^3 ක් $0.1 \text{ mol dm}^{-3} \text{ HCl}$. සමග අනුමාපනය සලකන්න.

Consider the titration of $0.1 \text{ mol dm}^{-3} \text{ NaOH}$ with $0.1 \text{ mol dm}^{-3} \text{ HCl}$.

(i) මෙම අනුමාපනයට අදාළ ඔලොපොරොන්තු වන අන්ත ලක්ෂය වනුයේ
What is the expected “end – point”?

(ii) මාලා සහ සීතා යන ශිෂ්‍යයන් දෙදෙනා ඉහත සඳහන් අනුමාපනය 4 වාරයක් කරන ලදී. එම අනුමාපනයන් 4 ට දෙදෙනාගේ අන්ත ලක්ෂය පරිමා වනුයේ

Two students, Mala and Seetha, carried out the above titration, four times each.

The results [volume of HCl used (cm^3) at the end point] are given below.

මාලා Mala = 25.00, 24.95, 25.05, 25.00

සීතා Seetha = 24.50, 24.45, 24.55, 24.50

අදාළ ගණනය කිරීම් භාවිතයෙන් ඉහත ප්‍රතිඵල විශ්ලේෂණය කරන්න.

Comment on their results using relevant calculations

(35 marks)

(b) අයඩෝමිට්‍රික් අනුමාපනයේ දී පිෂ්ටය දර්ශකයක් ලෙස යොදා ගනී. පිෂ්ටය දර්ශකයක් ලෙස යොදා ගැනීමේ වාසි 1 ක් සහ අවාසි 2 ක් ලියා දක්වන්න.

Starch is used as an indicator in iodometric titrations. Write **one** advantage and **two** disadvantages of starch as an indicator.

(15 marks)

(c). (i) ජලීය H_3PO_4 ද්‍රාවණය සහ ජලීය $\text{Ba}(\text{OH})_2$ ද්‍රාවණය අතර සිදුවන අවක්ෂේපණ ප්‍රතික්‍රියාවට අදාළ තුලිත සමීකරණය ලියා දක්වන්න.

Write the balanced chemical equation for the precipitation reaction between aqueous H_3PO_4 solution and aqueous $\text{Ba}(\text{OH})_2$ solution.

(ii). 0.12 mol dm^{-3} ජලීය H_3PO_4 අම්ල 25.0 cm^3 ක අඩංගු PO_4^{3-} සම්පූර්ණයෙන් අවක්ෂේප කිරීමට අවශ්‍ය 0.2 mol dm^{-3} ජලීය $\text{Ba}(\text{OH})_2$ පරිමාව ගණනය කරන්න.

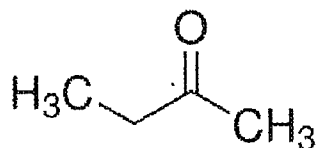
Calculate the required volume of 0.2 mol dm^{-3} aqueous $\text{Ba}(\text{OH})_2$ for the complete precipitation of PO_4^{3-} ions in 25.0 cm^3 of 0.12 mol dm^{-3} aqueous H_3PO_4 acid.

(35 marks)

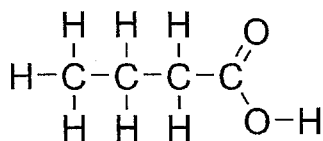
- (d) (i) පහත සඳහන් සංයෝගවලට අදාළ $^1\text{H NMR}$ වර්ණාවලියෙහි සංඝාත ගණන කොපමණ ද? ඒවායේ බහුච්ඡාය සහ චිත්‍රතාවය (integrations) ලියා දක්වන්න.

Identify the number of signals in $^1\text{H NMR}$ spectra of following compounds. Give their **multiplicities** and **integrations**.

a.



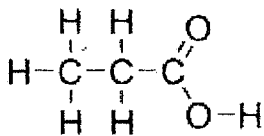
b.



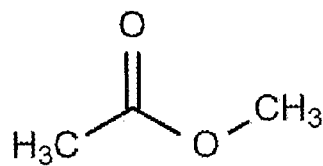
- (ii). පහත දක්වා ඇති $\text{C}_3\text{H}_6\text{O}_2$, වල IR වර්ණාවලීන්ගේ වෙනස්කම් ලියා දක්වන්න.

Identify the differences in the IR spectra of the following isomers of $\text{C}_3\text{H}_6\text{O}_2$.

a.



b.



(50 marks)

- නිමකම් ඇවිරිණි. -

இலங்கை திறந்த பல்கலைக்கழகம்
அடிப்படை விஞ்ஞான சான்றிதழ் கற்கை நெறி – 2012/2013

CMF 2206 - இரசாயனவியல் - II

Assignment test – II

காலம் – 1 ½ மணித்தியாலங்கள்



திகதி: 2013 ஜூலை 26 (வெள்ளி)

நேரம்: பி.ப 02.30 – பி.ப 04.00 வரை

This question paper consists of two parts, Part A (MCQ) and Part B (Structured)

Part A (40%)

- ☒ Answer all 20 questions
- ☒ Use a **PEN** (not a PENCIL) in answering.
- ☒ Any answer with more than **one** “X” marked will be considered as an *incorrect* answer.
- ☒ For each correct response 2 marks will be awarded. Marks will be deducted for incorrect answers. (0.3 per wrong answer).

Part B (60%)

- Answer all (02) questions in the space provided.
- ☒ The use of a non-programmable electronic calculator is permitted.
- ☒ You are **NOT allowed** to keep Mobile phones with you during the examination; **Switch off** and leave them out.

Gas constant (R) = $8.314 \text{ J mol}^{-1} \text{ K}^{-1}$, Avogadro constant (L) = $6.023 \times 10^{23} \text{ mol}^{-1}$

சகல வினாக்களுக்கும் விடை தருக.

A - பகுதி (40%)

01. இயற்கை இறப்பர் பற்றிய பின்வரும் கூற்றுக்களைக் கருதுக.

- டயரானது (இயற்கை இறப்பரால் ஆனது) வளியில் எரிக்கப்படும் போது SO₂ மற்றும் CO₂ வாயுக்கள் வெளியேற்றப்படுகின்றன.
- இயற்கை இறப்பரானது புரோபீன் (Propene) இனால் ஆன ஓர் பல்பகுதியம்.
- அது 'திரான்சு' இரட்டைப் பிணைப்பைக் கொண்டது.
- வல்கனைசப்படுத்தப்பட்ட இறப்பரானது சல்பர் குறுக்கிணைப்புக்களைக் கொண்டது.

இவற்றுள் சரியான கூற்று / கூற்றுக்களானது -

1. a மற்றும் b 2. b மற்றும் c 3. c மற்றும் d 4. a மற்றும் d 5. a மட்டும்
02. 100 மீளும் அலகுகளினால் ஆன பல்புரோபிலீன் இன் மூலத்திணிவு யாது?
1. 4200 g mol⁻¹ 2. 28 g mol⁻¹ 3. 4000 g mol⁻¹ 4. 2800 g mol⁻¹ 5. 42 g mol⁻¹
03. பின்வரும் கூற்றுக்களில் நியூக்கிளிக் அமிலம் (கருவமிலம்) பற்றிய தவறான கூற்று -
1. அவை மா மூலக்கூறாகும்.
 2. நியூக்கிளியோசைட் நியூக்கிளிக்கமிலத்தின் ஒருபகுதியம் ஆகும்.
 3. நியூக்கிளியோசைட்டானது வெல்லம், வெல்லம் காரம் மற்றும் பொசுபேற்றுக் கூட்டம் உட்பட்டது.
 4. நியூக்கிளியோசைட்டு ஆனது நியூக்கிளிக்கமிலத்தின் மீளும் அலகாகும்.
 5. கலமொன்றின் கருவில் பிரதானமாகக் காணப்படும் நியூகிலிக்கமிலங்கள் RNA மற்றும் DNA ஆகும்.
04. பின்வருவனவற்றில் பருமனான (bulk sweetener) இனிப்பூட்டி யாது?
1. சக்கரீன் 2. அஸ்பாமின் 3. சோர்பிடோல் 4. சுக்குரலோஸ் 5. சைக்கலமேட்
05. புரதம், அமினோ அமிலங்கள் பற்றிய பின்வரும் கூற்றுக்களுள் பிழையான கூற்று
1. எல்லா அமினோ அமிலங்களும் ஒளியியல் தொழிற்பாடற்றவை
 2. α - அமிலங்கள் மாத்திரமே புரதத்துடன் தொடர்புடையன.
 3. புரதமானது உயர் சார் மூலக்கூற்றுத் திணிவுடையது.
 4. அமினோ அமிலங்க் இரட்டை தொழிற்பாடுடைய மூலக்கூறாகும்.
 5. D- அமினோ அமிலங்களே புரதத்துடன் தொடர்புடையவை.
06. கிளைகளற்ற, வெப்ப நெகிழியாகவும் தொழிற்படும் கூட்டற் பல்பகுதியம் எது?
1. நைலான் 2. பொலிஸ்டர் 3. PVC
 4. பினோல்ட் போமல்டியைட் (Phenol formaldehyde) 5. வல்கனைஸ் இறப்பர் (Vulcanized rubber)
07. கொழுப்பமிலம் (18:1) ஓ9 இன் இரசாயன சூத்திரம்?
1. CH₃(CH₂)₇CH = CH (CH₂)₇COOH 2. CH₂=CH(CH₂)₁₃CH₂CH₂COOH
 3. CH₃CH₂(CH₂)₁₃CH=CHCOOH 4. CH₂=CH(CH₂)₁₃CH₂CH₂=CH₂
 5. CH₂=CH(CH₂)₁₂CH=CHCH₂COOH

08. பின்வரும் கூற்றுக்களுள் பல்பகுதியம் பற்றிய சரியான கூற்று?

1. இயற்கை இறப்பின் ஒவ்வொரு மீளும் அலகிலும் இரண்டு காபன் - காபன் இரட்டைப் பிணைப்பைக் கொண்டது.
2. PVC வெப்பம் இறுகும் பல்பகுதியம் (Thermosetting polymer)
3. பொலிஸ்டைரீன் ஒரு ஒடுங்கற் (condensation) பல்பகுதியமாகும்.
4. டையமின் மற்றும் இருகாபோக்சலிக்கமிலத்தின் தாக்கத்தினால் புரதம் உருவாகின்றது.
5. $\text{HOOC}(\text{CH}_2)_4\text{COOH}$ மற்றும் $\text{H}_2\text{N}(\text{CH}_2)_6\text{NH}_2$ ஆகியவற்றாலான நைலான் - 6, 6 ஒரு பல்ஏமைட்டாகும்.

09. சுக்குரோசில் காணப்படும் இரு சக்கரைட்டுக்கள்,

1. α -D குளுகோஸ், α -D குளுகோஸ்
2. α -D குளுகோஸ், β -D பிரக்டோஸ்
3. α -D குளுகோஸ், α -D பிரக்டோஸ்
4. β -D களக்டோஸ், α -D குளுகோஸ்
5. β -D குளுகோஸ், α -D குளுகோஸ்

10. பின்வரும் கூற்றுக்களுள் சரியான கூற்று -

1. சாதாரண குருதி குளுக்கோஸ் மட்டத்தை விடக் குறைவான குளுக்கோஸ் காணப்படும் நிலை, 'குருதிச் சக்கரை உயர்வு' (Hypoglycaemia) எனப்படும்.
2. சாதாரண குருதி மட்டத்தைவிட உயர்வாக குளுக்கோஸ் காணப்படும் நிலை குருதிச் சக்கரை குறைவு (Hypoglycaemia) எனப்படும்.
3. Juvenile-onset நீரிழிவானது உடலிலுள்ள இன்சலின் தொழிற்பாடற்ற தன்மையால் (non response) இல் உருவாகின்றது.
4. குளிர் சூழலில் உடலினால் இழக்கப்படும் வெப்பத்தினை தேவையான வெப்பத் தட்டுபடால் ஈடு செய்வதற்கு Hypothermia உருவாகின்றது.
5. கணையத்தால் சுரக்கப்படும் இன்சலின் உற்பத்தி குறைபாட்டால் Maturity onset நீரிழிவு உருவாகின்றது.

11. நியமிப்பு பற்றிய பின்வரும் கூற்றுக்களுள் சரியானது / சரியானவை -

- a. அமில மூல நியமிப்பில் பாரியளவு pH மாற்றம் முடிவுப்புள்ளியருகே நிகழும்.
- b. அமில மூல நியமிப்பில் பாரியளவு pH மாற்றம் ஆரம்பத்தில் நிகழும்.
- c. தாழ்த்தேற்று தாக்கமொன்றில் மின்வாயழுத்தமே மாறுபடும் காரணியாகும்.
- d. அயடோமான நியமிப்பில் மாப்பொருள் காட்டியாகத் தொழிற்படும் -

1. a மற்றும் b
2. b மற்றும் c
3. c மட்டும்
4. a, b, d மட்டும்
5. a, c, d மட்டும்

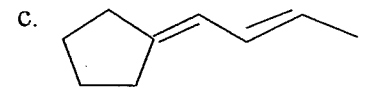
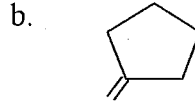
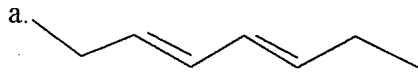
12. - போரிக்கமில் NH_4OH உடனான நியமிப்பில் மிகப் பொருத்தமான காட்டியானது,

- | | | |
|----------------------|-------------------------|-------------|
| 1. மெதில் சிவப்பு | 2. பினோல்ப்தலீன் | 3. பெரோயின் |
| 4. மெதில் செம்மஞ்சள் | 5. மேற்கூறிய எதுவுமன்று | |

13. பின்வரும் நீர்க்கரைசல்களுள் உயர் pH பெறுமானத்தைக் கொண்டது?

- | | | |
|--|--|--|
| 1. $0.006 \text{ mol dm}^{-3} \text{ Ca(OH)}_2$ | 2. $0.001 \text{ mol dm}^{-3} \text{ CH}_3\text{COOH}$ | 3. $0.01 \text{ mol dm}^{-3} \text{ NaOH}$ |
| 4. $0.1 \text{ mol dm}^{-3} \text{ NH}_4\text{Cl}$ | 5. $0.010 \text{ mol dm}^{-3} \text{ NH}_4\text{OH}$ | |

14. பின்வரும் மூலக்கூறுகளை அதன் λ_{max} அதிகரிக்கும் ஒழுங்கில் வரிசைப்படுத்துக.



- | | | | | |
|----------------|----------------|----------------|----------------|----------------|
| 1. $a < b < c$ | 2. $c < b < a$ | 3. $a < c < b$ | 4. $b < a < c$ | 5. $c < a < b$ |
|----------------|----------------|----------------|----------------|----------------|

15. பின்வருவனவற்றில் NaOH 25.00 cm^3 இனை HCl பின்வரும் உடன் நியமிப்பு செய்வதற்கு செய்ய வேண்டிய முக்கியமான மற்றும் சரியான படிமுறை

1. குழாயியை HCl கரைசலினால் கழுவுதல்
2. நியமிப்புக் குடுவையை NaOH இனால் கழுவுதல்
3. அளவியை HCl இனால் கழுவுதல்
4. அளவியை பூச்சியம் மட்டம் வரை HCl ஆல் நிரப்ப வேண்டும்.
5. HCl மற்றும் NaOH இனதும் வெப்ப நிலையை துணிய வேண்டும்.

16. எதனோலானின் திணிவு நிறமாலையில் உச்சத்தை $m/e = 3$ இல் தருகிறது. இவ் உச்சத்திற்குப் பொறுப்பான துண்டம் யாது?

- | | | | | |
|-------------------------------|--------------------------------|-------------------------------|-------------------------------------|------------------------|
| 1. $[\text{CH}_2\text{OH}]^+$ | 2. $[\text{CH}_2=\text{OH}]^+$ | 3. $[\text{CH}_3\text{OH}]^+$ | 4. $[\text{CH}_2\text{OH}]^\bullet$ | 5. $[\text{CHOH}_2]^+$ |
|-------------------------------|--------------------------------|-------------------------------|-------------------------------------|------------------------|

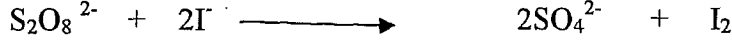
17. கனியுப்பு மாதிரியொன்றில் காணப்படும் Ca இன் அளவானது, நிறைமான முறையில் Ca இனை CaCO_3 ஆக வீழ்படிவாக்குதல் மூலம் துணியப்பட்டது. பெறப்பட்ட CaCO_3 இன் திணிவு 8.502 g ஆகும். அவ் மாதிரியில் Ca இன் திணிவு வீதமானது, ($\text{Ca} = 40.00$, $\text{C} = 12.00$, $\text{O} = 16.00$)

- | | | | | |
|-------|-------|-------|-------|-------|
| 1. 85 | 2. 80 | 3. 65 | 4. 60 | 5. 55 |
|-------|-------|-------|-------|-------|

18. 2.00 ml , 50.0 ml , 10 ml கனவளவுகளை அளப்பதற்கு மிகப் பொருத்தமான அளவிடும் சாதனங்கள் முறையே பின்வருவனவற்றுள்,

1. குழாயி, அளவி, அளவுச்சாடி
2. அளவி, குழாயி அளவுச்சாடி (அளவிடைச்சாடி)
3. அளவி, அளவுச்சாடி, குழாயி
4. அளவுச்சாடி, அளவி, குழாயி
5. அளவுச்சாடி, குழாயி, அளவி

19. $0.010 \text{ mol dm}^{-3}$ $\text{K}_2\text{S}_2\text{O}_8$ கரைசலில் 10.0 cm^3 ஆனது I^- கரைசலில் இடும் பொழுது, பின்வரும் தாக்கத்திற்கமைய I_2 ஆனது பிறப்பிக்கப்பட்டது.



பிறப்பிக்கப்பட்ட I_2 ஆனது $\text{Na}_2\text{S}_2\text{O}_3$, உடன் நியமிக்கப்பட்டது. I_2 வுடன் தாக்கம்புரிய தேவைப்பட்ட 0.01 mol dm^{-3} $\text{Na}_2\text{S}_2\text{O}_3$ முடிவுப்புள்ளிக் கனவளவானது (cm^3 இல்)

1. 5.0 2. 15.0 3. 13.0 4. 20.0 5. 20.7

20. நீர் கரைசல் கலவையொன்று 15.0 mL 0.1 M NaOH , 10.0 mL $0.1 \text{ M Na}_2\text{CO}_3$ மற்றும் 5.00 mL நீரினால் உருவாக்கப்பட்டது. பின்னால்தலின் காட்டியாகக் கொண்டு, இதனை 0.1 mol dm^{-3} HCl உடன் நியமித்த பொழுது, முடிவுப்புள்ளி கனவளவு 25.00 mL . ஆகும். மேற்படி நியமிப்பினை மெதில் செம்மஞ்சள் காட்டியாக கொண்டு நியமித்தால் எதிர்பார்க்கப்படும் முடிவுப்புள்ளிக் கனவளவு யாது?

1. 20.00 mL 2. 30.00 mL 3. 25.00 mL 4. 35.00 mL 5. 40.00 mL

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 ASSIGNMENT TEST II – 2012/2013



MCQ ANSWER SHEET: Mark a cross (x) over the most suitable answer.

Index No.

Marks

Unanswered		
Correct Answers		
Wrong Answers		
Total		

1.

1	2	3	4	5
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2.

1	2	3	4	5
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3.

1	2	3	4	5
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4.

1	2	3	4	5
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5.

1	2	3	4	5
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6.

1	2	3	4	5
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7.

1	2	3	4	5
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8.

1	2	3	4	5
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9.

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10.

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11.

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12.

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13.

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14.

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15.

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16.

1	2	3	4	5
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17.

1	2	3	4	5
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18.

1	2	3	4	5
---	---	---	---	---

19.

1	2	3	4	5
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20.

1	2	3	4	5
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B - பகுதி

1. (a) (i). பின்வரும் பல்பகுதியங்களின் மூலம் அலகின் இரசாயன சூத்திரத்தையும் அதன் ஒரு பதியத்தையும் எழுதுக. Write down the chemical formula of the repeating unit and the monomer of the following polymers.

பல்பகுதியம் Polymer	பொலிஸ்டைரீன் Polystyrene	PVC	இயற்கை இறப்பர் Natural rubber
மீளும் அலகு Repeating Unit			
ஒருபகுதியம் Monomer			

- (ii). தெரிலீன் இன் இரசாயன சூத்திரத்தை எழுதுக. (தெரிலீன் ஆனது எதிலீன் கிலைகோல் மற்றும் Benzene 1,4-dicarboxylic acid இனது ஒடுங்கற் பல்பகுதியத்தால் ஆனது)
Write down the chemical formula of Terylene (obtained by condensation polymerisation of ethylene glycol and benzene 1,4-dicarboxylic acid)

- (iii) அன்றாட வாழ்வில் தெரிலீனின் மூன்று உபயோகங்கள் தருக.

Write **three** uses of Terylene in our day to day life.

- (iv) HDPE மற்றும் LDPE ஆகியவற்றின் நான்கு பௌதீகவியல்புகளைத் தருக.

State **four** physical properties of HDPE and LDPE.

HDPE

LDPE

(80 புள்ளிகள்)

(b) (i). பின்வரும் மூலக்கூறின் D மற்றும் L பிஸ்சர் (fisher) மாதிரியுருக்களை வரைக.

Draw the fisher projection of D and L forms of the following compound.

லக்டிக் அமிலம் Lactic acid - $\text{CH}_3\text{CH}(\text{OH})(\text{COOH})$

(ii) உணவுக் கைத்தொழிலில் பயன்படுத்தப்படும் ஒட்சியேற்றவெதிரி என அழைக்கப்படுவதன் அர்த்தம் என்ன? மூன்று உதாரணங்களைக் குறிப்பிடுக.

What do you mean by antioxidants used in **food industry**? Give 3 examples.

(30 marks)

(c) (i). பின்வரும் கொழுப்பமிலத்தின் இரசாயனச் சூத்திரத்தினைத் தருக.

Give the chemical formulae of the following fatty acids.

1. லினொலினிக் அமிலம் Linolenic acid (18:3)9,12,15

2. ஸ்டீரியிக் அமிலம் Stearic acid (18:0)

- (ii). 'சவர்க்காரத்தைவிட துப்புரவாக்கி உபயோகமானது. இதனை விளக்குக.
'Detergents are useful than soap'. Explain this statement.

- (iii). கழுவுதல் பொறிமுறையில் சவர்க்கார மூலக்கூறுகளின் தொழிற்பாட்டினை மாதிரியுரு மூலமாக விளக்குக.

With the aid of a diagram, briefly explain the action of soap molecules in the washing process.

(55 marks)

2. (a) $0.1 \text{ mol dm}^{-3} \text{ NaOH}$ 25.0 cm^3 உடன் $0.1 \text{ mol dm}^{-3} \text{ HCl}$ இன் நியமிப்பினைக் கருதுக.

Consider the titration of $0.1 \text{ mol dm}^{-3} \text{ NaOH}$ with $0.1 \text{ mol dm}^{-3} \text{ HCl}$.

- (i) எதிர்பார்க்கப்படும் முடிவுப்புள்ளி யாது? What is the expected "end – point"?

- (ii) மாலா மற்றும் சீதா ஆகியோர் நான்கு தடவை மேற்கூறிய நியமிப்பினை மேற்கொண்டு, பெறப்பட்ட HCl இன் முடிவுப்புள்ளிக் கனவளவுகள் (cm^3) ஆனது முறையே

Two students, Mala and Seetha, carried out the above titration, four times each.

The results [volume of HCl used (cm^3) at the end point] are given below.

மாலா Mala = 25.00, 24.95, 25.05, 25.00

சீதா Seetha = 24.50, 24.45, 24.55, 24.50

பொருத்தமான கணிப்பீட்டின் மூலம் முடிவுகளைப் பற்றி கருத்துத் தெரிவிக்க.

Comment on their results **using relevant calculations**

(35 marks)

- (b) அயடோமான நியமிப்பில் காட்டியாக ஸ்டாச் (starch) பயன்படுத்தப்படுகின்றது. அதனால் உள்ள நன்மையொன்றினையும் தீமை இரண்டினையும் எழுதுக.

Starch is used as an indicator in iodometric titrations. Write **one** advantage and **two** disadvantages of starch as an indicator.

(15 marks)

- (c). (i) H_3PO_4 நீர்க்கரைசல் மற்றும் $\text{Ba}(\text{OH})_2$ நீர்க்கரைசலுக்கிடையான வீழ்படிவுத் தாக்கத்திற்கான சமன்படுத்தப்பட்ட இரசாயனத் தாக்கத்தினை எழுதுக.

Write the balanced chemical equation for the precipitation reaction between aqueous H_3PO_4 solution and aqueous $\text{Ba}(\text{OH})_2$ solution.

- (ii). 0.12 mol dm^{-3} , 25.0 cm^3 H_3PO_4 கரைசலொன்றில் காணப்படும் PO_4^{3-} அயனை முற்றாக வீழ்படிவாக்குவதற்குத் தேவையான 0.2 mol dm^{-3} $\text{Ba}(\text{OH})_2$ நீர்க்கரைசலின் கனவளவைக் கணிக்க.

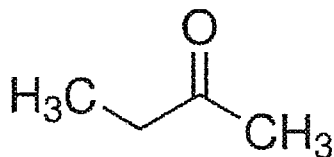
Calculate the required volume of 0.2 mol dm^{-3} aqueous $\text{Ba}(\text{OH})_2$ for the complete precipitation of PO_4^{3-} ions in 25.0 cm^3 of 0.12 mol dm^{-3} aqueous H_3PO_4 acid.

(35 marks)

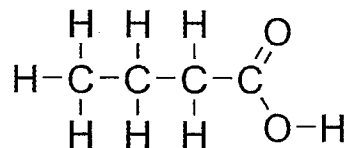
- (d) (i) பின்வரும் மூலக்கூறுகள் HNMR நிறமாலையில் காட்டும் சமிக்கை (signals) இன் எண்ணிக்கையை உய்த்தறிக. அவற்றின் பல்வகைப்பாடு (multiplicities) மற்றும் தொகையீட்டல் (integrations) இனைத் தருக.

Identify the number of signals in ^1H NMR spectra of following compounds. Give their multiplicities and integrations.

a.



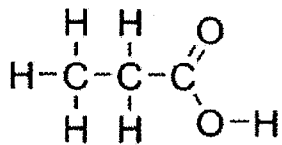
b.



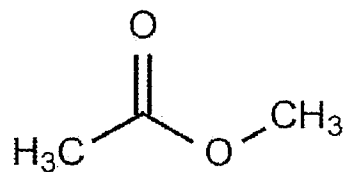
- (ii). $\text{C}_3\text{H}_6\text{O}_2$. இன் சமபகுதியங்கள் IR நிறமாலையில் காட்டும் வேறுபாடுகளை உய்த்தறிக.

Identify the differences in the IR spectra of the following isomers of $\text{C}_3\text{H}_6\text{O}_2$.

a.



b.



(50 marks)

Answer guide for CMF 2206 CAT II 2012/2013

Part A

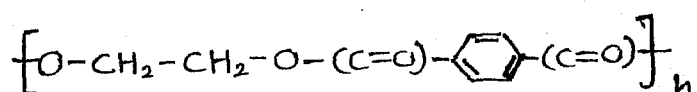
- | | | | | |
|-------|-------|--------|-------|-------|
| 1. 4 | 2. 1 | 3. all | 4. 3 | 5. 5 |
| 6. 3 | 7. 1 | 8. 5 | 9. 2 | 10. 4 |
| 11. 5 | 12. 5 | 13. 1 | 14. 4 | 15. 3 |
| 16. 2 | 17. 1 | 18. 2 | 19. 4 | 20. 4 |

Part B

1. (a) (i).

	Polystyrene	PVC	Natural rubber
Repeating unit	$-(C_6H_5)CH-CH_2-$	$-(Cl)CH-CH_2-$	$-CH_2-C(CH_3)=CH-CH_2-$
Monomer	$C_6H_5-CH=CH_2$	$(Cl)CH=CH_2$	$CH_2=C(CH_3)-CH=CH_2$

(ii).



- (iii) 1. To prepare fibre glass and textiles.
 2. To prepare photographic films
 3. To use as a substitute for natural fibers.

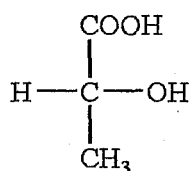
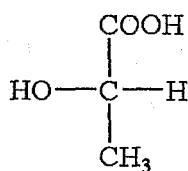
(iv). HDPE -

LDPE

High density
Greater rigidity and strength
High melting point
Linear and long unbranched chain
Strong intermolecular forces

Waxy and translucent
Semi rigid
Low melting point
Branched chains
Weak intermolecular forces

(b). (i)



L(+) lactic acid

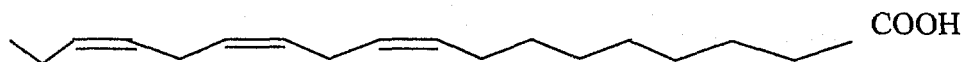
D(-) lactic acid

(ii) Antioxidants are the substances which added to food that contain unsaturated fats.

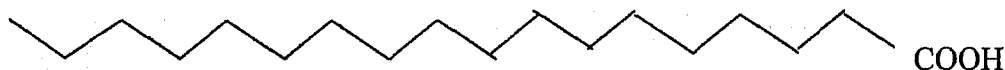
It is important to prevent food from turning rancid,

Eg: Ascorbic acid, Tocopherols and BHA

(C) (i). 1.



2.



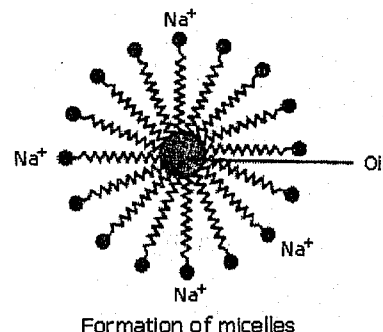
(ii). Water hardness is mainly due to Ca^{2+} and Mg^{2+} .

Soap form precipitate (scum) with metal ions and less effective when used in hard water.

But detergents do not form scum with metal ions and so can use effectively even in hardest water.

(iii).

- Soap is a mixture of salt of carboxylic acids.
- They have uncharged, non polar hydrophobic tail and charged, polar, hydrophilic head.
- Grease and dirt are non polar in nature.
- So hydrophobic tail mix with dirt and head are solvated with water molecules.
- When we add enough soap, at one time all those molecules are get together (diagram) and form clumps called micelles.
- Those micelles then washed away with water.



2.(a) (i). As concentrations are same stoichiometric ratio
 $\text{NaOH} : \text{HCl} = 1:1$.

Therefore expected end point should be 25.00 cm^3 .

(ii)

Student Name	Mean	Range
Mala	25.00	$25.05 - 24.95 = 0.10$
Seetha	24.50	$24.55 - 24.45 = 0.10$

Results of Mala – average is similar to true value. So more accurate. due to high range it is less précised.

Results of Seetha- Average is far from true value. So less accurate. Due to low range results are less précised.

(b) Advantage- Inexpensive

Disadvantages- 1. Insoluble in cold water

2. Give water insoluble complex with iodine in high concentrations.

3. Starch suspension is not stable. So freshly prepared starch have to be used.

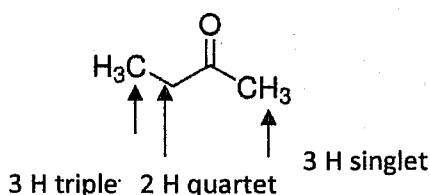


(ii) The required volume of $0.2 \text{ M Ba}(\text{OH})_2 = V \text{ cm}^3$
 $\# \text{ of moles of H}_3\text{PO}_4 = \frac{0.12 \times 25.0}{1000} = 0.003 \text{ mol}$
 $\# \text{ of moles of Ba}(\text{OH})_2 = \frac{0.2 \times V}{1000}$

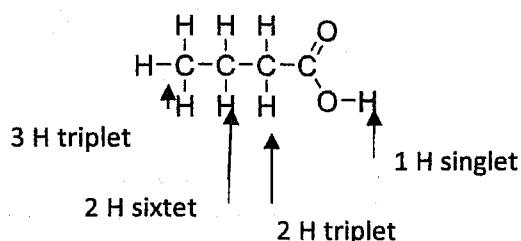
Stoichiometric ratio $\text{H}_3\text{PO}_4 : \text{Ba}(\text{OH})_2 = 2 : 3$
 $\frac{2}{3} = \frac{0.003 \text{ mol} \times 1000}{0.2 V}$

$V = 22.5 \text{ cm}^3$

(d) (i) a. 3 signals



b. 4 signals



(ii). In (a), carbonyl frequency is around 1710 cm^{-1} (acids) while b shows 1735 cm^{-1} (esters). Also (a) shows broad band around 3000 cm^{-1} for OH group. But (b) doesn't show that broad band