



The Open University of Sri Lanka  
Foundation Certificate Programme in Science  
CMF2205 – 2012/2013. Level 2  
Assignment Test II

Date: 15<sup>th</sup> February 2013

Time: 2.30 pm - 4.00 pm

ANSWER ALL QUESTIONS

PART - A

1. The concentration of a solute X in a solution is  $2.4 \times 10^5 \text{ mol cm}^{-3}$ . Molar mass of the solute X is  $168 \text{ g mol}^{-1}$ . The concentration of the solution in  $\text{mol dm}^{-3}$  is
- (1) 2.4      (2)  $2.4 \times 10^4$       (3)  $7 \times 10^4$       (4)  $2.4 \times 10^5$       (5)  $2.4 \times 10^6$
2. A mixture of gases contain oxygen ( $\text{O}_2$ ), carbon dioxide ( $\text{CO}_2$ ), carbon monoxide ( $\text{CO}$ ) and Argon ( $\text{Ar}$ ). The fraction of gases in the mixture were respectively 0.34, 0.42, 0.2 and 0.04. The % of Ar gas in the mixture
- (1) 2      (2) 0.2      (3) 0.04      (4) 4      (5) 8
3.  $\text{H}_2\text{SO}_4$  is a liquid with a density of  $1.96 \text{ g cm}^{-3}$ . What volume of  $\text{H}_2\text{SO}_4$  should be measured to obtained  $1.204 \times 10^{25}$   $\text{H}_2\text{SO}_4$  molecules ?
- (1)  $1.2 \text{ dm}^3$       (2)  $2.0 \text{ dm}^3$       (3)  $1.0 \text{ dm}^3$       (4)  $1.6 \text{ dm}^3$       (5)  $1.4 \text{ dm}^3$
4. The mole percentage of hydrogen in a mixture of 6 g of hydrogen and 28 g of nitrogen is
- (1) 25      (2) 35      (3) 50      (4) 75      (5) 95
5. Molecular formula of hydrocarbon (A) is  $\text{C}_5\text{H}_6$ . Number of  $\text{sp}^2$  carbons in A is
- (1) 1      (2) 2      (3) 3      (4) 4      (5) 5
6. Which one is not a structural formula of pentene.
- (1)  $\text{CH}_2=\text{CH}-\text{CH}_2-\text{CH}_2-\text{CH}_3$       (2)  $\text{CH}_3-\text{CH}=\text{CH}-\text{CH}_2-\text{CH}_3$       (3)  $\text{CH}_3-\text{CH}_2-\text{CH}=\text{CH}-\text{CH}_3$
- (4)  $\text{CH}_3-\text{CH}=\underset{\text{CH}_3}{\text{C}}-\text{CH}_3$       (5)  $\text{CH}_3-\overset{\text{CH}_3}{\text{C}}=\underset{\text{CH}_3}{\text{C}}-\text{CH}_3$
7. What is the IUPAC name of the following compound.
- 
- (1) 4-Bromo-5-hydroxy-2-pentenoic acid  
(2) 2-Bromo-5-hydroxy-3-pentenoic acid  
(3) 3-Bromo-4-hydroxy-2-pentenoic acid  
(4) 1-Carboxy-4-bromo-5-hydroxy-pent-2-ene  
(5) 4-Bromo-5-hydroxy-5-carboxy-pent-2-ene

8. A solution of  $\text{Na}_2\text{SO}_4$  has been prepared by dissolving 142 mg of  $\text{Na}_2\text{SO}_4$  in water, in a  $500 \text{ cm}^3$  volumetric flask and by diluting up to the mark. The  $\text{Na}^+$  ion concentration in  $\text{mg dm}^{-3}$  units in this solution is
- (1)  $4.00 \times 10^{-3}$  (2) 46 (3) 184 (4)  $2.00 \times 10^{-3}$  (5) 92
9. The concentration of three HCl solution are  $0.050 \text{ mol dm}^{-3}$ ,  $0.200 \text{ mol dm}^{-3}$ , and  $0.300 \text{ mol dm}^{-3}$  respectively  $200 \text{ cm}^3$ ,  $200 \text{ cm}^3$  and  $300 \text{ cm}^3$  of these solutions were mixed together. The concentration of the resulting solution is
- (1)  $0.20 \text{ mol dm}^{-3}$  (2)  $0.26 \text{ mol dm}^{-3}$  (3)  $0.23 \text{ mol dm}^{-3}$  (4)  $0.21 \text{ mol dm}^{-3}$  (5)  $0.30 \text{ mol dm}^{-3}$
10. An organic compound containing C, H and O only. It has 29.6% oxygen by mass. Its relative molecular mass is 270. How many oxygen atoms are present in a molecule of this organic compound.
- (1) 3 (2) 5 (3) 4 (4) 2 (5) 1
11. A HCl solution contains 36.5% by mass of HCl. The density of the solution is  $1.15 \text{ g cm}^{-3}$ . What is the concentration of HCl in the solution in units of  $\text{mol dm}^{-3}$ ?
- (1) 0.575 (2) 1.15 (3) 11.5 (4) 115 (5) 5.75
12. Consider the three carbonium ions a, b and d. The order of increasing stability of the ions is
- $\text{CH}_3\text{CH}_2^+$   
a

$\begin{array}{c} \text{H} \\ | \\ \text{CH}_3\text{C}^+ \\ | \\ \text{CH}_3 \end{array}$   
b

$\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3\text{C}^+ \\ | \\ \text{CH}_3 \end{array}$   
d
- (1)  $a < b < d$  (2)  $a < d < b$  (3)  $d < b < a$  (4)  $b < a < d$  (5)  $b < d < a$
13. Which of the following can undergo addition ozone molecule
- (1)  $\text{C}_2\text{H}_6$  (2)  $\text{C}_2\text{H}_2$  (3)  $\text{C}_2\text{H}_2\text{Cl}_2$  (4)  $\text{C}_2\text{H}_2\text{Cl}_4$  (5)  $\text{C}_2\text{H}_3\text{Cl}_2\text{Br}_2$
14. Which of the following compounds decolourises Baeyer's reagent but does not react with ammonical silver nitrate
- (1)  $\text{C}_2\text{H}_6$  (2)  $\text{CH}_4$  (3)  $\text{C}_2\text{H}_2$  (4)  $\text{C}_2\text{H}_4$  (5) None of the above
15. What is the molarity of a solution made by dissolving 2.925g of NaCl in water and the total volume made up to  $200 \text{ cm}^3$  of solution?
- (1) 0.3 (2) 0.2 (3) 0.25 (4) 2 (5) 0.5
16. Weight of  $4.6 \times 10^{22}$  atoms of an element is 13.8 g. The atomic mass of the element is
- (1) 11.4 (2) 34.4 (3) 290 (4) 180 (5) 138

17. In the reaction between  $\text{Cr}_2\text{O}_7^{2-}$  and  $\text{H}_2\text{O}_2$  in an acidic medium,  $\text{H}_2\text{O}_2$  is oxidised to  $\text{O}_2$  and  $\text{Cr}_2\text{O}_7^{2-}$  is converted to  $\text{Cr}^{3+}$ . The correct equation for this reaction is

- (1)  $\text{Cr}_2\text{O}_7^{2-} + 8\text{H}^+ + \text{H}_2\text{O}_2 \longrightarrow 2\text{Cr}^{3+} + 5\text{H}_2\text{O} + \text{O}_2$   
 (2)  $\text{Cr}_2\text{O}_7^{2-} + 8\text{H}^+ + 3\text{H}_2\text{O}_2 \longrightarrow 2\text{Cr}^{3+} + 7\text{H}_2\text{O} + 3\text{O}_2$   
 (3)  $\text{Cr}_2\text{O}_7^{2-} + 8\text{H}^+ + 5\text{H}_2\text{O}_2 \longrightarrow 2\text{Cr}^{3+} + 9\text{H}_2\text{O} + 5\text{O}_2$   
 (4)  $\text{Cr}_2\text{O}_7^{2-} + 8\text{H}^+ + 7\text{H}_2\text{O}_2 \longrightarrow 2\text{Cr}^{3+} + 11\text{H}_2\text{O} + 7\text{O}_2$   
 (5)  $\text{Cr}_2\text{O}_7^{2-} + 8\text{H}^+ + 9\text{H}_2\text{O}_2 \longrightarrow 2\text{Cr}^{3+} + 13\text{H}_2\text{O} + 9\text{O}_2$

18. The number of atoms in 0.024g of the  $^{12}\text{C}$  isotope is

- (1)  $12.044 \times 10^{15}$  (2)  $12.044 \times 10^{20}$  (3)  $12.044 \times 10^{21}$  (4)  $6.022 \times 10^{19}$  (5)  $6.022 \times 10^{20}$

19. How many moles of hydrogen atoms are present in 0.10 kg of solution of ethanol in water containing 10% by mass of ethanol ( $\text{C}_2\text{H}_5\text{OH}$ )

- (1) 1.4 (2) 10.0 (3) 11.30 (4) 5.2 (5) 5.7

20. Which of the following molecules has highest boiling point ?

- (1)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$  (2)  $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3 - \text{C} - \text{CH}_3 \\ | \\ \text{CH}_3 \end{array}$  (3)  $\begin{array}{c} \text{CH}_3\text{CHCH}_2\text{CH}_3 \\ | \\ \text{CH}_3 \end{array}$  (4)  $\begin{array}{c} \text{CH}_3\text{CHCH}_3 \\ | \\ \text{CH}_3 \end{array}$   
 (5)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{-CH}_3$

———— // ————

Relative atomic mass H = 1, C = 12, N = 14, O = 16, Na = 23, S = 32, Cl = 35.5

Avogadro constant =  $6.022 \times 10^{23}$

**PART - B**

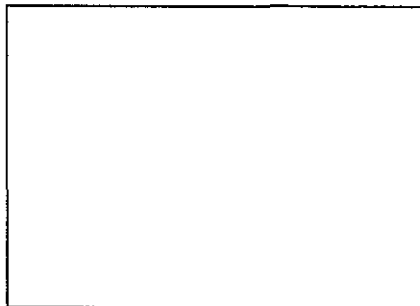
1. (a). The organic compound **P** contains 47.4 % carbon 2.63 % hydrogen 18.4% nitrogen and oxygen only .The relative molecular mass of **P** is about 150. Determine the molecular formula of **P**.

P කාබනික සංයෝගයෙහි කාබන් 47.4%, හයිඩ්‍රජන් 2.63%, නයිට්‍රජන් 18.4%. සහ ඔක්සිජන් පමණක් අඩංගු වේ. එම සංයෝගයෙහි ආරේක්ෂිත අණුක ස්කන්ධය 150 ක් පමණ වේ. නම් එම සංයෝගයට අදාළ අණුක සූත්‍රය නිර්ණය කරන්න.

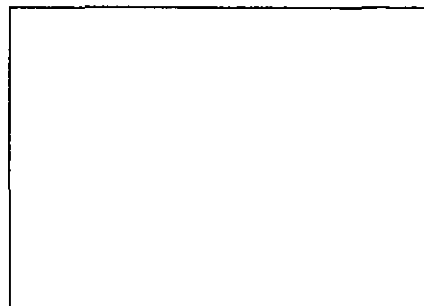
- (b) **A** and **B** hydrocarbons are geometrical isomers each having two  $sp^2$ -hybridised carbon atoms and two  $sp^3$ -hybridised carbon atoms only.

Write the structures of **A** and **B**

A සහ B සසිද්‍රෝනාභව ජනමිතික සමාමයඵ්කතාව පෙන්වන අතර එක් එක් අණුවෙහි  $sp^2$  මුහුම්කරණය ඇති C පරමාණු 2 ක් සහ  $sp^3$  මුහුම්කරණය ඇති C පරමාණු 2 ක් පමණක් ඇත. A සහ B හි ව්‍යුහ ඇඳ පෙන්වන්න



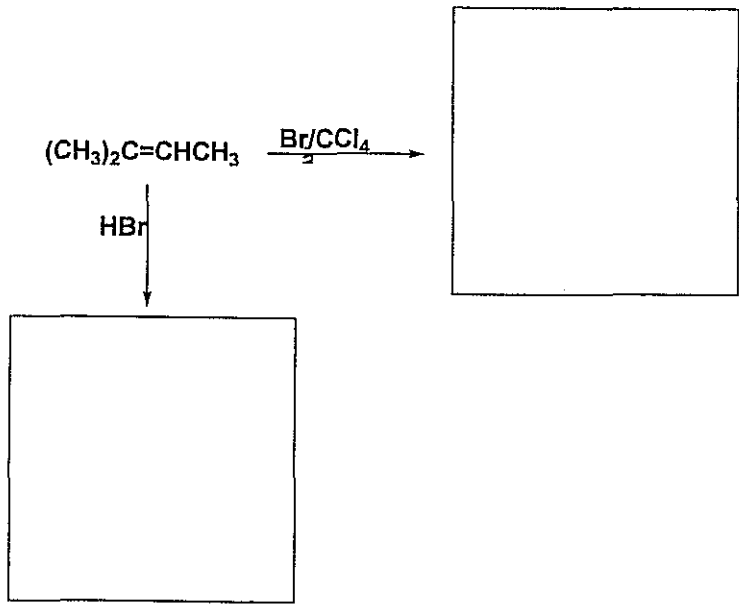
**A**



**B**

(c) Give the products of the following reactions.

පහත ප්‍රතික්‍රියා මගින් ඇතිවන ඵල ලියා දක්වන්න.



2. (a) 50.0 cm<sup>3</sup> of H<sub>2</sub>SO<sub>4</sub> solution was titrated with a standard solution of 0.25 mol dm<sup>-3</sup> NaOH using phenolphtheline as an indicator. 30.0 cm<sup>3</sup> of the standard solution is needed for complete colour change(or neutralization) Calculate the concentration of the H<sub>2</sub>SO<sub>4</sub> solution

50.0 cm<sup>3</sup> H<sub>2</sub>SO<sub>4</sub> ප්‍රමාණයක්, 0.25 M සම්මත ප්‍රමාණයක් ආලෝක රිතයට පත් කිරීමේ දී දර්ශකය නැවත කර දැනුවත් කරන කිරීමට NaOH ප්‍රමාණයෙන් 30.0 cm<sup>3</sup> පරිමාවක් උදාහරණයක් සඳහා අවශ්‍ය වේ නම් H<sub>2</sub>SO<sub>4</sub> ප්‍රමාණයෙහි සාන්ද්‍රණය ගණනය කරන්න.

(b) Write the balanced chemical equations for each of the following

පහත ප්‍රතික්‍රියා සඳහා තුලිත සමීකරණ ලියා දක්වන්න.

(i) The complete combustion of rocket fuel hydrazine ( $N_2H_4$ ) giving products  $NO_2$  and  $H_2O$

රොකට් ඉන්ධනයක් වන හයිඩ්‍රොජන් ( $N_2H_4$ ) සම්පූර්ණ දහනයෙන්  $NO_2$  සහ  $H_2O$  යන ඵල සාදයි.

(ii) The combustion of propane ( $C_3H_8$ ) in excess oxygen.

එතේන් වැනිකරණ සමග ඉතාමත් දහනය කර වීම

(iii) The oxidation of  $Fe^{2+}$  to  $Fe^{3+}$  by acidified  $MnO_4^-$  where  $MnO_4^-$  is reduced to  $Mn^{2+}$

ද්‍රාව්‍ය අක්ෂිකරණයක් සඳහා  $MnO_4^-$  වැනි  $Fe^{2+}$   $Fe^{3+}$  වෙත වැනිකරණය වීම. (මෙහිදී  $MnO_4^-$   $Mn^{2+}$  වෙත වැනිකරණය වේ)



ശ്രീ ലංකා විഖ്യാത විශ്വവിദ്യാലയം  
 വിദ്യാർത്ഥി പരീക്ഷാപത്രം - CMF 2205

2012 - 2013

പരീക്ഷാ പദവികൾ - II

2013-02-15

സ.മ 2.30 - സ.മ 4.00

കീഴെ പറയുന്ന ചോദ്യങ്ങൾക്ക് ഉത്തരം നൽകുക

Part A (മുഴുവൻ ചോദ്യങ്ങൾക്കും =  $6.022 \times 10^{23}$ )

1. 168 g mol<sup>-1</sup> ഉള്ള ഒരു പദാർത്ഥത്തിന്റെ മൂലകങ്ങളുടെ എണ്ണം  $2.4 \times 10^{23}$  mol cm<sup>-3</sup> ആണ്. ഈ പദാർത്ഥത്തിന്റെ മൂലകങ്ങളുടെ എണ്ണം mol dm<sup>-3</sup> ആണ്.

(1) 2.4 (2)  $2.4 \times 10^4$  (3)  $7 \times 10^4$  (4)  $2.4 \times 10^5$  (5)  $2.4 \times 10^6$
2. ഓക്സിജൻ (O<sub>2</sub>), കാർബൺ ഡൈഓക്സൈഡ് (CO<sub>2</sub>), നൈട്രജൻ ഡൈഓക്സൈഡ് (NO<sub>2</sub>) എന്നീ വാതകങ്ങൾ (Ar) ചേർന്ന ഒരു മിശ്രിതം ഉണ്ട്. ഈ മിശ്രിതത്തിന്റെ ഓക്സിജൻ അംശം (fraction) 0.34, 0.42, 0.2, 0.04 ആണ്. ഈ മിശ്രിതത്തിൽ Ar വാതകത്തിന്റെ അംശം കണ്ടെത്തുക.

(1) 2 (2) 0.2 (3) 0.04 (4) 4 (5) 8
3. 1.96 g cm<sup>-3</sup> ഉള്ള ഒരു ദ്രവത്തിന്റെ 1.204 × 10<sup>25</sup> കണികകൾ ഉണ്ടാകാൻ ആവശ്യമായ ദ്രവത്തിന്റെ വ്ലൂമിനെ കണ്ടെത്തുക.

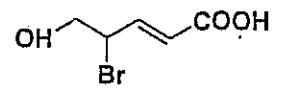
(1) 1.2 dm<sup>3</sup> (2) 2.0 dm<sup>3</sup> (3) 1.0 dm<sup>3</sup> (4) 1.6 dm<sup>3</sup> (5) 1.4 dm<sup>3</sup>
4. 6g ഓക്സിജൻ 28g ഓക്സിജൻ ഉള്ള ഒരു മിശ്രിതത്തിൽ ഓക്സിജൻ അംശം കണ്ടെത്തുക.

(1) 25 (2) 35 (3) 50 (4) 75 (5) 95
5.  $C_5H_6$  എന്ന ഒരു ഹൈഡ്രോകാർബണിന്റെ ഓക്സിജൻ അംശം  $sp^2$  ഉള്ള ക്രമീകരണം ഉണ്ടാകാൻ ആവശ്യമായ ഓക്സിജൻ അംശം കണ്ടെത്തുക.

(1) 1 (2) 2 (3) 3 (4) 4 (5) 5
6. താഴെ പറയുന്നവയിൽ ഏതൊരു ഹൈഡ്രോകാർബണിന്റെ ഓക്സിജൻ അംശം  $sp^2$  ഉള്ള ക്രമീകരണം ഉണ്ടാകാൻ ആവശ്യമായ ഓക്സിജൻ അംശം കണ്ടെത്തുക.

(1)  $CH_2=CH-CH_2-CH_2-CH_3$  (2)  $CH_3-CH=CH-CH_2-CH_3$  (3)  $CH_3-CH_2-CH=CH-CH_3$

(4)  $CH_3-CH=C(CH_3)-CH_3$  (5)  $CH_3-C(CH_3)=C(CH_3)-CH_3$



7. මෙම සංයෝගයේ IUPAC නාමකරණයට දැනුවත් නම වන්නේ

- (1) 4-Bromo-5-hydroxy-2-pentenoic acid
- (2) 2-Bromo-5-hydroxy-3-pentenoic acid
- (3) 3-Bromo-4-hydroxy-2-pentenoic acid
- (4) 1-Carboxy-4-bromo-5-hydroxy-pent-2-ene
- (5) 4-Bromo-5-hydroxy-5-carboxy-pent-2-ene

8. පරිමාව  $500 \text{ cm}^3$  වූ පරිමාමිතික ප්ලාස්ටික් තුළ  $\text{Na}_2\text{SO}_4$  142 mg ආවේණික කර ප්ලාස්ටික් ප්ලාස්ටික් කාළා ඒය එහි මවකය හෙත් ප්ලාස්ටික් තනුක කරනු ලබේ. එම ප්ලාස්ටික් දැඩියු  $\text{Na}^+$  දියන ආක්ෂරය  $\text{mg dm}^{-3}$  එකක වූයේ.

- (1)  $4.00 \times 10^{-3}$  (2) 46 (3) 184 (4)  $2.00 \times 10^{-3}$  (5) 92

9. ආක්ෂරය පිළිවෙලින්  $0.050 \text{ mol dm}^{-3}$ ,  $0.200 \text{ mol dm}^{-3}$  සහ  $0.300 \text{ mol dm}^{-3}$  වූ HCl ප්ලාස්ටික් පිළිවෙලින්  $200 \text{ cm}^3$ ,  $200 \text{ cm}^3$  සහ  $300 \text{ cm}^3$  ප්ලාස්ටික් එක් කර මිශ්‍රණයක් ආදාහන් වූ ලදී. එම මිශ්‍රණයේ ආක්ෂරය වූයේ

- (1)  $0.20 \text{ mol dm}^{-3}$  (2)  $0.26 \text{ mol dm}^{-3}$  (3)  $0.23 \text{ mol dm}^{-3}$  (4)  $0.21 \text{ mol dm}^{-3}$  (5)  $0.30 \text{ mol dm}^{-3}$

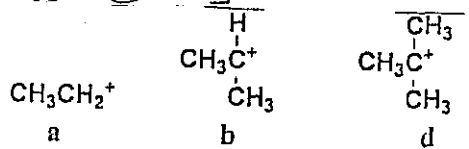
10. කාබනික සංයෝගයක කාබන්, හයිඩ්‍රජන් සහ මන්සිරන් පරමාණු අඩංගු ස්කන්ධය දැනුවත් 29.6%. මන්සිරන් අඩංගු වේ. එහි ආරෝක්ෂණ දරණ ස්කන්ධය 270 ක් වන්නේ නම් එහි දරණයක අඩංගු මන්සිරන් පරමාණු ගණන කොපමණ ද?

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

11. HCl දැඩියු ප්ලාස්ටික් 36.5% ක් ස්කන්ධය දැනුවත් HCl අඩංගු වේ. ප්ලාස්ටික් ආකාරය 1.15  $\text{g cm}^{-3}$  වේ නම් HCl ප්ලාස්ටික් ආක්ෂරය  $\text{mol dm}^{-3}$  වූයේ කොපමණ ද?

- (1) 0.575 (2) 1.15 (3) 11.5 (4) 115 (5) 5.75

12. පහත දී ඇති a, b, d නම් වූ කාබොනික් දියන 3 සලකන්න. එහි ස්ථායීතාව වැඩිවන පිළිවෙල වූයේ



- (1)  $a < b < d$  (2)  $a < d < b$  (3)  $d < b < a$  (4)  $b < a < d$  (5)  $b < d < a$



8. පහත කුමන අර්ථයට ඔක්සිජන් අර්ථයේ ආකල්පය කළ හැකිද?  
 (1) C<sub>2</sub>H<sub>6</sub> (2) C<sub>2</sub>H<sub>2</sub> (3) C<sub>2</sub>H<sub>2</sub>Cl<sub>2</sub> (4) C<sub>2</sub>H<sub>2</sub>Cl<sub>4</sub> (5) C<sub>2</sub>H<sub>3</sub>Cl<sub>2</sub>Br<sub>2</sub>

14. පහත කුමන අර්ථයේ ඔක්සිජන් (Baeyer's) ප්‍රතික්‍රියාවේ සමග විවර්ත වන නමුත්  
 ඇමෝනියාම සිල්වර් නයිට්‍රේට් සමග ප්‍රතික්‍රියා නොකරයිද?  
 (1) C<sub>2</sub>H<sub>6</sub> (2) CH<sub>4</sub> (3) C<sub>2</sub>H<sub>2</sub> (4) C<sub>2</sub>H<sub>4</sub> (5) None of the above

15. NaCl 2.925 g ක් ජලයෙහි ජලයෙහි දිය කර මුළු පරිමාව 200 cm<sup>3</sup>  
 ක් ලෙස සාදා ගන්නා ලද ද්‍රාවණයක මවුලිකතාව වන්නේ  
 (1) 0.3 (2) 0.2 (3) 0.25 (4) 2 (5) 0.5

16. පරමාණු 4.6 x 10<sup>22</sup> අඩංගු සහ අභ්‍යන්තර 13.8 g වන සංඝටනයක සමස්ත  
 පරමාණුක අභ්‍යන්තර වන්නේ  
 (1) 11.4 (2) 34.4 (3) 290 (4) 180 (5) 138

17. ආම්ලික මාධ්‍යයේ Cr<sub>2</sub>O<sub>7</sub> සහ H<sub>2</sub>O<sub>2</sub> සමග සිදුවන ප්‍රතික්‍රියාවේ H<sub>2</sub>O<sub>2</sub>  
 O<sub>2</sub> බවට ඔක්සිකරණය වන අතර Cr<sub>2</sub>O<sub>7</sub><sup>2-</sup> Cr<sup>3+</sup> බවට පත්වේ. ඒ අනුව  
 ලියන ප්‍රතික්‍රියාව සඳහා නිවැරදි සමීකරණය වන්නේ,  
 (1) Cr<sub>2</sub>O<sub>7</sub><sup>2-</sup> + 8H<sup>+</sup> + H<sub>2</sub>O<sub>2</sub> → 2Cr<sup>3+</sup> + 5H<sub>2</sub>O + O<sub>2</sub>  
 (2) Cr<sub>2</sub>O<sub>7</sub><sup>2-</sup> + 8H<sup>+</sup> + 3H<sub>2</sub>O<sub>2</sub> → 2Cr<sup>3+</sup> + 7H<sub>2</sub>O + 3O<sub>2</sub>  
 (3) Cr<sub>2</sub>O<sub>7</sub><sup>2-</sup> + 8H<sup>+</sup> + 5H<sub>2</sub>O<sub>2</sub> → 2Cr<sup>3+</sup> + 9H<sub>2</sub>O + 5O<sub>2</sub>  
 (4) Cr<sub>2</sub>O<sub>7</sub><sup>2-</sup> + 8H<sup>+</sup> + 7H<sub>2</sub>O<sub>2</sub> → 2Cr<sup>3+</sup> + 11H<sub>2</sub>O + 7O<sub>2</sub>  
 (5) Cr<sub>2</sub>O<sub>7</sub><sup>2-</sup> + 8H<sup>+</sup> + 9H<sub>2</sub>O<sub>2</sub> → 2Cr<sup>3+</sup> + 13H<sub>2</sub>O + 9O<sub>2</sub>

18. 0.024 g අභ්‍යන්තරයක ඇති C<sup>12</sup> සමස්තයක සමස්ත පරමාණු ගණන වන්නේ  
 (1) 12.044 x 10<sup>15</sup> (2) 12.044 x 10<sup>20</sup> (3) 12.044 x 10<sup>21</sup> (4) 6.022 x 10<sup>19</sup> (5) 6.022 x 10<sup>20</sup>

19. ජලයෙහි 0.10 kg අභ්‍යන්තරයක් ඇති එනනෝල් ද්‍රාවණයක අභ්‍යන්තරයෙන් 10%  
 එනනෝල් ඇතිවීමේ අවශ්‍යතාවය සොයා ගැනීමට අවශ්‍ය වන සමස්ත පරමාණුක බර  
 අනුපාතය වේද? (C<sub>2</sub>H<sub>5</sub>OH)  
 (1) 1.4 (2) 10.0 (3) 11.30 (4) 5.2 (5) 5.7

20. මූලික නාමකය ඇති අර්ථය වන්නේ  
 (1) CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>3</sub> (2)  $\begin{matrix} \text{CH}_3 \\ | \\ \text{CH}_3 - \text{C} - \text{CH}_3 \\ | \\ \text{CH}_3 \end{matrix}$  (3)  $\begin{matrix} \text{CH}_3\text{CHCH}_2\text{CH}_3 \\ | \\ \text{CH}_3 \end{matrix}$  (4)  $\begin{matrix} \text{CH}_3\text{CHCH}_3 \\ | \\ \text{CH}_3 \end{matrix}$   
 (5) CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>-CH<sub>3</sub>

PART - B

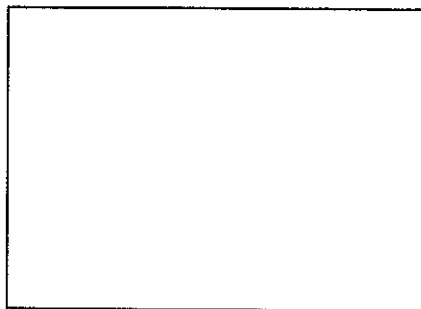
1. (a). The organic compound P contains 47.4 % carbon 2.63 % hydrogen 18.4% nitrogen and oxygen only .The relative molecular mass of P is about 150. Determine the molecular formula of P.

P කාබනික සංයෝගයෙහි කාබන් 47.4% , හයිඩ්‍රජන් 2.63% , නයිට්‍රජන් 18.4% සහ ඔක්සිජන් පමණක් අඩංගු වේ. එම සංයෝගයෙහි ආපේක්ෂිත අණුක ස්කන්ධය 150 ක් පමණ වේ. නම් එම සංයෝගයට අදාළ අණුක සූත්‍රය නිර්ණය කරන්න.

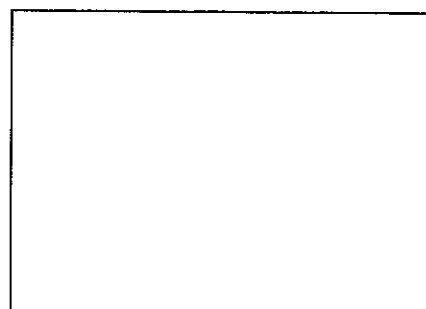
- (b) A and B hydrocarbons are geometrical isomers each having two  $sp^2$ -hybridised carbon atoms and two  $sp^3$ -hybridised carbon atoms only.

Write the structures of A and B

A සහ B හයිඩ්‍රොකාබන ජනවිතික සමායෝජිතතාව පෙන්වන අතර එක් එක් අණුවෙහි  $sp^2$  මුහුම්කරණය ඇති C පරමාණු 2 ක් සහ  $sp^3$  මුහුම්කරණය ඇති C පරමාණු 2 ක් පමණක් ඇත. A සහ B හි ව්‍යුහ ඇඳ පෙන්වන්න



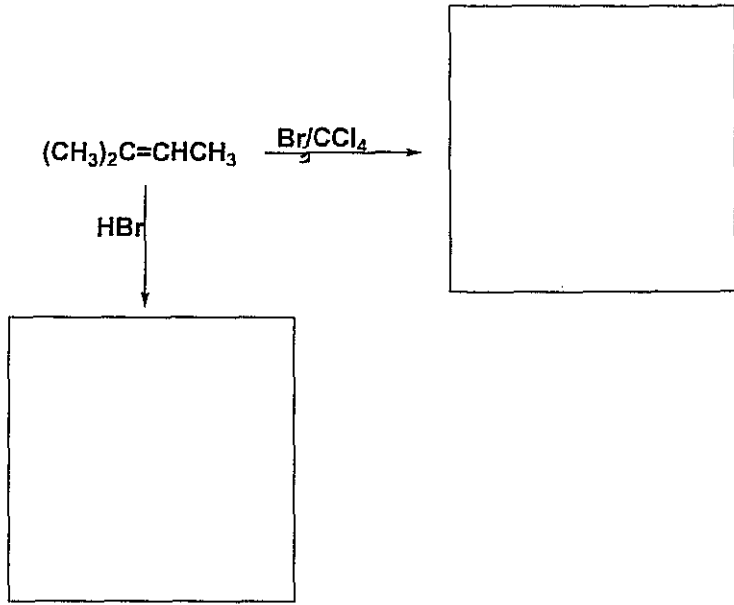
A



B

(c) Give the products of the following reactions.

පහත ප්‍රතික්‍රියාවලට අදාළ ඵල ලියා දක්වන්න.



2. (a) 50.0cm<sup>3</sup> of H<sub>2</sub>SO<sub>4</sub> solution was titrated with a standard solution of 0.25 mol dm<sup>-3</sup> NaOH using phenolphtheline as an indicator. 30.0 cm<sup>3</sup> of the standard solution is needed for complete colour change(or neutralization) Calculate the concentration of the H<sub>2</sub>SO<sub>4</sub> solution

50.0 cm<sup>3</sup> H<sub>2</sub>SO<sub>4</sub> ද්‍රාවණයක්, 0.25 M සම්මත ද්‍රාවණයක් භාවිතා කර ගිනිකොළ පිටුරු දැක්වීම සඳහා සම්පූර්ණයෙන්ම වර්ණ වෙනසක් සඳහා අවශ්‍ය වූ NaOH ද්‍රාවණයේ 30.0 cm<sup>3</sup> පරිමාවක් උදාහරණයක් ලෙසින් අවශ්‍ය වේ. මෙහි H<sub>2</sub>SO<sub>4</sub> ද්‍රාවණයේ සාන්ද්‍රණය ගණනය කරන්න.

(b) Write the balanced chemical equations for each of the following

එහෙක ප්‍රතික්‍රියා සඳහා තුලිත සමීකරණ ලියා දක්වන්න.

(i) The complete combustion of rocket fuel hydrazine ( $N_2H_4$ ) giving products  $NO_2$  and  $H_2O$

රොකට් ග්‍රන්ථකයක් වන හයිඩ්‍රොජන් ( $N_2H_4$ ) අක්ෂර්‍ය දහනයෙන්  $NO_2$  සහ  $H_2O$  යන ඵල සෑදේ.

(ii) The combustion of propane ( $C_3H_8$ ) in excess oxygen.

එක්ෂර වස්තුව සමඟ ජ්‍යෙෂ්ඨ දහනය කර වීම

(iii) The oxidation of  $Fe^{2+}$  to  $Fe^{3+}$  by acidified  $MnO_4^-$  where  $MnO_4^-$  is reduced to  $Mn^{2+}$

දියුලිත තත්ව යටතේ  $MnO_4^-$  වලින්  $Fe^{2+}$   $Fe^{3+}$  වුවට වස්තුවර්‍යය වීම. (වෛද්‍ය  $MnO_4^-$   $Mn^{2+}$  වුවට වස්තුවර්‍යය වීම)



இலங்கைத் திறந்த பல்கலைக்கழகம்  
அத்திவார பாடநெறி விஞ்ஞானம்  
CMF2205 – 2012/2013. மட்டம் 2  
மதிப்பீட்டிடு பரீட்சை II

திகதி 15-02-2013

நேரம் பி.ப2.30 – பி.ப4.30

1. கரைசல் ஒன்றிலுள்ள கரையம்  $x$  இனது செறிவு  $2.4 \times 10^3 \text{ mol cm}^{-3}$  கரையம்  $x$  இனது மூலர்திணிவு  $168 \text{ g mol}^{-1}$  எனின் கரைசலின் செறிவு  $\text{mol dm}^{-3}$  யில் யாது?  
(1) 2.4 (2)  $2.4 \times 10^4$  (3)  $7 \times 10^4$  (4)  $2.4 \times 10^5$  (5)  $2.4 \times 10^6$
2. ஓட்சிசன்( $\text{O}_2$ ), காபனீரொட்சைட்டு( $\text{CO}_2$ ), காபனோரொட்சைட்டு( $\text{CO}$ ) மற்றும் ஆர்கன்( $\text{Ar}$ ) எனும் வாயுக்களை கொண்ட வாயுக்கலவையினுள் அவ்வாயுக்களின் பின்னங்கள் முறையே 0.34, 0.42, 0.2 மற்றும் 0.04 ஆகும். அக்கலவையினுள் வாயு  $\text{Ar}$  காணப்படும் % யாது?  
(1) 2 (2) 0.2 (3) 0.04 (4) 4 (5) 8
3.  $\text{H}_2\text{SO}_4$  ஆனது  $1.96 \text{ g cm}^{-3}$  எனும் அடர்த்தியுடைய திரவம் ஆகும்.  $1.204 \times 10^{25}$   $\text{H}_2\text{SO}_4$  மூலக்கூறுகளை பெறுவதற்கு தேவையான  $\text{H}_2\text{SO}_4$  இனது கனவளவு யாது?  
(1)  $1.2 \text{ dm}^3$  (2)  $2.0 \text{ dm}^3$  (3)  $1.0 \text{ dm}^3$  (4)  $1.6 \text{ dm}^3$  (5)  $1.4 \text{ dm}^3$
4. 6 g ஐதரசன் மற்றும் 28 g நைதரசன் கொண்ட கலவையினுள், ஐதரசனது மூல் சதவீதம் யாது?  
(1) 25 (2) 35 (3) 50 (4) 75 (5) 95
5. ஐதரோகாபன் (A) இனது மூலக்கூற்றுக்குத்திரம்  $\text{C}_5\text{H}_6$  ஆகும். A யினுள் காணப்படும்  $\text{sp}^2$  காபன்களின் எண்ணிக்கை?  
(1) 1 (2) 2 (3) 3 (4) 4 (5) 5
6. பின்வருவனவற்றுள் எது pentene இற்குரிய மூலக்கூற்றுக்குத்திரம் அல்லாதது?  
(1)  $\text{CH}_2=\text{CH}-\text{CH}_2-\text{CH}_2-\text{CH}_3$  (2)  $\text{CH}_3-\text{CH}=\text{CH}-\text{CH}_2-\text{CH}_3$  (3)  $\text{CH}_3-\text{CH}_2-\text{CH}=\text{CH}-\text{CH}_3$   
(4)  $\text{CH}_3-\text{CH}=\text{C}-\text{CH}_3$  (5)  $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3-\text{C}=\text{C}-\text{CH}_3 \\ | \\ \text{CH}_3 \end{array}$



The Open University of Sri Lanka  
Foundation Certificate Programme in Science  
CMF2205 – 2012/2013. Level 2  
Assignment Test II

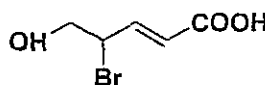
Date: 15<sup>th</sup> February 2013

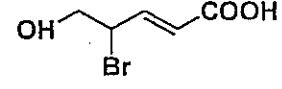
Time: 2.30 pm - 4.00 pm

ANSWER ALL QUESTIONS

PART - A

1. The concentration of a solute X in a solution is  $2.4 \times 10^3 \text{ mol cm}^{-3}$ . Molar mass of the solute X is  $168 \text{ g mol}^{-1}$ . The concentration of the solution in  $\text{mol dm}^{-3}$  is
- (1) 2.4      (2)  $2.4 \times 10^4$       (3)  $7 \times 10^4$       (4)  $2.4 \times 10^5$       (5)  $2.4 \times 10^6$
2. A mixture of gases contain oxygen ( $\text{O}_2$ ), carbondioxide ( $\text{CO}_2$ ), carbonmonoxide (CO) and Argon (Ar). The fraction of gases in the mixture were respectively 0.34, 0.42, 0.2 and 0.04. The % of Ar gas in the mixture
- (1) 2      (2) 0.2      (3) 0.04      (4) 4      (5) 8
3.  $\text{H}_2\text{SO}_4$  is a liquid with a density of  $1.96 \text{ g cm}^{-3}$ . What volume of  $\text{H}_2\text{SO}_4$  should be measured to obtained  $1.204 \times 10^{25}$   $\text{H}_2\text{SO}_4$  molecules ?
- (1)  $1.2 \text{ dm}^3$       (2)  $2.0 \text{ dm}^3$       (3)  $1.0 \text{ dm}^3$       (4)  $1.6 \text{ dm}^3$       (5)  $1.4 \text{ dm}^3$
4. The mole percentage of hydrogen in a mixture of 6 g of hydrogen and 28 g of nitrogen is
- (1) 25      (2) 35      (3) 50      (4) 75      (5) 95
5. Molecular formula of hydrocarbon (A) is  $\text{C}_5\text{H}_6$ . Number of  $\text{sp}^2$  carbons in A is
- (1) 1      (2) 2      (3) 3      (4) 4      (5) 5
6. Which one is not a structural formula of pentene.
- (1)  $\text{CH}_2=\text{CH}-\text{CH}_2-\text{CH}_2-\text{CH}_3$       (2)  $\text{CH}_3-\text{CH}=\text{CH}-\text{CH}_2-\text{CH}_3$       (3)  $\text{CH}_3-\text{CH}_2-\text{CH}=\text{CH}-\text{CH}_3$
- (4)  $\text{CH}_3-\text{CH}=\underset{\text{CH}_3}{\text{C}}-\text{CH}_3$       (5)  $\text{CH}_3-\overset{\text{CH}_3}{\text{C}}=\underset{\text{CH}_3}{\text{C}}-\text{CH}_3$
7. What is the IUPAC name of the following compound.
- (1) 4-Bromo-5-hydroxy-2-pentenoic acid  
(2) 2-Bromo-5-hydroxy-3-pentenoic acid  
(3) 3-Bromo-4-hydroxy-2-pentenoic acid  
(4) 1-Carboxy-4-bromo-5-hydroxy-pent-2-ene  
(5) 4-Bromo-5-hydroxy-5-carboxy-pent-2-ene





7. தரப்பட்ட சேர்வையின் IUPAC பெயரீடு யாது?

- (1) 4-Bromo-5-hydroxy-2-pentenoic acid
- (2) 2-Bromo-5-hydroxy-3-pentenoic acid
- (3) 3-Bromo-4-hydroxy-2-pentenoic acid
- (4) 1-Carboxy-4-bromo-5-hydroxy-pent-2-ene
- (5) 4-Bromo-5-hydroxy-5-carboxy-pent-2-ene

8.  $500 \text{ cm}^3$  கனவளவு குடுவையினுள்  $142 \text{ mg Na}_2\text{SO}_4$  ஐ நீரில் கரைத்து குறித்த மட்டம் வரை நிரப்பி ஐதாக்கியதன் மூலம் கரைசல்  $\text{Na}_2\text{SO}_4$  தயாரிக்கப்பட்டது. இங்கு  $\text{Na}^+$  அயனின் செறிவு  $\text{mgdm}^{-3}$  அலகில் யாது?

- (1)  $4.00 \times 10^{-3}$
- (2) 46
- (3) 184
- (4)  $2.00 \times 10^{-3}$
- (5) 92

9. தரப்பட்ட மூன்று HCl கரைசலின் செறிவானது  $0.050 \text{ mol dm}^{-3}$ ,  $0.200 \text{ mol dm}^{-3}$ , மற்றும்  $0.300 \text{ mol dm}^{-3}$  ஆகும். இவை முறையே  $200 \text{ cm}^3$ ,  $200 \text{ cm}^3$  மற்றும்  $300 \text{ cm}^3$  எனும் வகையில் கலக்கப்பட்டால் பெறப்படும் விளைவுக்கரைசலின் செறிவு யாது?

- (1)  $0.20 \text{ mol dm}^{-3}$
- (2)  $0.26 \text{ mol dm}^{-3}$
- (3)  $0.23 \text{ mol dm}^{-3}$
- (4)  $0.21 \text{ mol dm}^{-3}$
- (5)  $0.30 \text{ mol dm}^{-3}$

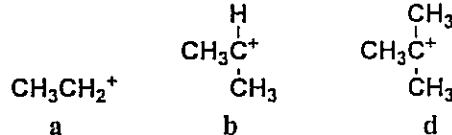
10. C, H, மற்றும் O கொண்ட சேதனச்சேர்வையானது திணிவு ரீதியாக 29.6% ஓட்சிசனை கொண்டது. இதன் சார்மூலக்கூற்றுத்திணிவானது 270. இச்சேர்வை மூலக்கூறில் காணப்படும் ஓட்சிசன் அணுக்களின் எண்ணிக்கை?

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

11. HCl கரைசலானது திணிவு ரீதியாக 36.5% HCl ஐ கொண்டது. கரைசலின் அடர்த்தி  $1.15 \text{ g cm}^{-3}$  எனின், கரைசலிலுள்ள HCl இன் செறிவு  $\text{mol dm}^{-3}$  எனும் அலகில் யாது?

- (1) 0.575
- (2) 1.15
- (3) 11.5
- (4) 115
- (5) 5.75

12. பின்வரும் a, b மற்றும் d எனும் காபோனியம் அயன்களை கருதுக. உறுதித்தன்மையில் அதிகரிக்கும் வரிசை யாது?



- (1)  $a < b < d$
- (2)  $a < d < b$
- (3)  $d < b < a$
- (4)  $b < a < d$
- (5)  $b < d < a$

13. பின்வருவனவற்றுள் எது ஓசோன் மூலக்கூறுடன் கூட்டல் தாக்கமடையும்?

- (1)  $\text{C}_2\text{H}_6$
- (2)  $\text{C}_2\text{H}_2$
- (3)  $\text{C}_2\text{H}_2\text{Cl}_2$
- (4)  $\text{C}_2\text{H}_2\text{Cl}_4$
- (5)  $\text{C}_2\text{H}_3\text{Cl}_2\text{Br}_2$

8. A solution of  $\text{Na}_2\text{SO}_4$  has been prepared by dissolving 142 mg of  $\text{Na}_2\text{SO}_4$  in water, in a  $500 \text{ cm}^3$  volumetric flask and by diluting up to the mark. The  $\text{Na}^+$  ion concentration in  $\text{mg dm}^{-3}$  units in this solution is

- (1)  $4.00 \times 10^{-3}$  (2) 46 (3) 184 (4)  $2.00 \times 10^{-3}$  (5) 92

9. The concentration of three HCl solution are  $0.050 \text{ mol dm}^{-3}$ ,  $0.200 \text{ mol dm}^{-3}$ , and  $0.300 \text{ mol dm}^{-3}$  respectively.  $200 \text{ cm}^3$ ,  $200 \text{ cm}^3$  and  $300 \text{ cm}^3$  of these solutions were mixed together. The concentration of the resulting solution is

- (1)  $0.20 \text{ mol dm}^{-3}$  (2)  $0.26 \text{ mol dm}^{-3}$  (3)  $0.23 \text{ mol dm}^{-3}$  (4)  $0.21 \text{ mol dm}^{-3}$  (5)  $0.30 \text{ mol dm}^{-3}$

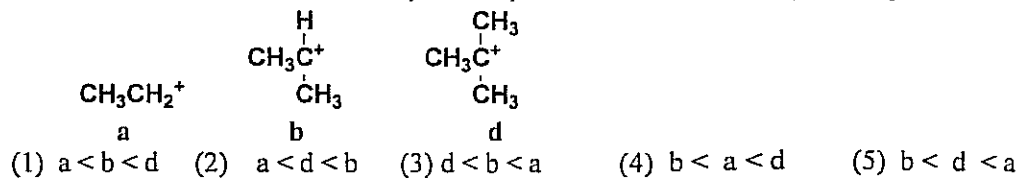
10. An organic compound containing C, H and O only. It has 29.6% oxygen by mass. Its relative molecular mass is 270. How many oxygen atoms are present in a molecule of this organic compound.

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

11. A HCl solution contains 36.5% by mass of HCl. The density of the solution is  $1.15 \text{ g cm}^{-3}$ . What is the concentration of HCl in the solution in units of  $\text{mol dm}^{-3}$ ?

- (1) 0.575 (2) 1.15 (3) 11.5 (4) 115 (5) 5.75

12. Consider the three carbonium ions a, b and d. The order of increasing stability of the ions is



13. Which of the following can undergo addition ozone molecule

- (1)  $\text{C}_2\text{H}_6$  (2)  $\text{C}_2\text{H}_2$  (3)  $\text{C}_2\text{H}_2\text{Cl}_2$  (4)  $\text{C}_2\text{H}_2\text{Cl}_4$  (5)  $\text{C}_2\text{H}_3\text{Cl}_2\text{Br}_2$

14. Which of the following compounds decolourises Baeyer's reagent but does not react with ammonical silver nitrate

- (1)  $\text{C}_2\text{H}_6$  (2)  $\text{CH}_4$  (3)  $\text{C}_2\text{H}_2$  (4)  $\text{C}_2\text{H}_4$  (5) None of the above

15. What is the molarity of a solution made by dissolving 2.925g of NaCl in water and the total volume made up to  $200 \text{ cm}^3$  of solution?

- (1) 0.3 (2) 0.2 (3) 0.25 (4) 2 (5) 0.5

16. Weight of  $4.6 \times 10^{22}$  atoms of an element is 13.8 g. The atomic mass of the element is

- (1) 11.4 (2) 34.4 (3) 290 (4) 180 (5) 138



14. அமோனிக்கல் வெள்ளி நைதரேற்றுடன் தாக்கமடையாத ஆனால் Baeyer's இன் சோதனைப்பொருளை நியந்தக்கமடைய செய்யும் சேர்வை பின்வருவனவற்றுள் எது?

- (1) C<sub>2</sub>H<sub>6</sub> (2) CH<sub>4</sub> (3) C<sub>2</sub>H<sub>2</sub> (4) C<sub>2</sub>H<sub>4</sub> (5) None of the above

15. 2.925 g NaCl ஐ நீரில் கரைத்து மொத்த கனவளவு 200 cm<sup>3</sup> ஆக்கப்பட்ட கரைசலின் மூலத்திறன் யாது?

- (1) 0.3 (2) 0.2 (3) 0.25 (4) 2 (5) 0.5

16. மூலகமொன்றின் 4.6 x 10<sup>22</sup> அணுக்களின் திணிவு 13.8 g எனின் அம்மூலகத்தின் அணுத்திணிவு யாது?

- (1) 11.4 (2) 34.4 (3) 290 (4) 180 (5) 138

17. அமில ஊடகத்தில் Cr<sub>2</sub>O<sub>7</sub><sup>2-</sup> மற்றும் H<sub>2</sub>O<sub>2</sub> என்பன தாக்கமடையும் பொழுது H<sub>2</sub>O<sub>2</sub> ஓட்சியேற்றப்பட்டு O<sub>2</sub> பெறப்படுவதையும் மற்றும் Cr<sub>2</sub>O<sub>7</sub><sup>2-</sup> ஆனது Cr<sup>3+</sup> ஆக மாற்றப்படுவதையும் சரியாக காட்டும் சமன்பாடு யாது?

- (1) Cr<sub>2</sub>O<sub>7</sub><sup>2-</sup> + 8H<sup>+</sup> + H<sub>2</sub>O<sub>2</sub> → 2 Cr<sup>3+</sup> + 5H<sub>2</sub>O + O<sub>2</sub>  
 (2) Cr<sub>2</sub>O<sub>7</sub><sup>2-</sup> + 8H<sup>+</sup> + 3H<sub>2</sub>O<sub>2</sub> → 2 Cr<sup>3+</sup> + 7H<sub>2</sub>O + 3O<sub>2</sub>  
 (3) Cr<sub>2</sub>O<sub>7</sub><sup>2-</sup> + 8H<sup>+</sup> + 5H<sub>2</sub>O<sub>2</sub> → 2 Cr<sup>3+</sup> + 9H<sub>2</sub>O + 5O<sub>2</sub>  
 (4) Cr<sub>2</sub>O<sub>7</sub><sup>2-</sup> + 8H<sup>+</sup> + 7H<sub>2</sub>O<sub>2</sub> → 2 Cr<sup>3+</sup> + 11H<sub>2</sub>O + 7 O<sub>2</sub>  
 (5) Cr<sub>2</sub>O<sub>7</sub><sup>2-</sup> + 8H<sup>+</sup> + 9H<sub>2</sub>O<sub>2</sub> → 2 Cr<sup>3+</sup> + 13H<sub>2</sub>O + 9O<sub>2</sub>

18. 0.024 g <sup>12</sup>C சமதானியிலுள்ள அணுக்களின் எண்ணிக்கை?

- (1) 12.044 x 10<sup>15</sup> (2) 12.044 x 10<sup>20</sup> (3) 12.044 x 10<sup>21</sup> (4) 6.022 x 10<sup>19</sup> (5) 6.022 x 10<sup>20</sup>

19. திணிவு ரீதியாக 10% எதனோலை கொண்ட 0.10 kg எதனோல் நீர்க்கரைசலில் காணப்படும் ஐதரசன் அணுக்களின் மூல் எண்ணிக்கை யாது?

- (1) 1.4 (2) 10.0 (3) 11.30 (4) 5.2 (5) 5.7

20. பின்வருவனவற்றுள் எம்மூலக்கூறு அதிகூடிய கொதிநிலை உடையது?

- (1) CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>3</sub> (2)  $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3 - \text{C} - \text{CH}_3 \\ | \\ \text{CH}_3 \end{array}$  (3)  $\begin{array}{c} \text{CH}_3\text{CHCH}_2\text{CH}_3 \\ | \\ \text{CH}_3 \end{array}$  (4)  $\begin{array}{c} \text{CH}_3\text{CHCH}_3 \\ | \\ \text{CH}_3 \end{array}$   
 (5) CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>-CH<sub>3</sub>

\* ————— \*

அணுத்திணிவு H = 1, C = 12, N = 14, O = 16, Na = 23, S = 32, Cl = 35.5

அவகாதரோ மாறிலி 6.022 x 10<sup>23</sup>

17. In the reaction between  $\text{Cr}_2\text{O}_7^{2-}$  and  $\text{H}_2\text{O}_2$  in an acidic medium,  $\text{H}_2\text{O}_2$  is oxidised to  $\text{O}_2$  and  $\text{Cr}_2\text{O}_7^{2-}$  is converted to  $\text{Cr}^{3+}$ . The correct equation for this reaction is

- (1)  $\text{Cr}_2\text{O}_7^{2-} + 8\text{H}^+ + \text{H}_2\text{O}_2 \longrightarrow 2\text{Cr}^{3+} + 5\text{H}_2\text{O} + \text{O}_2$   
 (2)  $\text{Cr}_2\text{O}_7^{2-} + 8\text{H}^+ + 3\text{H}_2\text{O}_2 \longrightarrow 2\text{Cr}^{3+} + 7\text{H}_2\text{O} + 3\text{O}_2$   
 (3)  $\text{Cr}_2\text{O}_7^{2-} + 8\text{H}^+ + 5\text{H}_2\text{O}_2 \longrightarrow 2\text{Cr}^{3+} + 9\text{H}_2\text{O} + 5\text{O}_2$   
 (4)  $\text{Cr}_2\text{O}_7^{2-} + 8\text{H}^+ + 7\text{H}_2\text{O}_2 \longrightarrow 2\text{Cr}^{3+} + 11\text{H}_2\text{O} + 7\text{O}_2$   
 (5)  $\text{Cr}_2\text{O}_7^{2-} + 8\text{H}^+ + 9\text{H}_2\text{O}_2 \longrightarrow 2\text{Cr}^{3+} + 13\text{H}_2\text{O} + 9\text{O}_2$

18. The number of atoms in 0.024g of the  $^{12}\text{C}$  isotope is

- (1)  $12.044 \times 10^{15}$  (2)  $12.044 \times 10^{20}$  (3)  $12.044 \times 10^{21}$  (4)  $6.022 \times 10^{19}$  (5)  $6.022 \times 10^{20}$

19. How many moles of hydrogen atoms are present in 0.10 kg of solution of ethanol in water containing 10% by mass of ethanol ( $\text{C}_2\text{H}_5\text{OH}$ )

- (1) 1.4 (2) 10.0 (3) 11.30 (4) 5.2 (5) 5.7

20. Which of the following molecules has highest boiling point ?

- (1)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$  (2)  $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3-\text{C}-\text{CH}_3 \\ | \\ \text{CH}_3 \end{array}$  (3)  $\begin{array}{c} \text{CH}_3\text{CHCH}_2\text{CH}_3 \\ | \\ \text{CH}_3 \end{array}$  (4)  $\begin{array}{c} \text{CH}_3\text{CHCH}_3 \\ | \\ \text{CH}_3 \end{array}$   
 (5)  $\text{CH}_3\text{CH}_2\text{CH}_2-\text{CH}_3$

———— // ————

Relative atomic mass H = 1, C = 12, N = 14, O = 16, Na = 23, S = 32, Cl = 35.5

Avogadro constant =  $6.022 \times 10^{23}$

PART - B

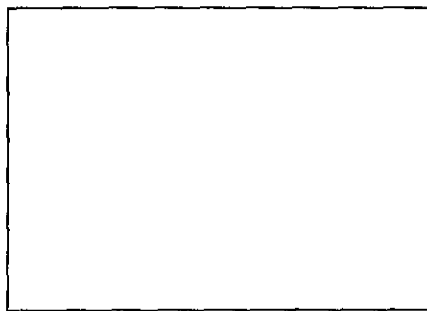
1. (a) . The organic compound P contains 47.4 % carbon 2.63 % hydrogen 18.4% nitrogen and oxygen only .The relative molecular mass of P is about 150. Determine the molecular formula of P.

சேதனச்சேர்வை P ஆனது 47.4% காபன், 2.63% ஐதரசன், 18.4% நைதரசன் மற்றும் ஓட்சிசனை கொண்டது. P யினது சார் மூலக்கூற்றுத்திணிவு 150 எனின் P யினது மூலக்கூற்றுச்சூத்திரம் யாது?

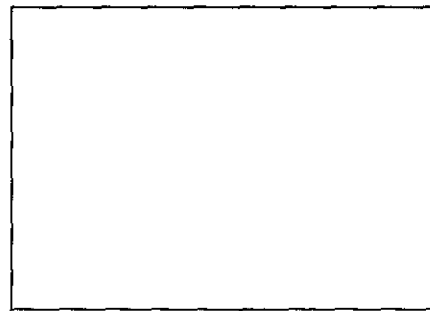
- (b) A and B hydrocarbons are geometrical isomers each having two  $sp^2$ -hybridised carbon atoms and two  $sp^3$ -hybridised carbon atoms only.

Write the structures of A and B

A மற்றும் B எனும் ஐதரோகாபன்கள் கேத்திரகணித சமதானிகளாகும். ஒவ்வொன்றும் இரண்டு  $sp^2$  கலப்பு காபன் அணுக்களையும் இரண்டு  $sp^3$  கலப்பு காபன் அணுக்களையும் மட்டும் கொண்டிருப்பின் A மற்றும் B என்பவற்றின் கட்டமைப்புகளை தருக.



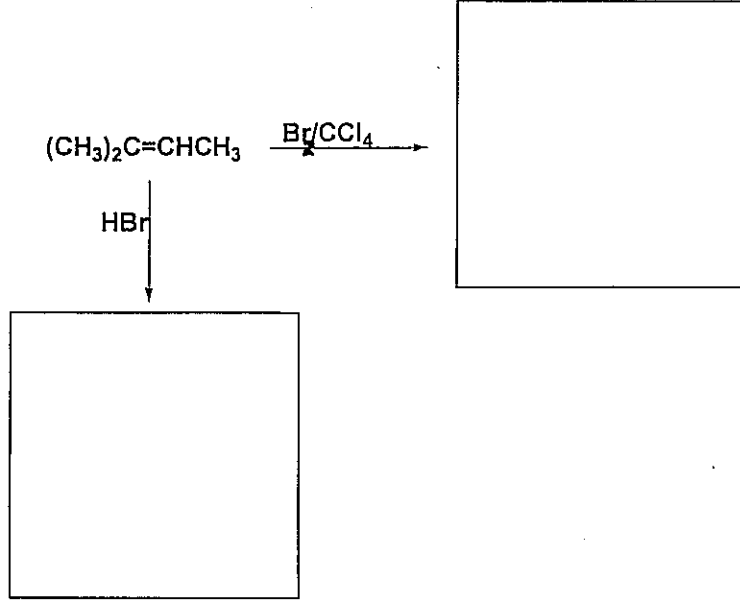
A



B

(c) Give the products of the following reactions.

பின்வரும் தாக்கங்களின் விளைவுகளை தருக?



2. (a)  $50.0 \text{ cm}^3$  of  $\text{H}_2\text{SO}_4$  solution was titrated with a standard solution of  $0.25 \text{ mol dm}^{-3}$   $\text{NaOH}$  using phenolphtheline as an indicator.  $30.0 \text{ cm}^3$  of the standard solution is needed for complete colour change (or neutralization) Calculate the concentration of the  $\text{H}_2\text{SO}_4$  solution

$50.0 \text{ cm}^3$   $\text{H}_2\text{SO}_4$  கரைசலானது, நியமக்கரைசல்  $0.25 \text{ mol dm}^{-3}$   $\text{NaOH}$  உடன் பினோப்தலினை காட்டியாக உபயோகித்து நியமிக்கப்பட்டது. நியமிப்பின் முழு நிறமாற்றத்திற்காக நியமக்கரைசலின்  $30.0 \text{ cm}^3$  தேவைப்பட்டது எனின்  $\text{H}_2\text{SO}_4$  கரைசலின் செறிவை கணிக்க.

(b) .Write the balanced chemical equations for each of the following

பின்வருவனவற்றுக்கான சமப்படுத்தப்பட்ட இரசாயனச்சமன்பாடுகளை தருக.

(i) The complete combustion of rocket fuel hydrazine ( $N_2H_4$ ) giving products  $NO_2$  and  $H_2O$   
விண்கல எரிவாயு ஐதரசீன் ( $N_2H_4$ ) இற்கான பூரண தகன தாக்கத்தின் விளைவுகள்  $NO_2$  மற்றும்  $H_2O$ .

(ii) The combustion of propane ( $C_3H_8$ ) in excess oxygen.

மிகை ஓட்சிசன் முன்னிலையில் புரொப்பேன் ( $C_3H_8$ ) இன் தகனம்.

(iii) The oxidation of  $Fe^{2+}$  to  $Fe^{3+}$  by acidified  $MnO_4^-$  where  $MnO_4^-$  is reduced to  $Mn^{2+}$   
அமில  $MnO_4^-$  முன்னிலையில்  $Fe^{2+}$  ஆனது  $Fe^{3+}$  ஆக ஓட்சியேற்றப்படுதல்.  
இங்கு  $MnO_4^-$  ஆனது  $Mn^{2+}$  ஆக தாழ்த்தப்படும்.

Assignment Test II - Answer Guide

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

Part - B

1.(a) Atoms	C	H	N	O
% amount	47.4	2.63	18.4	31.57
Number of Moles	47.4/12	2.63/1	18.4/14	31.57/16
	3.95	2.63	1.314	1.973
/Minimum Number	3.95/1.314	2.63/1.314	1.314/1.314	1.973/1.314
	3.006	2.001	1.0	1.501
X 2	6	4	2	3

Empirical Molecular formula P -  $C_6H_4N_2O_3$

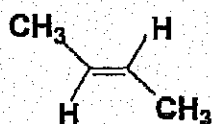
$$[(12 \times 6) + (1 \times 4) + (14 \times 2) + (16 \times 3)] \times n = 150$$

$$n = 0.9968$$

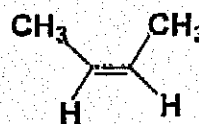
$$n \approx 1$$

Molecular formula P -  $C_6H_4N_2O_3$

(b)

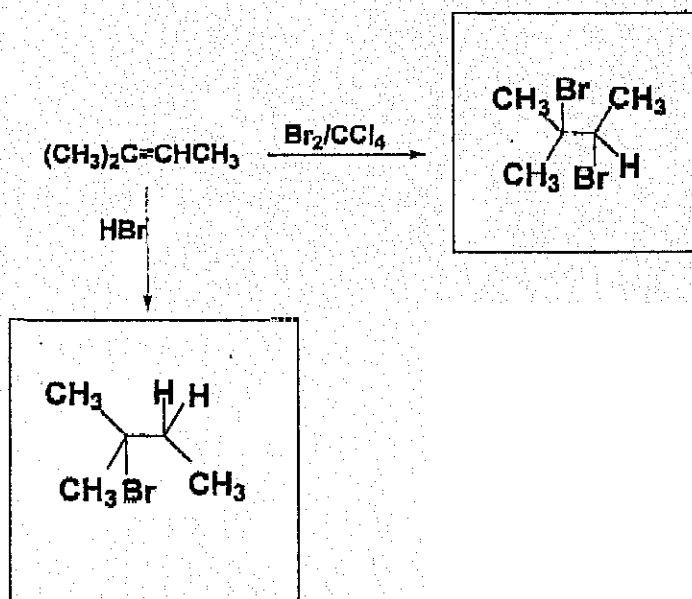


A



B

(c)



2.(a) Number of moles NaOH used for neutralization =  $0.25 \times 30.0 / 1000$  moles =  $0.0075$  mol



Stoichiometry                      2                      1

According to stoichiometry

Number of  $\text{H}_2\text{SO}_4$  moles required for neutralization =  $0.0075/2 = 0.00375$  moles

Volume of the above amount of  $\text{H}_2\text{SO}_4$  present =  $50.0 \text{ cm}^3$

Concentration of the  $\text{H}_2\text{SO}_4$  solution =  $0.00375 \times 1000/50.0 \text{ mol dm}^{-3}$   
 =  $0.075 \text{ mol dm}^{-3}$

