VISION GROUP

NATIONAL PRIDE • GLOBAL EXCELLENCE

HOME SCHOOLING MATERIAL

PASS O' LEVEL

MATH, CHEMISTRY, ICT

YOUR GUIDE AWAY FROM SCHOOL

COMPUTER STUDIES PAPER TWO (0COMP008) GUIDE

1. **WORD PROCESSING**

SKILL	Text	Paragraph	Equation	Symbol	A5	Portrait	Font type	Font size	Spacing	Indention	Drop cap	Background	Water mark	Saving	Printing	**Total**
EXPECTED	2	1	2	1	1	1	1	1	1	2	2	2	1	1	1	**20**

2. SPREADSHEETS

SKILL	Data entry	Heading	Average	Rank	Newmark	Cell reference	Values	Maximum	Minimum	Footer	Background	Save	Print	**Total**
EXPECTED	3	1	2	2	1	2	1	2	2	1	1	1	1	**20**

3. **ELECTRONIC PRESENTATION**

	Slide 1		**Slide 2**			**Slide 3**			**Slide 4**			**Slide 5**			**Slide**					
SKILL	Slide	Data entry	Slide	Textbox	Data entry	Slide	Table	Data entry	Slide	Organisation chart	Data entry	Slide	Text	Audio	Slide	Text	Call out	Save	Print	**Total**
EXPECTED	1	2	1	2	2	1	2	2	1	2	2	1	2	3	1	1	2	1	1	**30**

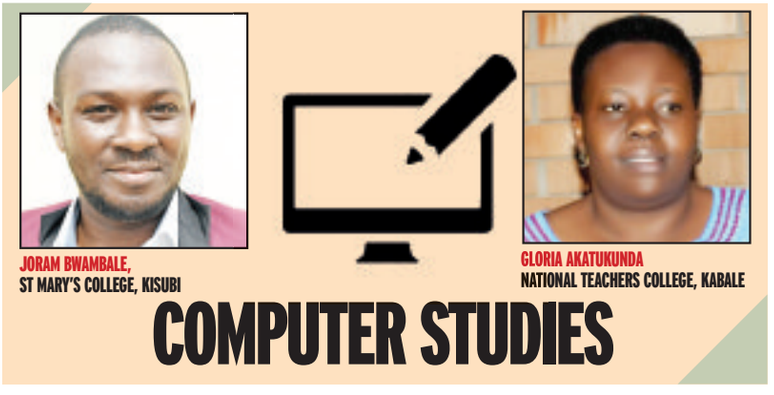
4. **DATABASE MANAGEMENT**

SKILL	Database	Tables	Primary key	Field types	Data types	Forms	Data entry	Relationship	Query	Labels	Report	Orientation	Background	Heading	Sorting	Print	**Total**
EXPECTED	1	2	1	2	2	3	3	3	4	3	1	1	1	1	1	1	**30**

5. **WEB DESIGNING**

	Page 1					**Page 2**			**Page 3**			**Page 4**			**Page 5**									
SKILL	Page	Heading	Marquee	Text	Link	Page	Heading	Text	Page	Heading	Discussion forum	Page	Text	Video	Page	Text	Contact	Links	Design	Background	Picture	Saving	Print	**Total**
EXPECTED	1	1	1	1	1	1	1	2	1	1	2	1	1	4	1	1	1	2	2	1	1	1	1	**30**

COMPUTER STUDIES PAPER ONE QUESTIONS (0COMP009)



SECTION A

1. An antivirus such as Avast is an example of
   A. A user interface
   B. An operating system
   C. An application software
   D. A utility program
2. One of the following is not a programming tool
   A. Debugger
   B. An interpreter
   C. Notepad
   D. Compiler
3. On the computer keyboard, the spacebar……..
   A. Erases unnecessary characters
   B. Controls the keyboard
   C. Spaces characters
   D. Cancels a command
4. On the computer desktop, a graphical representation of a program or application is called
   A. Scroll button
   B. Dialogue box
   C. Checkbox
   D. Icon
5. When working with Word processing, one of the following displays the name of the current document.
   A. Title bar
   B. Status bar
   C. Menu bar
   D. Tool bar
6. Which software would you need to open and view webpages?
   A. Website
   B. Web browser
   C. Web application
   D. Google
7. Your school has opened a network to be used for collaboration. As a student, which of the following would you need to be able to log onto the network?
   A. Licence
   B. Specialised software
   C. Very fast network
   D. User ID
8. Checking a computer program for errors is referred to as…….
   A. Debugging
   B. Bugging
   C. Correction
   D. Programming
9. A computer that links several personal computers together on a network is called
   A. Gateway
   B. Server
   C. Router
   D. Client
10. The difference between hardware and software is that hardware is;
   A. Tangible while software is intangible
   B. Metallic while software is plastic
   C. Permanent while software is temporary
   D. Reliable while software is unreliable
11. A grid in a spreadsheet program where entries are made consists of……
   A. Rows, columns and diagonals
   B. Rows, columns and worksheets
   C. Workbooks and worksheets
   D. Rows and columns
12. Which of the following database objects is used to find answers to question about data?
   A. Macro
   B. Module
   C. Form
   D. Query
13. The main purpose of a screen saver is to;
   A. Help prevent screen burnout
   B. Brighten the screen
   C. Show that the screen is able to show various graphics
   D. Entertain the computer user
14. When using Internet, the …….. is used to translate data for transmission along the telephone line.
   A. Memory card
   B. Hard disk
   C. Flash disk
   D. Modem
15. While working with spreadsheet software, the ######## signs can fill a cell. What would you do?
   A. Make the cell active
   B. Enter the formula
   C. Widen the column
   D. Recalculate the column
16. One of the following components of a central processing unit directs all activities with it.
   A. System clock
   B. Memory unit
   C. Control unit.
   D. Registers
17. The text and graphics which is always displayed on the screen of a smartphone can be termed as…….
   A. Photocopy
   B. Hardcopy
   C. Master copy
   D. Soft copy
18. A person who accesses a computer network illegally is called …….
   A. Criminal B. Wizard
   C. Hacker D. User
19. One of the students lost her work during the computer exams. This is because she forgot to…..
   A. Print B. Boot
   C. Save D. Edit
20. What is a mouse in relation to computing?
   A. A small destructive rodent
   B. A round plastic container near the computer
   C. A pointing device that controls a pointer on the screen
   D. A device for typing

Turn to page II

PASS O'LEVEL

From page I

SECTION B

21. (a) Explain the following terms as used in computer software.
    (i) System software.
    (ii) Application software.
    (iii) Utility programs.
    (b) Of what use is the operating system?
    (c) Explain at least two examples of a Utility program.

22. (a) Mention at least three ways that can be used to ensure
    (i) Safety of the computer devices in the computer laboratory.
    (ii) Health of the computer user.
    (iii) Security of data.
    (b) What feature would you use to ensure that you word document is not opened by unauthorised people?

23. (a) In reference to the internet, define netiquette.
    (b) Explain at least three practices that exhibit proper netiquette.
    (c) What possible risks does a Facebook user face?
    (d) Explain the safety practices that can be adopted to avoid or reduce the impact of the risks mentioned in (c) above.

24. (a) In relation to spreadsheet, define:
    i. Workbook.
    ii. Relative cell referencing.
    iii. Absolute cell referencing.
    a) State two data types that can be entered in a spreadsheet program.
    b) Under what circumstances would it best to use spreadsheet software.

25. In relation to Database Management Systems
    a) Explain the following terms
    (i) A record
    (ii) Primary key
    (iii) Caption
    b) State one example of a database management system.
    c) Explain at least three facts to justify the increased use of databases for large storage of data.

26 (a) Define a computer.
    (b) Explain three reasons why you think computer education should be taught in schools.
    (c) How can computers be used at our homes?

SECTION C

26. You and your friends are starting a bank/ SACCOS/ saving scheme. Your friends think buying a computer is a waste of time.
    a. Explain with reasons why you would need a computer in your bank
    b. What particular computer devices and tools would you purchase?
    c. Discuss the possible challenges you would face when using the computers.

27. (a) Discuss the common health problems that can arise from long-term usage of computers.
    (b) What good practices can be adopted when working with computers to avoid the health problems mentioned in (a) above.
    (c) In what ways can a computer user ensure the long life of computer devices?

29. (a) "Computers are an aid to education". Discuss with examples.
    (b) Discuss the negative effects of

SOLUTIONS FOR MATHEMATICS (OM007)

1.

$$\frac{\frac{3}{\ddot{u}}-\left(\frac{25}{\ddot{u}}-\frac{9}{\ddot{u}}\right)}{\frac{\ddot{u}}{\ddot{u}}\text{ of }\left(-+-\right)}$$

BODMAS

$$\frac{\frac{3}{2}-\left(\frac{25\times4-9\times3}{12}\right)}{\frac{6}{5}\text{ of }\left(\frac{5\times3+5\times4}{12}\right)}$$

$$\frac{\frac{3}{2}-\left(\frac{100-27}{12}\right)}{\frac{6}{5}\text{ of }\left(\frac{35}{12}\right)}$$

$$\frac{\frac{3}{2}-\left(\frac{73}{12}\right)}{\frac{6}{5}\text{ of }\left(\frac{35}{12}\right)}$$

$$\frac{\frac{3}{2}-\frac{73}{12}}{\frac{6}{5}\times\frac{35}{12}}=\frac{\frac{3\times6-73}{12}}{\frac{1}{1}\times\frac{7}{2}}$$

$$\left(\frac{18-73}{12}\right)\div\frac{7}{2}$$

$$\frac{-55}{12}\times\frac{2}{7}$$

$$\frac{-55}{42}=-1\frac{13}{42}$$

2. $P=\{10, 15, 21, 28, 36\}$
$Q=\{9, 16, 25, 36\}$
$P\cap Q=\{36\}$
$n(P\cap Q)=1$

3. $$\log\left(\frac{11}{2}\right)+2\log\left(\frac{4}{11}\right)-\log\left(\frac{5}{22}\right)=\log k-\log10$$

$$\log\left(\frac{11}{2}\right)+\log\frac{16}{121}-\log\left(\frac{5}{100}\right)=\log k-\log10$$

$$\log\left(\frac{11}{2}\times\frac{16}{121}\right)-\log\left(\frac{5}{22}\right)=\log\frac{k}{10}$$

$$\log\frac{8}{11}-\log\frac{5}{22}=\log\frac{k}{10}$$

$$\log\left(\frac{8}{11}\div\frac{5}{22}\right)=\log\frac{k}{10}$$

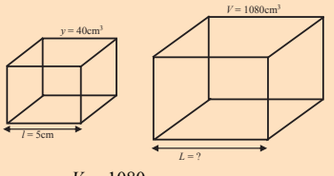
$$\log\left(\frac{8}{11}\times\frac{22}{5}\right)=\log\frac{k}{10}$$

$$\log\frac{16}{5}=\log\frac{k}{10}$$

$$\frac{16}{5}=\frac{k}{10}$$

$$k=32$$

4.



Volume scale factor, $VSF=\frac{V}{v}=\frac{1080}{40}=27$

Linear scale factor $LSF=\frac{L}{l}=\sqrt[3]{VSF}=\sqrt[3]{27}=3$

$$\frac{L}{l}=3$$

$L=3l=3\times5=15\text{cm}$

The length is 15 cm

5. a) $f(p)=3p^2-15, g(p)=\frac{1}{p+3}$

IVAN GIMEI,
ST MARY'S COLLEGE, KISUBI

AUGUSTUS ISINGOMA,
ST JOHN'S SS, NYABWINA - SHEEMA

$$gf(p)=\frac{1}{f(p)+3}=\frac{1}{3p^2-15+3}$$

$$=\frac{1}{3p^2-12}$$

b). $gf(p)=\frac{1}{3p^2-12}$

gf(p) is meaning less when the denominator is zero

$3p^2-12=0$

$$\frac{3p^2}{3}=\frac{12}{3}$$

$P^2=4$

$p=\sqrt{4}$

$P=\pm2$

6. $\frac{25}{100}\times3000=750/=$

Profit per article
$1\longrightarrow750$
$x\longrightarrow108000$

$$\frac{x}{1}=\frac{10800}{750}$$

$x\approx14.4$ articles

7. $$\left(\frac{3}{3\sqrt{2}-2\sqrt{5}}\right)-\left(\frac{1}{3\sqrt{2}+2\sqrt{5}}\right)$$

$$\frac{3\left(3\sqrt{2}+2\sqrt{5}\right)}{\left(3\sqrt{2}-2\sqrt{5}\right)\left(3\sqrt{2}+2\sqrt{5}\right)}-\left(\frac{3\sqrt{2}-2\sqrt{5}}{\left(3\sqrt{2}+2\sqrt{5}\right)\left(3\sqrt{2}-2\sqrt{5}\right)}\right)$$

$$=\frac{9\sqrt{2}+6\sqrt{5}}{9\times2+6\sqrt{10}-6\sqrt{10}-4\times5}-\left(\frac{3\sqrt{2}-2\sqrt{5}}{9\times2-4\times5}\right)$$

$$=\frac{9\sqrt{2}+6\sqrt{5}}{-2}-\frac{3\sqrt{2}-2\sqrt{5}}{-2}$$

$$=\frac{9\sqrt{2}+6\sqrt{5}-3\sqrt{2}+2\sqrt{5}}{-2}$$

$$=\frac{6\sqrt{2}+8\sqrt{5}}{-2}$$

$=-3\sqrt{2}-4\sqrt{5}$

$=-3\sqrt{2}+-4\sqrt{5}$

Comparing with $a\sqrt{2}+b\sqrt{5}$

a = -3

b = -4

8. $F\propto\frac{V^2}{r}$

$F=k\frac{V^2}{r}$

$V=12kN=12000N$

$V=72kmh^{-1}=\frac{72\times1000}{36000}=20ms^{-1}$

$r=50m$

$F=1$

$12000=\frac{k\times20^2}{50}$

$\frac{600000}{400}=k$

$=k=1500$

$F=1500\times\frac{V^2}{r}$

$F=1500\frac{V^2}{r}$

$r=30m$

$V=54kmh^{-1}=\frac{54\times1000}{3600}$

$=15ms^{-1}$

$F=1500\times\frac{15^2}{30}$

$F=11250N$

9. Let $ATI = x$

$x^2 + x^2 = 10^2$

$2x^2 = 100$

$x = \sqrt{50}$

$x = 5\sqrt{2}$

$\sin 25 = \frac{5\sqrt{2}}{TB}$

$TB = \frac{5\sqrt{2}}{\sin 25}$

$= 16.73$

10 Average speed $= \frac{\text{Total distance}}{\text{Total time}}$

Total distance $= 2D$

Total time $= T$

P to Q

$1.6 = \frac{D}{T_1}, T_1 = \frac{D}{16}$

Q to P

$12 = \frac{D}{T_2}, T_2 = \frac{D}{12}$

Total time, $T = T_1 + T_2$

$T = \frac{D}{16} + \frac{D}{12} = \frac{3D + 4D}{48}$

Total distance, $S = 2D$

Average speed $= \frac{S}{T} = 2D \div \left(\frac{7D}{48}\right) = 2D \times \frac{48}{7D} = \frac{96}{7} = 13.7143 kmh^{-1}$

In metres per second

$\frac{96}{7} kmh^{-1} = \frac{96}{7} \times \frac{1000}{3600} ms^{-1} = 3.8095 ms^{-1}$

SECTION B

11. For line M

(1, 0) and (-1, 4)

Gradient of $M = \frac{4-0}{-1-1} = \frac{4}{-2} = -2$

Equation of the line M

Considering (1, 0) and any other point (x, y) on line M

The gradient (1, 0) and (x, y) is -2 (gradient of a straight is constant)

$\frac{y-0}{x-1} = -2$

$y = -2(x - 1)$

$y = -2x + 2$

The equation of the line M is $y = -2x + 2$

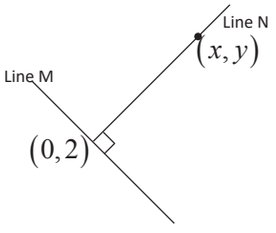
Equation of a line N which is a perpendicular bisector M

The line N passes through the mid-point of line M

Gradient of line × gradient of line M = -1

Gradient of N $= \frac{-1}{-2} = \frac{1}{2}$

Mid – point of line M $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right) = \left(\frac{1 + -1}{2}, \frac{0 + 4}{2}\right) = \left(\frac{0}{2}, \frac{4}{2}\right) = (0, 2)$



Considering point (0, 2) and any other point (x, y) on the line N

Gradient of point (0, 2) and any other point (x, y) on the line N is ½ (gradient of a straight line is constant)

$\frac{y-2}{x-0} = \frac{1}{2}$

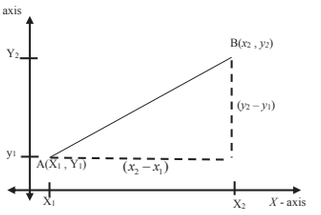
$y - 2 = \frac{1}{2}x$

$y = \frac{1}{2}x + 2$

The equation of line N is $y = \frac{1}{2}x + 2$

b) Given A(2, 1), B(7, 4), C(4, y)

The length of AB is equal to the length of BC



From Pythagoras theorem

The length of AB

$= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} = \sqrt{(7-2)^2 + (4-1)^2} = \sqrt{5^2 + 3^2} = \sqrt{34} units$

The length of BC

$= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} = \sqrt{(4-7)^2 + (y-4)^2} = \sqrt{(-3)^2 + (y-4)^2} = \sqrt{9 + (y-4)^2} units$

But length of AB = length of BC

$\sqrt{34} = \sqrt{9 + (y-4)^2}$

$\left(\sqrt{34}\right)^2 = \left(\sqrt{9 + (y-4)^2}\right)^2$

$34 = 9 + (y - 4)^2$

$34 - 9 = (y - 4)^2$

$25 = (y - 4)^2$

$\sqrt{(y-4)^2} = \sqrt{25}$

$y - 4 = \pm 5$

$y = \pm 5 + 4$

$y = 5 + 4 = 9, y = -5 + 4 = -1$

$y = 9$ and $y = -1$

12. a) $n(\varepsilon) = 100$

$n(B \cup L \cup S)' = 52$

$n(B \cap S' \cap L') = n(B \cap L) = n(S \cap L' \cap B') = 2n(B \cap S)$

$= 2n(L \cap B' \cap S') = 4n(S \cap L \cap B') = 4n(B \cap L \cap S)$

Let

$n(B \cap L \cap S) = x$

$4n(S \cap L \cap B') = 4n(B \cap L \cap S)$

$4n(S \cap L \cap B') = 4x$

$n(S \cap L \cap B') = x$

$2n(L \cap B' \cap S') = 4n(B \cap L \cap S)$

$2n(L \cap B' \cap S') = 4x$

$n(L \cap B' \cap S') = 2x$

$2n(B \cap S) = 4n(B \cap L \cap S)$

$2n(B \cap S) = 4x$

$n(B \cap S) = 2x$

$n(S \cap L' \cap B') = 4n(B \cap L \cap S)$

$n(S \cap L' \cap B') = 4x$

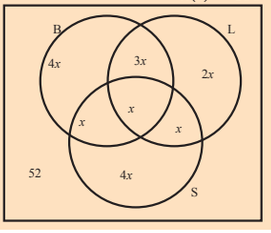
$n(B \cap L) = 4n(B \cap L \cap S)$

$n(B \cap L) = 4x$

$n(B \cap S' \cap L') = 4n(B \cap L \cap S)$

$n(B \cap S' \cap L') = 4x$

$n(\varepsilon) = 100$



b) (i) Cars with faulty steering

$4x + 3x + 2x + x + x + x + 4x + 52 = 100$

$16x + 52 = 100$

$16x = 48$

$x = 3$

Cars with faulty steering $= 4x + x + x + x = 7x = 7 \times 3 = 21$

21 cars had faulty steering.

(ii) Cars with one fault only $= 4x + 2x + 4x = 10x = 10 \times 3 = 30$

c) Desired outcome = those with at least two faults = those with two faults + those with three faults

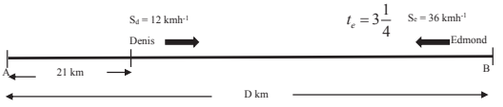
Probability $= \frac{n(\text{desired outcome})}{n(\varepsilon)}$

n(desired outcome) $= 3x + x + x + x + 6x = 6 \times 3 = 18$

$n(\varepsilon) = 100$

Probability $= \frac{18}{100} = 0.18$

13. a) Let the distance between A and B be D km.



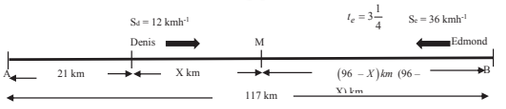
From

Speed $= \frac{distance}{time}$

$Distance = speed \times time$

There the distance between A and B is 117 km

b) Let the extra distance Denis covered before they met be X km and let the meeting point be M.



$\overline{MB} = 117 - (X + 21) = 117 - 21 - X = 96 - X$

After extra X km Denis and Edmond have the same time of travel

Let the time be T

For Denis

$speed = \frac{distance}{time}$

$S_d = \frac{X}{T}, 12 = \frac{X}{T}$

$X = 12T \ldots (i)$

For Edmond

$S_e = \frac{96 - X}{T}, 36 = \frac{96 - X}{T}$

$36T = 96 - X \ldots (ii)$

Substitute $X = 12T$ in equation (ii)

$36T = 96 - X$

$36T = 96 - 12T$

$36T + 12T = 96$

$48T = 96$

$T = 2h$

Substitute $T = 2$in (i)

$X = 12T$

$X = 12$ xx $2 = 24km$

Distance from A $24 + 21 = 45km$

There the Denis and Edmond at 45 km from town A after 2h

c) Extra time Denis remains in motion when Edmond has reached town B $= t_d - t_e$

Let the time Denis' time be t_d

Speed$= \frac{\text{distance}}{\text{time}}$

$S_d = \frac{117 - 21}{t_d}$

$12 = \frac{96}{t_d}$

$t_d = \frac{96}{12} = 8h$

(You can as well first find the time Denis took to move from M to B and add 2h to come up with the 8h above)

Difference in time $= t_d - t_e = 8 - 3\frac{1}{4} = 4\frac{3}{4} = 4.75h$

The extra time Denis remains in motion when Edmond has reached town B is 4.75hor 4h and 45minutes

Turn to page IV

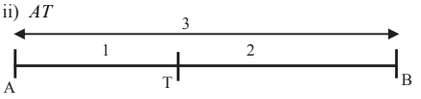
Continued from page III

14 a) Interest rate = 4%
Loan = 1.6 millions
UGX300,000 on every 2nd of each following month
Amount to be paid by the end of November = loan + interest
Interest in November
$\frac{4}{100}\times 1600000 = 64000/=$
Amount = 1600000 + 64000 = 1664000
Balance after a 300,0000 deposit on 2nd December
166400 – 300000 = 1364000
Amount to be paid by the end of November = 1364000
Amount to be paid by the end of December = balance after a deposit on 2nd December + interest in December
Interest in December
$\frac{4}{100}\times 1364000 = 54560$
Amount to be paid by the end of December = 1364000 + 54560 =1418560
Balance after a 300,0000 deposit on 2nd January
1418560 – 300000 = 1118560
Amount to be paid by the end of December = balance after a deposit on 2nd January + interest in January
Interest in January
$\frac{4}{100}\times 1118560 = 44742.4$
Amount to be paid by the end of January = 1118560 + 44742.4 =1163302.4
Balance after 2nd February deposit
1163302.4 – 300000 = 863302.4
Unpaid balance by 3rd of February =
$863302.4 + \frac{4}{100}\times 863302.4 = 897834.496\ 3$

b) 867834.496
c) Total interest = total amount paid – loan
Total interest
= (300000 + 300000 + 300000 + 867834.496) – 1600000
= 1767834.496 – 1600000 = 167834.496
The interest paid for the loan is UGX167834.496

15. i) $\overrightarrow{AB} = \overrightarrow{AO} + \overrightarrow{OB} = -\overrightarrow{OA} + \overrightarrow{OB} = \overrightarrow{OB} - \overrightarrow{OA} = \underset{\sim}{b} - \underset{\sim}{a}$

ii) $\overrightarrow{AT}$



$\overrightarrow{AT} : \overrightarrow{TB} = 1:2$

$\overrightarrow{AT} : \overrightarrow{AB} = 1:3$

$\frac{\overrightarrow{AT}}{\overrightarrow{AB}} = \frac{1}{3}$

$\overrightarrow{AT} = \frac{1}{3}\overrightarrow{AB}$

$\overrightarrow{AT} = \frac{1}{3}(\underset{\sim}{b} - \underset{\sim}{a})$

(iii) $\overrightarrow{OT}$

$\overrightarrow{OT} = \overrightarrow{OA} + \overrightarrow{AT} = \underset{\sim}{a} + \frac{1}{3}(\underset{\sim}{b} - \underset{\sim}{a}) = \underset{\sim}{a} - \frac{1}{3}\underset{\sim}{a} + \frac{1}{3}\underset{\sim}{b} = \frac{2}{3}\underset{\sim}{a} + \frac{1}{3}\underset{\sim}{b} = \frac{1}{3}(2\underset{\sim}{a} + \underset{\sim}{b})$

$\therefore \overrightarrow{OT} = \frac{1}{3}(2\underset{\sim}{a} + \underset{\sim}{b})$

(iv) $\overrightarrow{AR}$

$\overrightarrow{AR} = \overrightarrow{AO} + \overrightarrow{OR} = -\overrightarrow{OA} + \frac{\ddot{u}}{\ddot{u}}\overrightarrow{OB} = -\overrightarrow{OB} - \overrightarrow{OA} = -\underset{\sim}{b} - \underset{\sim}{a}$

$\overrightarrow{AR} = \frac{1}{2}\underset{\sim}{b} - \underset{\sim}{a}$

b) (i) $\overrightarrow{OX} = \overrightarrow{OA} + \overrightarrow{AR} = \overrightarrow{OA} + k\overrightarrow{AR} = \underset{\sim}{a} + k(\frac{1}{2}\underset{\sim}{b} - \underset{\sim}{a}) = \underset{\sim}{a} - k\underset{\sim}{a} + \frac{1}{2}k\underset{\sim}{b}$

$\overrightarrow{OX} = \ddot{u}\quad k\ \underset{\sim}{a}\quad \frac{1}{2}k\underset{\sim}{b}$

(ii) $\overrightarrow{OX} = L\overrightarrow{OT} = L\times\frac{1}{3}(2\underset{\sim}{a} + \underset{\sim}{b}) = \frac{2}{3}L\underset{\sim}{a} + \frac{1}{3}L\underset{\sim}{b}$

Equating the corresponding terms in the expressions of $\overrightarrow{OX}$

$(1-k)\underset{\sim}{a} + \frac{1}{2}k\underset{\sim}{b} = \frac{2}{3}L\underset{\sim}{a} + \frac{1}{3}L\underset{\sim}{b}$

$1 - k = \frac{2}{3}L$

$\frac{1}{2}k = \frac{1}{3}L$

$k = \frac{2}{3}L$

Substitute $k = \frac{2}{3}L$ in (i)

$1 - k = \frac{2}{3}L \cdots (i)$

$1 - \frac{2}{3}L = \frac{2}{3}L$

$1 = \frac{2}{3}L + \frac{2}{3}L$

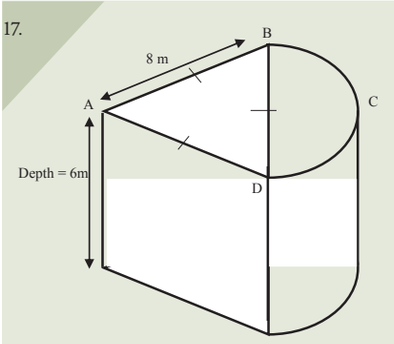
$1 = \frac{4}{3}L$

$L = \frac{3}{4}$

$k = \frac{2}{3}L = \frac{2}{3}\times\frac{3}{4} = \frac{1}{2}$

$\therefore k = \frac{3}{4}, L = \frac{1}{2}$

17.



Area of the two rectangular faces corresponding to sides AB and AD = 6 × 8 + 6 × 8 = 96m²
Area of the curved surface corresponding to BCD

$= \frac{1}{2}\pi \times diameter \times height = \frac{1}{2}\pi \times 8 \times 6 = 24 \times 3.142 = 75.408cm^2$

Area of the bottom surface of the pond = area of the triangle + the area of the semi-circle
Height of the triangle =

$\sqrt{8^2 - 4^2} = \sqrt{64 - 16} = \sqrt{48} = 6.9282m$

$= \frac{1}{2}bh = \frac{1}{2}\times 8 \times 6.9282 = 27.7128m^2$

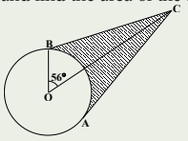
Area of the triangle
Area of the semi-circle =

$\frac{1}{2}\pi r^2 = \frac{1}{2}\times\pi\times 4^2 = 8\times 3.142 = 25.136m^2$

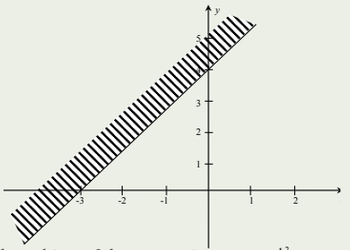
Total area of the sides in contact with water = 96 + 75.408 + 27.7128 + 25.136 = 224.2568m²

MATHEMATICS QUESTIONS (OMTC009)

1. Use completing the square method, solve the quadratic equation $5x^2 - 3x = 0$
2. Given that $\begin{pmatrix} -3 & x \\ y & 5 \end{pmatrix}\begin{pmatrix} 3 \\ -2 \end{pmatrix} = \begin{pmatrix} 11 \\ 8 \end{pmatrix}$ find the values of x and y
3. Given that $\cos\theta = \frac{\sqrt{3}}{2}$ find the value of tanθ + sinθ. (Leave your answer in surd form)
4. In the figure below o is the Centre of the circle, AC and CB are tangents to the circle,
and that OB=5cm and find the area of the shaded region



5. Solve the simultaneous equations
$5y + 2x + 25 = 0$
$3x - 2y + 9 = 0$
6. Given that p*q=3q² – 5p, evaluate -2*(3*-4)
7. Two fair coins are tossed
   a. Construct a table showing all the possible outcomes
   b. What is the probability of getting at least a head?
8. Factorise completely
   i) $(b-5)^2 + 3(b-5)$
   ii) $361 - (y-16)^2$
9. Determine the inequality which is represented by the shaded region on the graph below

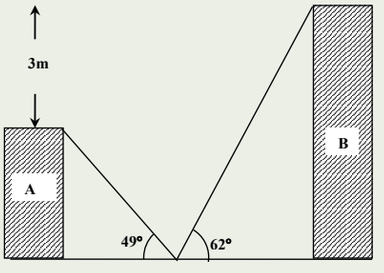


10. Make b the subject of the expression $R = \frac{b^2}{(b-m)(b+m)}$

SECTION B

11. (a) Solve the equation $5\begin{pmatrix} x-2 \\ y \end{pmatrix} - 3\begin{pmatrix} -4 \\ 3-2y \end{pmatrix} = \begin{pmatrix} 3 \\ 24 \end{pmatrix}$
    (b) Given that $A = \begin{pmatrix} 4 & 2 \\ -1 & 3 \end{pmatrix}$ and $B = \begin{pmatrix} 5 & 2 \\ 0 & -3 \end{pmatrix}$,
    (i) Calculate A² and AB
    (ii) Find the inverse of A²
12. a) Draw a graph of $y=2x^2$-x-15 for values of x ranging from -3 to +4
    b) Use your graph to solve the equations below
    (i) $2x^2 - x - 15 = 0$
    (i) $2x^2 = x + 19$

13



a) From point 0 on the level ground between two buildings A and B, the angles of elevation of the tops of building A and B are 49 and 62, respectively. Building B is 3m higher than building A and PO = 28m.
Calculate i) the height of building A.
ii) How far building B from point O.

b) A ship is observed moving away from the top of a cliff which is 76m high. Within a time span of 10seconds the angle of depression decreases from 35 to 25.Determine the distance covered within this time range, hence find the speed of the ship in meters per second.

CHEMISTRY OCHEM008 SOLUTIONS

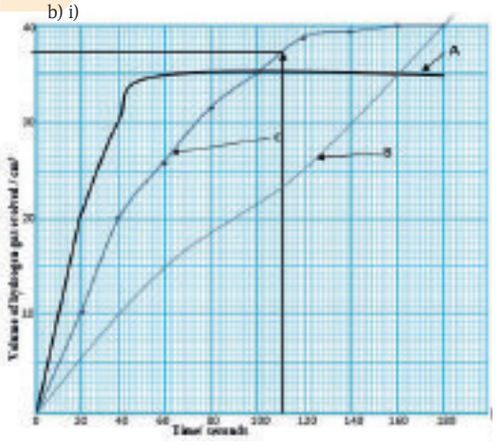
MUGOGO MOSES,
SEETA HIGH SCHOOL

ANDREW HANNINGTON NSEREKO,
BISHOP'S SENIOR SCHOOL, MUKONO

11. a) i) Magnesium is a very reactive metal when stored it reacts with oxygen to form a layer of magnesium oxide on its surface this layer of magnesium oxide is quite stable and prevents further reaction of magnesium with oxygen the magnesium ribbon is cleaned by sand paper for removing this layer so that the underlying metal can be exposed to air.

ii) $Mg(s) + 2HCl(aq) \longrightarrow MgCl_2(aq) + H_2(s)$

b) i)



ii) $\frac{38}{110}$ cm^3/s

c) i) and ii) See the graph .

12. a) i) This is because magnesium displaces copper forming magnesium sulphate which is a colourless solution.

ii) The piece of iron bar reacts with the oxygen rich rain water forming a brown coating called rust.

b) Divide the solution into two parts:

- To the first part, add excess aqueous ammonia: a white precipitate is formed, it is insoluble in excess.
- To the second part, add potassium iodide solution: no observable change confirms presence of aluminium ions in solution.

c) i) The hydrated compound was heated strongly evaporating off all the water vapour and remaining with an hydrated substance.

ii) Mass of water vapour lost = (5 – 2.2.5) = 3.25g
mass of hydrogen in water
Determine moles of Na2SO4.and H2O

$Na_2SO_4 \Rightarrow \frac{2.205}{142} = 0.01553$ moles

$H_2O \Rightarrow \frac{3.25}{18} = 0.181$ moles

Find mole ratio:

water: sodium sulphate
0.181 : 0.01553
12 : 1
$Na_2SO_4 \cdot 12H_2O$
the value of X = 12

13. a) Molar heat of neutralisation (molar enthalpy of neutralisation) is the energy liberated per mole of water formed during a neutralisation reaction.

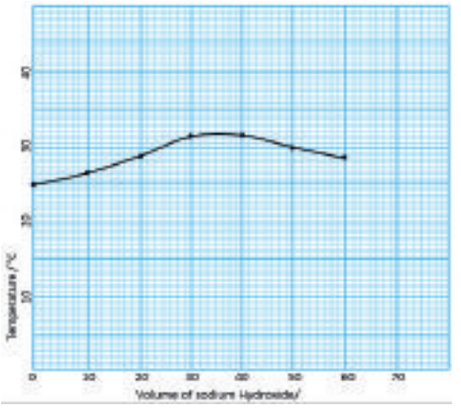
b) In an experiment to determine the molar heat of neutralisation, 50 cm^3 of IM hydrochloric acid was neutralised by adding 10 cm^3 solution of dilute sodium hydroxide.

During the experiment, the data in the table below was obtained.

Volume of sodium hydroxide (cm^3)	0	10	20	30	40	50	60
Temperature of mixture (°C)	25.0	27.0	29.0	31.0	31.0	30.0	29.0

i) $HCl(aq) + NaOH(aq) \longrightarrow NaCl(aq) + H_2O(l)$

ii) A graph of temperature against volume of sodium hydroxide.



ii) $\Delta T = 25 - 35 = 10^oC$

d) Calculate:

i) $\Delta H = MC\theta$
$= (35 + 500) \times 4.2 \times 10$
$= 3570J$

ii) The value would be less, this is because ethanoic acid is a weak acid therefore it would partly ionise thence fewer hydrogen ions consequently little heat.

14. a) i) Ores are naturally occurring rocks that contain metals or metal compounds in sufficient amounts to make it worthwhile extracting.

ii) Chalcopyrite, Chalcocite and Covellite.

b) $4CuFeS_2(s) + 13O_2(g) \rightarrow 4CuO(s) + 2Fe_2O_3(s) + 8SO_2(g)$

c) $2CuO(s) + C(s) \longrightarrow 2Cu(s) + CO_2(g)$

d) Copper made by this reduction is impure. Impure copper can be purified using electrolysis.

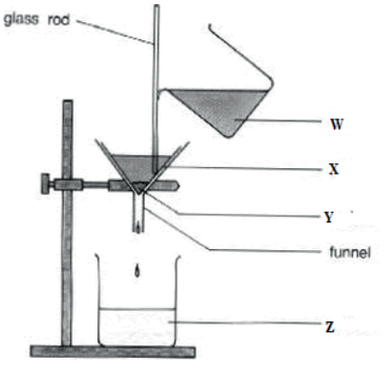
i) Copper (II) sulphate solution

ii) **cathode:**
$Cu^{2+}(aq) + 2e- \longrightarrow Cu(s)$
Anode:
$Cu(s) \longrightarrow Cu^{2+}(aq) + 2e-$

e) - Copper is used in electrical equipment such as wiring and motors.
- Copper is also used in roofing, guttering, and as rainspouts on buildings.
- It is also used in plumbing and in cookware and cooking utensils.

CHEMISTRY QUESTIONS OCHEM009

1. The figure below shows a method of separation of a mixture.



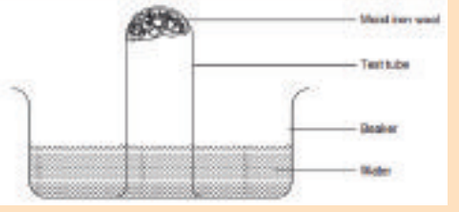
a) In which states of matter must the components of the mixture be for this method to be effective?

b) Identify substance:
i) W
ii) Z

c) State the role of:
i) material X
ii) the glass rod, in the experiment

d) Which physical property does substance Y have as evident from the experiment?

2. A student set up an experiment as shown in the diagram below.



a) State and explain two observations that would be made at the end of the experiment.

b) i) How does your observation in (a) above affect the daily use of iron wool?
ii) Write a possible equation of reaction for your observation in (a) above.

c) Suggest how you would make the experiment go faster.

3. Below is a table showing the solubilities of salts Q and R at different temperatures.

Temperature (°C)	0	10	20	30	40	50
Solubilities in grams per 100 g of water: Salt Q	3.0	5.0	7.4	10.0	14.0	19.0
Solubilities in grams per 100 g of water: Salt R	15.0	17.0	20.7	25.7	28.7	33.0

a) Define the term "solubility of salt".

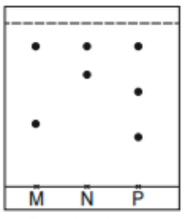
b) i) From the table, give a general comment about the solubilities of the salts.
ii) If both salts Q and R are present in 100 cm^3 of saturated solution at 50^0C, what will be the total mass of crystals formed if the solution was cooled to 20^0C?

c) State one application of solubility.

4. The spots in the diagram below represent a paper chromatogram for three brands of soda suspected to contain unwanted food additives.

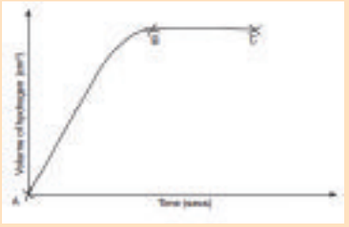
Turn to page VI

From page V



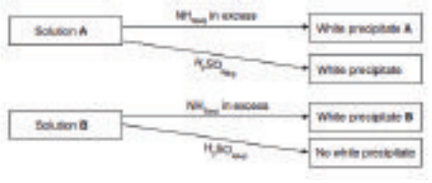
The results showed the presence of unwanted food additives in N and P only on the chromatogram.
a) Label solvent front and base line.
b) On the diagram, circle the pure component in the sodas
c) State one application of chromatography.

5. The sketch was obtained when 2g of magnesium was reacted with excess of 2M hydrochloric acid.
The volume of hydrogen was then plotted against time as shown below.



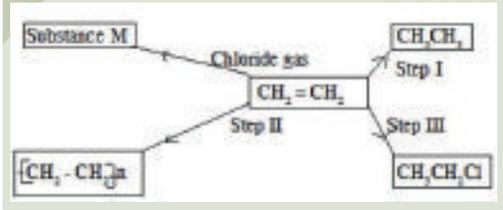
a) On the same axis, plot the graph that would be obtained if 1M hydrochloric acid was used instead of 2M hydrochloric acid.
b) Explain the significance of the flat portion BC of the curve.
c) Explain how the use of powdered magnesium would affect the reaction.

6. A student summarised and reported the results shown below;



a) Identify possible cations present in:
i) Solution A.
ii) Solution B.
b) i) State and explain the observations made when a sample of dry white precipitate B is heated in a test tube.
ii) Write an equation of reaction for your observation in b (i) above.

7. The scheme diagram below shows reactions of ethene gas



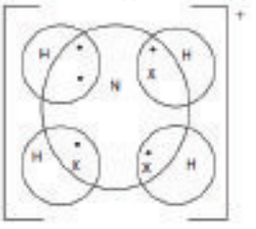
a) State the reagent for:
i) Step I
ii) Step III
b) i) Identify substance M
ii) Write an equation of reaction leading to formation of substance M
c) i) Identify the product in Step II.
ii) State any two uses of the product identified in c(i) above.

8. a) Name the property of concentrated sulphuric acid illustrated by its action on:
i) Sugar
ii) Sodium chloride.
b) Write an equation of reaction between concentrated sulphuric acid with sugar and sodium chloride.

9. Study the flow chart below and use it to answer the questions that follow.

a) Identify:
i) Reagent X
ii) Gas A
b) Identify process B.
c) Write an equation for:
i) The formation of gas C.
ii) Process B

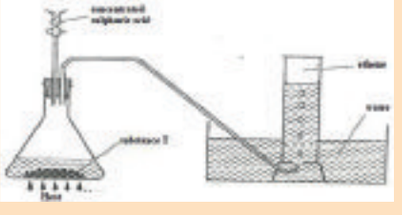
10. Below is a dot (•) and cross (x) diagram of a particle.



a) Identify the bond type(s) in the diagram.
b) The compound whose particle is shown above was reacted with sodium hydroxide and warmed.
i) State what was observed
ii) Write an equation of reaction.

SECTION B:

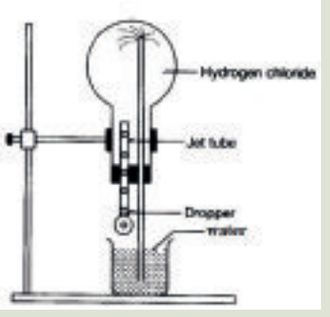
11. a) Crude oil is a major source of many hydrocarbons.
i) Name the process used to separate the hydrocarbons in crude oil
ii) Upon which physical properties are the hydrocarbons separated?
b) Under certain conditions, hexane can be converted to two products. The formula of one of the compounds is C_3H_8.
i) Write the formula of the other product.
ii) Identify a reagent which can be used to distinguish the two products and state what is observed in each case.
c) Ethyne is another hydrocarbon in crude oil. Write an equation and name the product formed when ethyne reacts with:
i) Chlorine
ii) Hydrogen chloride gas
d) The apparatus below was used to prepare ethene in the laboratory.



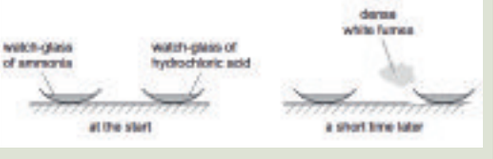
Identify substance T.
ii) State the property of ethene which allows it to be collected as shown.
iii) Ethene can form polymers. Write the equation of polymerisation of ethene.

12. a) Describe an experiment to determine heat molar heat of combustion of ethanol.
b) In an experiment to determine molar heat of reaction 0.15g of Magnesium powder was added to 25.0cm3 of a 2M copper (II) sulphate solution. The temperature of copper (II) sulphate solution was 25°C, while the mixture recorded a temperature of 43°C.
i) Other than increase in temperature, state and explain any other observation.
ii) Calculate the heat change during the reaction (specific heat capacity of the solution is 4.2J/g/K and its density is 1g/cm^3.
iii) Determine the molar heat of displacement of copper by magnesium (Mg = 24).
c) Write an ionic equation for the reaction.

13. a) Describe how a sample of hydrogen chloride gas can be prepared in the laboratory.
b) The Figure below demonstrate a fountain experiment.

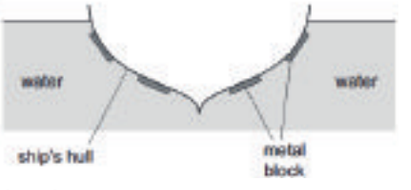


i) Write an equation for a reaction between hydrogen chloride and water.
ii) The solution in b(i) above was reacted with silver nitrate solution. State what was observed and write an equation of the reaction.
c) Watch-glasses of aqueous ammonia and concentrated hydrochloric acid were placed near each other on a table. At first no white fumes were seen. After a short time, white fumes were seen between the watch-glasses.



Explain:
i) How the dense white fumes were formed
ii) Why the fumes were closer to a watch glass with hydrochloric acid than that of ammonia.
iii) Write an equation of reaction leading to the formation of the white fumes.
d) Dilute hydrochloric acid was added to a solution containing lead (II) ions.
i) State what was observed
ii) Write an equation of reaction.
e) The resultant mixture in (d) above was heated.
i) State what was observed
ii) Write an equation of reaction

14. a) i) What is rust?
ii) Write an equation that leads to the formation of rust.
b) i) Describe an experiment to demonstrate rusting using iron wool.
ii) How does rust affect efficiency of moving parts in machines?
c) The hull of a ship is made from steel (mainly iron).Metal blocks are placed on the ship's hull to prevent rusting.



Explain why:
i) Magnesium is suitable to use as the metal blocks
ii) Copper is not suitable to use as the metal blocks