UGANDA MARTYRS SECONADRY SCHOOL, NAMUGONGO

RESOURCE MOCK S-2016

MATHEMATICS

456/2

PAPER 2

2 ½ HRS

Instructions to candidates:

- Answer all the questions in section A and any five from section B
- Any additional question(s) answered will not be marked.
- Show all the necessary working.

SECTION A

1. The vectors below are related on equation $\begin{pmatrix}4\\3\end{pmatrix}-k\begin{pmatrix}3\\-2\end{pmatrix}=\begin{pmatrix}-2\\x\end{pmatrix}$

   Determine values of k an x. (4mrks)

2. Determine the point of intersection for the lines $y=\frac{1}{2}x+3$ and $y=-x+6$

   (4mrks)

3. Without using tables or calculator, simplify $2\log_{10}6-\log_{10}3-\log_{10}1.2$

   (4mrks)

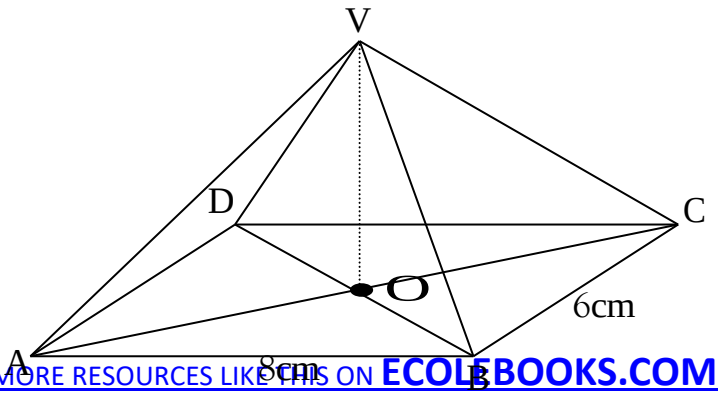
4. Set P and Q are such that, $n(P)=n(P')=8$, $n(P'\cap Q)=6$ and $n(Q')=7$.
   Represent the information on a Venn diagram, hence state $n(P\cap Q)$
   (4mrks)

5. Express $\frac{\sqrt{3}}{2-\sqrt{3}}$ with a rational denominator hence find value of $\frac{\sqrt{3}}{2-\sqrt{3}}$, given $\sqrt{3}=1.732$. (4mrks)

6. The capacity of a cylinder of height 14cm is 1.584 liters. Calculate the radius of the circular end of a cylinder. $\left(\text{use } \pi=\frac{22}{7}\right)$ (4mrks)

7. Given $h(x)=\frac{1}{2}x+b$ and $h(6)=2$ find value of b, hence determine value of x for which $h(x)=-3$. (4mrks)

8. Below is a right pyramid ABCDV with a rectangular base ABCD of dimensions $AB=8cm$ $BC=6cm$ and height $OV=...cm$



Determine the angle between VC and the base. (4mrks)

9. In an organization the income up to shs. 210,000 is not taxed, and the rest of the income is taxed at 15%. Zoboota paid shs. 69,000 of tax, what was Zoboota's gross income. (4mrks)

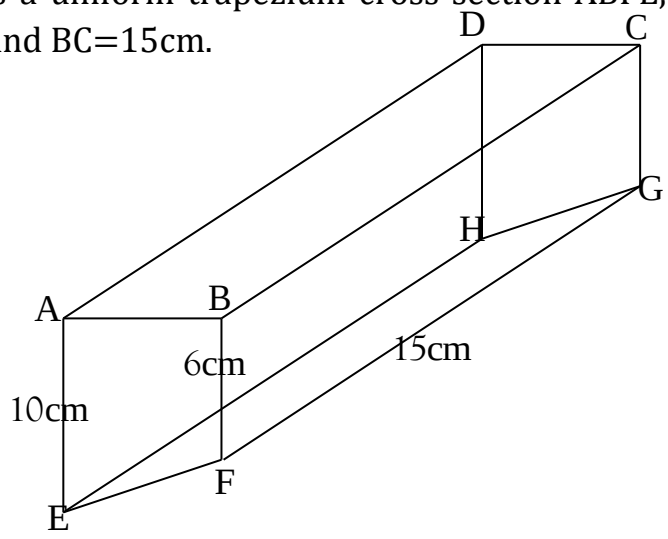
10. A line $3x - 5y = 12$ cuts the x-axis at point T. determine
    i) Gradient of line
    ii) Coordinates of T (4mrks)

SECTION B

11. a) Given $\log_{10} x = \bar{1}.413$ determine
    i) $\log_{10} 10x$
    ii) $\log_{10} \sqrt{x}$ (4mrks)

    b) y partly as x and partly as the square of x. $y = 51$ when $x = 3$ and $y = 2.25$ when $x = 0.5$ .Determine;
    i) The equation relating x and y
    ii) Value of y when x=2. (4mrks)

12. The figure below has a uniform trapezium cross-section ABFE, AB=8cm, AE=10cm, BF=6cm and BC=15cm.

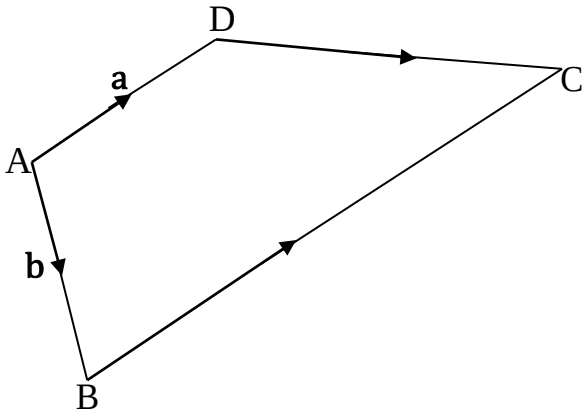


Determine the;
i) Length EF (to 2 decimal place) (2mrks)

ii) Area of the ABFE (2mrks)
iii) Volume of the figure (2mrks)
iv) Total surface area of the figure (6mrks)

13. At A' level 49 students offer at most three principal subjects. The science class all students offer principle mathematics besides physics (P), chemistry (C) or Biology (B).18 offer physics, 7 offer physics and chemistry and 12 offer biology and chemistry. The number of students that offer physics and biology is equal to those who offer neither physics, biology nor chemistry and they are 9. Given that the number of those offering chemistry is equal to those for Biology
a) Draw a Venn diagram represent the given information. (7mrks)
i) How many students offer 3 of the above mentioned subjects?(4mrks)
b) A student is picked at random what is the probability that he/she offers 2 of the subjects. (1mrk)

14. The diagram below shows a trapezium ABCD in which $AD:BC=2:3$ $\overrightarrow{AD}=\mathbf{a}$ and $\overrightarrow{AB}=\mathbf{b}$



Express the following vectors in terms of **a** and **b**;
i) $\overrightarrow{BC}$
ii) $\overrightarrow{BD}$
iii) $\overrightarrow{AC}$
(6mrks)

a) If A is $(-5,-3)$, D$(-1,3)$ and $\overrightarrow{AB}=\begin{pmatrix}4\\-2\end{pmatrix}$ AB=$\binom{4}{-2}$, determine;
i) Column vector $\overrightarrow{AD}$

ii) Length of $\overrightarrow{BD}$. (6mrks)

15. Given $h^{-1}(x)=\frac{3}{5x-2}$, determine;

i) The value of $h^{-1}(-2)$ (2mrks)

ii) An expression for $h(x)$ (4mrks)

iii) value of $h(2)$ (2mrks)

iv) The value of x for which $h(x)=0$ (2mrks)

v) The value of x for which $h^{-1}(x)$ is not defined. (2mrks)

16. A tray of eggs has 30 eggs and costs shs.7500. A shopkeeper bought x trays unfortunately 10 eggs broke. He sold the rest of eggs in row form or boiled at shs.350 and 400 each respectively. He sold 50 row eggs. He realized a profit of shs.7, 000 on selling all the eggs.

a) Express in terms of x.

i) The cost price of the eggs (4mrks)

ii) The total number of eggs sold

b) Form an equation for the selling price and solve for value of x. (4mrks)

c) Calculate the percentage profit. (2mrks)

17. Points $P(-1,4)$ and $T(7,-2)$ are the endpoints of line segment PT.

a) Determine the equation;

i) Of line PT (4mrks)

ii) Of the perpendicular bisector of PT. (5mrks)

b) The area enclosed between the two lines above and the y-axis. (3mrks)

END