12. If $f(x) = ax + b$ and that $f(2) = 5$ and $f(3) = 7$. *(05marks)*

(a) Find the values of a and b.

(b) Also given that $g(x) = \frac{3x+2}{x+4}$, find

(i) $gf(x)$

(ii) $(gf)^{-1}(x)$

(iii) the value of x for which $(gf)^{-1}(x)$ is meaningless. *(07marks)*

13. In a science class of 345 students, the students who took Physics (P), Math (M) and Chemistry (C) are equal in number. There are 30 students who took both Physics and Math only, 26 who took both Math and Chemistry only, 28 who took Chemistry and Physics only and 14 who took all the three subjects. There are 43 students who didn't take any of the subjects.

(a) Represent the given information on a Venn diagram. *(04 marks)*

(b) What percentage of students did not take chemistry? *(06 marks)*

(c) If a student is picked at random, what is the probability that the student took at least one of the 3 subjects. *(02 marks)*

14. Pokopoko bus left Kisenyi bus terminal for Kasese Having travelled 300km, it stopped for 30 minutes due to road blockage. It had travelled 60% of the total distance by this time. After it started again, the driver increased the speed by 20km/h and reached Kasese at the scheduled time. If V is the original speed of the bus;

(a) show that $V^2 + 20V - 8000 = 0$ *(09 marks)*

(b) find the value of V. *(03 marks)*

Turn Over

3

15. Samuel works with DFCU bank. He pays a monthly income tax of sh.196,000. Uganda Revenue Authority uses the tax from employees' income.

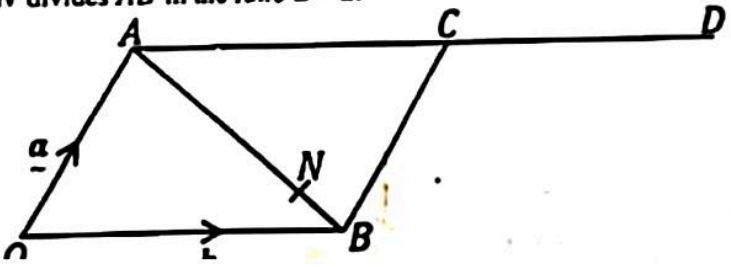
Taxable Income	Rate (%)
1st sh.40,000	2
Next sh.80,000	3
Next sh.180,000	5
Next sh.100,000	8
Next sh. 200,000	10
On remainder	12

(a) Determine Samuel's monthly taxable income. *(08 marks*

(b) If Samuel receives a monthly allowance of sh. 120,0000, find his monthly gross salary *(02 marks*

(c) What is Samuel's monthly net pay? *(02 marks*

16. In the diagram below $OACB$ is a parallelogram. D is a point such that $AC = CD$. Point N divides AB in the ratio $2 : 1$.



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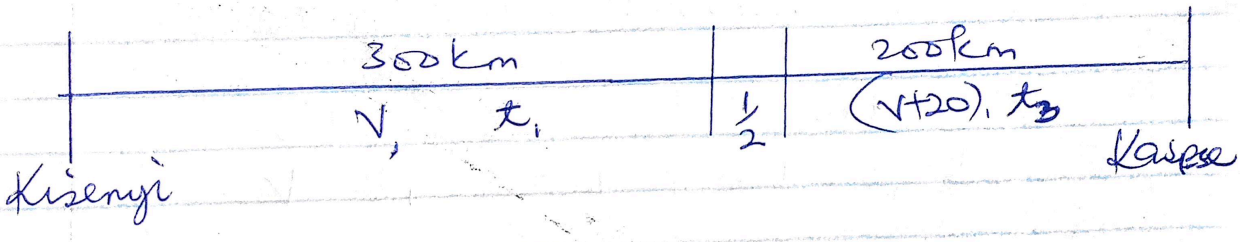
Wakata Mtc 2 UCE No 14.

$\frac{60}{100}$ of $y = 300$

$60y = 30000$

$y = 500$

Total distance from Kisenyi to Kasese = 500km.



$t_1 = \frac{300}{V}$

Time taken, t_2 to cover 200 km using the original speed, V, $= \frac{200}{V}$.

Time taken, t_3 to cover 200km using the increased speed $(V+20)$ is $\frac{200}{V+2}$.

$\Rightarrow t_2 - t_3 = \frac{1}{2}$.

$\frac{200}{V} - \frac{200}{V+20} = \frac{1}{2}$

$\frac{200(V+20) - 200V}{V(V+20)} = \frac{1}{2}$

$\frac{200V + 4000 - 200V}{V^2 + 20V} = \frac{1}{2}$.

$\frac{4000}{V^2+20V} = \frac{1}{2}$

$V^2 + 20V = 8000$

$V^2 + 20V - 8000 = 0$.

b) $V^2 + 20V - 8000V = 0$.

$(V-80)(V+100) = 0$.

$V = 80$ or $V = -100$

$\therefore V = 80 \text{ km/hr}$.