Name:	Index No:	
2920/106 COMPUTATIONAL MATHEMATICS	Signature:	
November 2012 Time: 3 hours	Date:	_



THE KENYA NATIONAL EXAMINATIONS COUNCIL DIPLOMA IN INFORMATION COMMUNICATION TECHNOLOGY

MODULE 1

COMPUTATIONAL MATHEMATICS

3 hours

INSTRUCTIONS TO CANDIDATES

Write your name and index number in the spaces provided above.

Sign and write the date of examination in the spaces provided above.

You should have a scientific calculator for this examination.

Answer any FIVE of the following EIGHT questions in the space provided.

All questions carry equal marks.

For Examiner's Use Only

Question	1	2	3	4	5	6	7	8	Total Marks
Marks									

This paper consists of 19 printed pages.

Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

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Turn over

(a)	(i)	Define the term dependent events as used in probability.	(2 marks)
		A mile tra	
	(ii)	Mwanzo Institute presented two teams during the National competitions: the boys' football team and girls' volleyball probability of the boys' football team winning is ³ / ₂ and the	team. The
		of the girls' volleyball team winning is 4. Calculate the pr	obability th
		I. at least one team wins;	(4 marks
		epoli 6	
		II. both teams lose.	(2 marks
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	_	- Style	
		e ^o	
(b)	Diff	erentiate between bits and bytes as used in computer systems	. (4 marks
-			
(c)	(i)	Define the term relative frequency as used in statistics.	(2 marks
	-		

(ii) Table 1 shows time taken by employees to complete an activity.

Time (min)	10.0	10.5	11.0	11.5	12.0	12.5	13.0
Frequency	4	8	14	22	19	10	3

Table 1

Using assumed mean of 11.5, determine the standard deviation. (6 marks)

2. (a) (i) Define the term leading diagonal as used in matrices. (2 marks)

- CONT

(ii) Using the inverse method, solve the following equations

$$8x + 4y + 2z = 3$$

 $4x + 3y + z = 3$

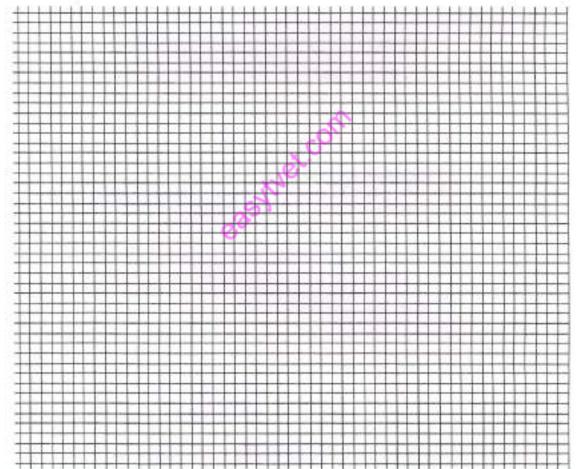
$$2x + y + 3z = 1$$

y + 3z = 1 (6 marks)

(b)	Convert 1265 ₁₀ to its octal equivalent.	(2 marks)

(c) Distinguish between skewness and kurtosis as used in statistics. (4 marks)

(d) (i) Plot the graph of $y = 4x^2 - 8x - 21$ for values of x ranging from -2 to 4. (3 marks)



	(ii) Using th	e graph in (i) solve $4x^2 - 10x - 10$	15 = 0 (3 ma
(a)	Convert 3C4.21	F ₁₆ to its decimal equivalent.	(4 ma
(a)	Convert 3C4.21	F ₁₆ to its decimal equivalent.	(4 ma
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	Table 2 shows to Use it to answer Range 20.5–20.9 21.0–21.4 21.5–21.9	the frequency distribution of resistant the question that follows. Frequency 3 10 11	ance of resistors in ohm

(i)	Define the term column vector as used in algebra. (2 marks
(ii)	Using the completing square method, solve the quadratic equation $2x^2 + 9x - 5 = 0$. (4 marks
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_	602,
(i)	Determine the first four terms of the following expansion $\left(1 + \frac{1}{2}x\right)^{10}$ (3 marks)
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(ii)	Hence find	(1.005)10	correct to 4	decimal	places.	
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(3 marks)

4. (a) Using the de Morgan's laws, simplify the Boolean expression $(\overline{A}, \overline{B} + C)$, $(\overline{A} + \overline{B}, \overline{C})$.

(5 marks)



(b) Figure 1 shows a logic circuit. Use it to answer the question that follows.

A B Figure 1

Construct a truth table for the circuit.

(3 marks)

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(c)	The deflection y at the centre of a circular plate suspended at the edge and uniformly loaded is given by $y = \frac{kwd^2}{t^3}$ where $w = \text{total load}$, $d = \text{diameter of plate}$, $t = \text{thickness}$ and k is constant. Calculate the approximate percentage change in y if w increased by 3 %, d is decreased by $2\frac{1}{2}$ % and t is increased
	by 4%. (6 marks)
	and the Occasion of the same
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	ad y		
)	(i)	Define each of the following terms as used in algebra: I. constant;	(1 mark)
		II. variable.	(1 marks
	(ii)	Using elimination method, solve the following of simultations. 13x - 5y + 2z = 9 5x + 3y - z = 8	aneous
		13x + 9y - 2z = 25	(4 mark
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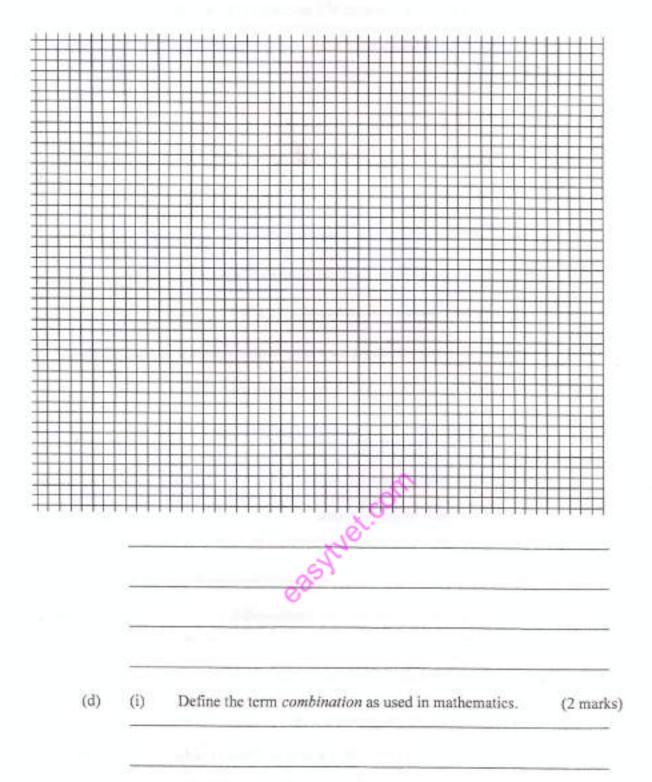
	(i)	Demi	e me ter	ш соедист	em as u	sed in on	nomial theorem.	(2 ma
	(ii)	Expre	ss -1	as a bir	nomial s	eries up 1	to and including t	he 4 th te
		-11'	4.4					(4 ma
	-							
(b)	Disting	guish b	etween	XOR and	NOT o	perations	as used in Boole	an algel
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(c)			s value follows		d from a	certain e	expression. Use it	to ansv
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(d)	T-shi	ain college purchased sports uniform in ts was the same as the cost of 2 shorts. Shirts and two shorts. Determine the c	If a total of Kshs 1150 was spe
		•	
(a)	Expla	in each of the following types of data a	s used in statistics.
	(i)	discrete;	(2 mark
	_	©	
	(ii)	continuous.	(2 mark
(b)	are se	ch of laptops contains 16 working and elected at random from the batch withou	
	proba (i)	ibility that: all three are working;	(3 mark

6.

(ii)	two are working but one is defective.	(3 marks
<u> </u>		
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	graphic method, solve the following equal $2y = 0$	uations.
	y + 11 = 0	(4 marks

(c)



	(ii)	A committee consisting of 6 members is to be formed on 4 women. Determine the number of committees that can such that at least a third of the members are women.	t of 7 men an be formed (4 marks)
(a)	(i)	Define each of the following terms as used in binary cod	les:
		I. reflective codes;	(2 marks)
		II. non weighted codes.	(2 marks)
		25/1	
	(ii)	Outline two applications of binary codes.	(2 marks)
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(b)	(i)	State the implication of $x \notin A$ in set theory notation.	(2 marks)
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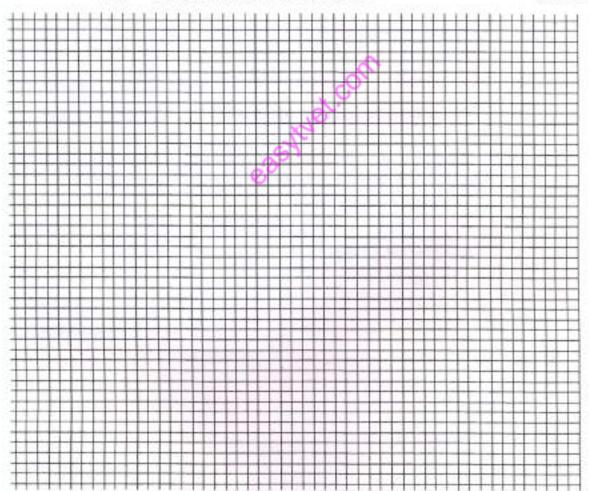
(ii)	Determine $B \cap \overline{A}$ given that $A = \{1,2,3\}$ and $B\{3,4,5,6\}$.	(2 marks)
(iii)	Using Venn diagrams determine $C \cap D$ given $C \subseteq D$. Dete	
		(2 marks
-		
If "P.	= 12°P ₂ , determine the value of n.	(4 marks
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(i)	Using class intervals of 200 and starting with 300 prepare a frequence distribution table to represent the data (3 mark)

(ii) Represent the data using an ogive.

(3 marks)



· /		et to four significant figures.	(4 marks)
(d)	(i)	Outline three properties of ASCII code.	(3 marks
		251	
		0	
	(ii)	Using the one's complement (IC), evaluate.	
	2.77	1101101	
		-110111	(3 marks
	-		
	7.11		
	-		
			11