

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF CERTIFICATE IN COMPUTER SCIENCE

MATH 00101: FOUNDATION MATHEMATICS

STREAMS: CERT (COMP SCI)

TIME: 2 HOURS

DAY/DATE: MONDAY 6/08/2018

11.30 A.M - 1.30 P.M.

- a. Solve the quadratic equation  $4x^2 = 20x - 25$  using the factorization method [4 Marks]
- b. A group of young men decided to raise sh.480,000 to start a business. Before the actual payment was made, four of the members pulled out and each of those remaining had to pay an additional sh.20,000. Determine the original number of the members. [5 Marks]
- c. For the function  $f(x) = 2x^2 + 3x - 1$ , evaluate
- i)  $f(2)$
  - ii)  $f(a)$
  - iii)  $f(a+h)$  [5 Marks]
- d. Simplify  $P^3 \times P^4 \times P^5$  [3 Marks]
- e. Solve for  $x$  in  $9^{x+1} + 3^{2x+1} = 36$  [5 Marks]
- f. Solve  $\log_3 9$  without using a calculator [3 Marks]
- g. Ten boys are running in a race. In how many ways can the first three places be filled, if there are no dead heats [3 Marks]

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- h. Evaluate  $\frac{9!}{2!7!}$  [2 Marks]

### QUESTION TWO

- a. In how many ways can the letters of the word BESIEGE be arranged? [3 Marks]
- b. In how many ways can 4 girls and 2 boys be seated in 9 rows such that
- The children can sit anywhere
  - The two boys must sit together
  - The two boys must be separated [5 Marks]
- c. A committee of 5 men and 4 women is to be chosen from 8 men and 6 women. In how many ways can this be done? [4 Marks]
- d. Given that when  $f(x) = 3x^3 - 2x^2 + kx + 9$  is divided by  $x + 2$ , there is a remainder of -35
- Find the value of the constant k
  - Find the remainder when  $f(x)$  is divided by  $(3x - 2)$  [6 Marks]
- e. Distinguish between mutually exclusive events and equally likely events [2 Marks]

### QUESTION THREE

- a. Expand  $(1 + 3x)^5$  using the coefficients of the Pascal's triangle [5 Marks]
- b. An AP has third term 5 and fifth term 9. Find the first term and the common difference [5 Marks]
- c. A box of chocolates is randomly selected from a production line to see if any of the chocolates are faulty. Each box contains 12 soft-centres and 8 hard-centres. Two chocolates are randomly selected from the box and are tested to see if they have any faults.
- What is the probability of selecting two soft-centred chocolates?
  - What is the probability of selecting two hard-centred chocolates?
  - What is the probability of selecting a soft-centred and a hard-centred chocolate? [4 Marks]
- d. Find the mean of the following distribution [3 Marks]

X	2	4	7	8	13
F	3	8	8	5	6

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- e. A mixed hockey team containing 5 men and 6 women is to be chosen from 7 men and 9 women. In how many ways can this be done? [3 Marks]

### QUESTION FOUR

- a. A senior lecturer is set to give a series of four lectures. If he doesn't give any one lecture, the lecture is given by his assistant. He is certain to give the first lecture. The probability of giving the second lecture is 0.45. If he gives the second lecture, the probability of giving the third lecture is 0.7, otherwise it is 0.4. If he gives the third lecture, the probability of giving the fourth lecture is 0.35 otherwise it is 0.7. Calculate the probability that the lecturer
- 1
- i) Gives all the four lectures
  - ii) Gives two lectures only
  - iii) Gives lecture one and lecture four only [6 Marks]
- b. Solve  $\log_2(x^2 - 6x) = 3 + \log_2(1 - x)$  [5 Marks]
- c. Show that  $\frac{1 + \cos \theta}{\sin \theta} = 2$  [5 Marks]
- d. The first term of the AP is 3 and the common difference is 2. Find the sum of the first 50 terms [4 Marks]

### QUESTION FIVE

- a. The data below shows the frequency distribution table of masses (kg) of 60 computer science students that were tested positive with pregnancy as a result of one month lectures strike in Kenyatta University.

Mass (kg)	60-64	65-69	70-74	75-79	80-84	85-89	90-94
Frequency	2	4	8	22	18	5	1

- i) Mean
- ii) Median
- iii) Mode

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- iv) Standard deviation
- v) 6<sup>th</sup>Decile
- vi) Lower and upper quartiles

[8 Marks]

b. Given that  $f(x) = 4x^2 - 5$  and  $g(x) = x + 3$ , find

i)  $f \circ g(3)$

ii)  $g \circ f(3)$

iii)  $g \circ g(x)$

iv)  $f \circ f(x)$

[6 Marks]

c. Sketch the graph of the function  $f(x) = \frac{3x - 12}{4}$

[ 6

Marks]

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