



(Knowledge for Development)

KIBABII UNIVERSITY

(KIBU)

**UNIVERSITY EXAMINATIONS
2020/2021 ACADEMIC YEAR**

**END OF SEMESTER EXAMINATIONS
YEAR ONE SEMESTER TWO EXAMINATIONS**

**FOR THE DIPLOMA IN
(INFORMATION TECHNOLOGY)**

COURSE CODE : DIT 063

COURSE TITLE : BASIC MATHEMATICS

DATE: 05/10/2021

TIME: 9.00 A.M-11.00 A.M

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTIONS ONE AND ANY OTHER TWO

QUESTION ONE (COMPULSORY) (28 MARKS)

- a. Define (2 marks)
- i. Trigonometry (2 marks)
 - ii. Quadratic equation (2 marks)
- b. In a group of 6 boys and 4 girls, four children are to be selected. In how many different ways can they be selected such that at least one boy should be there? (4 marks)
- c. Find the sum of all the numbers between 0 and 207 which are exactly divisible by 3 (4 marks)
- d. Simplify the following $\frac{5^4 \cdot 6^{-2}}{5^2}$ (3 marks)
- e. Solve the following equations using logarithms $\log_3 \frac{1}{27} = x$ (2 marks)
- f. Solve the following quadratic equation using quadratic formula (3 marks)
- i. $x^2 - 2x + 2 = 0$ (2 marks)
 - ii. $x^2 + 2x - 8 = 0$ (4 marks)
- g. Simplify $3\sqrt{2x} - 5\sqrt{8x} + \sqrt{72x}$ (4 marks)
- h. Using the remainder theorem find the remainder when $(3x^2 - 4x + 2)$ is divided by $(x - 2)$ (2 marks)

QUESTION TWO (16 MARKS)

- a. If two letters are to be selected from A, B, C, D and E considering the order of selection, find the possible outcomes (4 marks)
- b. State the remainder theorem (2 marks)
- c. Using the theorem above find the remainder of $x^3 - 2x^2 - 5x + 6$ When divided by $(x + 2)$ and explain your answer (3 marks)
- d. Using long division divide $(x^3 - 2x^2 - 5x + 6)$ by $(x + 2)$ (5 marks)
- e. Find the value of x given $\log_4 64 = x$ (2 marks)

QUESTION THREE (16 MARKS)

- a. Define the term Arithmetic series (2 marks)
- b. Which term of the series 2187, 729, 243, ... is $\frac{1}{9}$? (5 marks)
- c. Determine the i) 9th and ii) 16th term of the series 2, 7, 12, 17, ... (4 marks)

- d. Solve $x^2 - 2x + 8 = 0$ by completing squares (5 marks)

QUESTION FOUR (16 MARKS)

- a. Use the binomial series to determine the expansion of $(2 + x)^7$ (6 marks)
- b. A drilling machine is to have 6 speeds ranging from 50rev/min. if the speed form a geometric progression determine their values each correct to nearest whole number. (7 marks)
- c. Find the value of x
 $200(1.1)^x = 20,000$ (3 marks)

QUESTION FIVE (16 MARKS)

- a. Given a right angle triangle with hypotenuse 15cm and the length of 12cm find the solutions of all the six trigonometric functions (8 marks)
- b. Verify that $\cos(180^\circ - x) = -\cos x$ and $\sin(180^\circ + x) = -\sin x$ (4 marks)
- c. Given a triangle with the sides ABC where the angle ABC is X° and the length b is 2.3 cm and the angle BCA is 43° and the length c is 3.5 cm. using sin rule find the solutions of X° (4 marks)

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