(Knowledge for Development)

KIBABII UNIVERSITY (KIBU)

MAIN CAMPUS

UNIVERSITY EXAMINATIONS

2021/2022 ACADEMIC YEAR

END OF SEMESTER EXAMINATIONS

FIRST YEAR SECOND SEMESTER EXAMINATION

FOR THE DIPLOMA IN

(INFORMATION TECHNOLOGY)

COURSE CODE: DIT 063

COURSE TITLE: BASIC MATHEMATICS

DATE: 31/08/2022 **TIME:** 09.00 A.M. – 11.00 A.M. **2HRS**

INSTRUCTIONS TO CANDIDATES:
ANSWER QUESTIONS ONE AND ANY OTHER TWO.

Paper Consists of 3 Printed Pages. Please Turn Over

QUESTION ONE COMPULSORY (24 MARKS)

a. Define

i. Define the term Arithmetic series (1mark)

ii. Quadratic function (1mark)

b. Simplify each of the following

i. $\frac{5^4.6^{-2}}{5^2}$ (3marks)

ii. $(4x^3)^2$ (2 marks)

c. Solve $4e^x = 100$ using logarithms (2 marks)

d. Solve the following quadratic equation using quadratic formula

i. $x^2 - 2x + 2 = 0$ (3 marks)

ii. $x^2 + 2x - 8 = 0$ (2 marks)

iii. $x^2 - 8x + 15 = 0$ (2 marks)

e. Simplify $3\sqrt{2x} - 5\sqrt{8x} + \sqrt{72x}$ (4 marks)

f. Solve $x^2 + 2x - 8 = 0$ graphically (4 marks)

QUESTION TWO (18 MARKS)

a. State the remainder theorem (2 marks)

b. Using the theorem above find the remainder of $3x^2 - 4x + 5$ When divided by $(x - 2)$ and explain your answer (3 marks)

c. Determine the remainder when $(x^3 - 2x^2 - 5x + 6)$ is divided by $(x + 2)$ and $(x - 1)$ hence factorize the cubic expression (9 marks)

d. How many different committees each consisting 3 boys and 2 girls can be chosen from 7 boys and 5 girls. (4 marks)

QUESTION THREE (18 MARKS)

a. Define the term geometric progression (2 marks)

b. Use the binomial series to determine the expansion of $(2 + x)^7$ (6 marks)

c. Determine the 9^{th} and the 16^{th} term of the series 2, 7, 12, 17... and find the sum of the first 16 terms (6 marks)

d. Determine the 10^{th} term of the series 3 6 12 24 . . . (2 marks)

e. $5^x = 25$ (2 marks)

QUESTION FOUR (18 MARKS)

a. A drilling machine is to have 6 speeds ranging from 50rev/min to 70rev/min. if the speed form a geometric progression determine their values each correct to the nearest whole number (7 marks)

b. The national income = £ 30,000 *mill* in 1964 it grows at 4% p.a

$$y = income\ (units\ of\ £\ 10{,}000\ mill)$$

$$1964: y = 3$$

$$1965: y = 3(1.04)$$

$$1966: y = 3(1.04)^2$$

$$1984: y = 3(1.04)^{20}$$

Express in terms of logs and solve for the income of the year 1984 (5 marks)

c. Find the value of x

$200(1.1)^x = 20{,}000$ (3 marks)

$5^x = 2(3)^x$ (3 marks)

QUESTION FIVE (18 MARKS)

a. Define the term trigonometry (2 marks)

b. Given a right angle triangle with hypotenuse 15cm and the length of 12cm find the solutions of all the six trigonometric functions. (8 marks)

c. Verify that $\cos(180° - x) = -cosx$ and $\sin(180° + x) = -sinx$ (4 marks)

d. 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)