KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS

2020/2021 ACADEMIC YEAR

FIRST YEAR FIRST SEMESTER

SUPPLEMENTARY EXAMINATION

FOR THE DEGREE OF BACHELOR OF SCIENCE

COURSE CODE: MAP 111 A

COURSE TITLE: FOUNDATION MATHEMATICS

DATE: 30/9/201   **TIME:** 2 PM – 4 PM

INSTRUCTIONS TO CANDIDATES

Answer Question One and Any other TWO Questions

TIME: 2 Hours

KIBABII UNIVERSITY

MATHEMATICS DEPARTMENT

SEMESTER I , 2020/21SPECIAL EXAMS

MAP 111A: FOUNDATION MATHEMATICS

INSTRUCTIONS

Answer Question ONE and any other TWO Questions

QUESTION ONE (30 MARKS)

a. Given that set A={1,4,6,8}, B = {0,2,4,8,9} and U = { the digits}. Draw a Venn diagram

   for A U B   (3 marks)

b. Find the partial fraction decomposition of $\dfrac{x^2+1}{x(x-1)^3}$ (8 marks)

c. In the arithmetic sequence -3,4,11, 18......, find the sum of the first 20 terms.   (6 marks)

d. Use the remainder theorem to evaluate $f(x) = 6x^4 - x^3 - 15x^2 + 2x -7$ at x =2   (3 marks)

e. Show that $f(x) = x$ is an odd function   (3 marks)

f. Find the values of $\sin 45^0$, $\cos 60^0$ and $\tan 60^0$ (3 marks)

g. Find

   i. $\vec{u} + \vec{v}$

   ii. $\vec{u} - \vec{v}$ if $\vec{u} = (3, 4)$ and $\vec{v} = (5, -1)$ (4 marks)

QUESTION TWO (20 MARKS)

a. Define the following

    i.   Venn diagram   (2 marks)

    ii.   Universal set   (2 marks)

    iii.   The complement of A   (2 marks)

b. Create a Venn diagram to show the relationship among the following sets. U is the set of whole numbers from 1 to 15. A is the set of multiples of 3. B is the set of primes. (9 marks)

c. If U = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10), A = { 1, 2, 3, 4, 5, 6 }, B = { 1, 2, 3, 5, 7 } and C = { 2, 4 }. Find

    i. $A \cap B$ (1 mark)

    ii. $A \cup B$ (1 mark)

    iii.   iii. A'   (1 mark)

    iv.   iv. $A \cap C$ (1 mark)

    v.   v. $A \cup C$ (1 mark)

QUESTION THREE (20 MARKS)

a. Find the partial fraction of $\dfrac{x-3}{x^3+3x}$ (9 marks)

b. Decompose the following

$$\frac{x^5-2x^4+x^3+x+5}{x^3-2x^2+x-2}$$ (11 marks)

QUESTION FOUR (20 MARKS)

a. Find the sum of the multiples of 3 between 28 and 112 (5 marks)

b. Write down the 8th term in the geometric progression 1, 3, 9, ……. (4 marks)

c. Find the number of terms in the geometric progression 6, 12, 24, …., 1536 (4marks)

d. Find the sum to infinity for the series 96 + 48 + 24 + ……… (3 marks)

e. Express the recurring decimal 0.242424…. as a vulgar fraction (4marks)

QUESTION FIVE (20 MARKS)

a. Show that $(x+2)$ is a factor of x^3-6x^2-x+30. Find the remaining factors. Use the

factors to determine the zeros of the polynomials. (7 marks)

b. Show that the function $y = 2x -3$ is neither (5 marks)

c. If $f(x) = x + 2$ and $g(x) = 3x^2 + 4x + 1$, find

    i. $f(g(x))$. (3 marks)

    ii. $g.f(x)$. (5 marks)