(Knowledge for Development)

KIBABII UNIVERSITY

(KIBU)

UNIVERSITY EXAMINATIONS
2020/2021 ACADEMIC YEAR

SPECIAL/SUPPLEMENTARY EXAMINATIONS
YEAR ONE SEMESTER ONE EXAMINATIONS

FOR THE DEGREE OF
BACHELOR OF SCIENCE
(INFORMATION TECHNOLOGY)

COURSE CODE: BIT 114

COURSE TITLE: MATHEMATICS FOR IT

DATE: 19/07/2022 **TIME: 11.00 A.M – 1.00 P.M.**

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTIONS ONE AND ANY OTHER TWO.

QUESTION ONE (COMPULSORY) [30 MARKS]

a) Given three propositions e, f and g, work out all the possible outcomes using a truth table (5 marks)

b) Given $f(x)=4x-5$ and $g(x)=2x+3$, then find $f \circ g(x)$ (4marks)

c) Differentiate $y = (x^3 - 1)^{100}$. (6 marks)

d) If A = {whole numbers between 1 and 8, the two numbers being exclusive} and B = {odd numbers between 3 and 13 where the two are inclusive}, then find B – A making use of a Venn diagram (5 marks)

e) Evaluate $\int_1^2 (x-1)(x+1)dx$ (5 marks)

f) Find the inverse of $f(x) = 4x+7$. (5 marks)

QUESTION TWO [20 MARKS]

a) Determine local maxima or minima of function below. $y = f(x) = x^3 - 6x^2 + 9x + 2$ (10 marks)

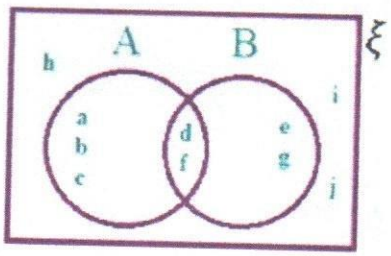
b) Given the curve xy = 4 find the equation of the normal at the point x = 2. Further, suppose we wish to know where the normal meet the curve again, if it does. (10 marks)

QUESTION THREE [20 MARKS]

a) Let A and B be two finite sets such that n(A) = 20, n(B) = 28 and n(A ∪ B) = 36, find n(A ∩ B). (4 marks)

b) In a group of 100 persons, 72 people can speak English and 43 can speak French. How many can speak English only? How many can speak French only and how many can speak both English and French? (10 marks)

c) Use Venn diagrams



to evaluate:- (6 marks)

(i) A ∪ B

(ii) A ∩ B

(iii) A'

(iv) B - A

(v) $(A \cap B)'$

(vi) $(A \cup B)'$

QUESTION FOUR [20 MARKS]

a) Let Q (x, y, z) denote the statement "$x^2+y^2=z^2$".

(i) What is the truth value of Q (3, 4, 5)?

(ii) What is the truth value of Q (2, 2, 3)? (6 marks)

b) Simplify $(z \wedge w) \vee (\neg z \wedge w) \vee (z \wedge \neg w)$ (8 marks)

c) Show that $(P \rightarrow Q) \vee (Q \rightarrow P)$ is a tautology. (6 marks)

QUESTION FIVE [20 MARKS]

(a) Evaluate $\int 4x\cos(2-3x)dx$. (8 Marks)

(b) Sketch the region bounded by the graphs $y=2x$, $y=2-2x$, $y=0$ and find the area, with respect to y (12 marks)