JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF MATHIMATICS AND ACTURIAL SCIENCE

UNIVERSITY EXAMINATION FOR DEGREE IN PUBLIC HEALTH AND COMMUNITY HEALTH

SPECIAL RESIT 2 2020/2021 ACADEMIC YEAR

Mathematics I (SMA3111):

INSTRUCTIONS:

1) Answer question ONE and any other TWO questions.
2) Candidates are advised not to write on the question paper.
3) Candidates must hand in their answer booklets to the invigilator while in the examination room.

QUESTION ONE (30 MARKS)

a) Define the following as used in set theory

i) Proper subset

ii) Complement of a set

b) Given that $\cos\theta = \frac{1}{4}$,find without using tables $\sec^2\theta$ and $\tan\theta$

c) Briefly explain the meaning of functions as a special type of real relation(4mks)

d) The 6^{th} term of an arithmetic progression is 17 and 13^{th} term is 38.Determine the 19^{th} term(4mks)

e) Simplify by rationalizing the denominator$\frac{3}{\sqrt{5}+\sqrt{3}}$ (3mks)

f) Ocholla deposited ksh4500 in a bank which paid compound interest of 12% semi-annually. Calculate the amount after 3 years (4mks)

g) In how many ways can 6 girls arrange themselves around a circular top table (4maks)

i. State remainder theorem

ii. Use remainder theorem to find the factors of $x^3 - 3x^2 + 6x + 4 = 0$ (4maks)

QUESTION TWO

a) Expand $\left(X - \frac{1}{2}\right)7$(4mks)

b) Find the inverse of the function

   i. $y = 2x + 1$(2mks)

   ii. Solve for x in $\log(xy) + \log(x + 1) = 2\log(x + 2)$(5maks

c) In how many ways can a committee consisting of 4 men and 3 women be chosen from 8 men and6 women (4mks)

d) Determine the validity of $\tan^2\theta - \sin^2\theta = \sin^2\theta\sec^2\theta$(4mks)

QUESTION THREE

a) From the following grouped frequency distribution calculate

Class	3-7	8-12	13-17	18-22	23-27	28-32
Frequency	15	13	27	29	10	13

   i. Arithmetic mean
   ii. Mode
   iii. Medium (10mks)

b) Let A $\{1,2,3,4\}$ and $\{0,3,6,8,12,15\}$ Consider a function f(x)=$x^2 - 1 \in A$.Then

   i. Show the arrow diagram to represent the mapping
   ii. Represent the mapping in roster form
   iii. Draw the arrow diagram to represent the mapping
   iv. Write the domain, co-domain and range of the mapping (10mks).

QUESTION FOUR

a) Evaluate $4a^2bc^3$-2ac given: a=2, b=$\frac{1}{2}$, c=1$\frac{1}{2}$ (4maks)

b) Given A$\{1,2\}$ B$\{x, y, z\}$ and C$\{3,4\}$ Find AXBXC (6maks)

c) Solve the equation X^p2=12 given that X≥ 2 (4maks)

d) Using examples define

i) domain

ii) range (4maks)

e) Simplify $\sqrt{1000}$ (2maks)

QUESTION FIVE

a) Given that A,B and C are subsets of the universal set U, each of the following defined as

U=$\{X: 2 \leq X < 12\}$

P=$\{X: 3 < X < 6\}$

Q=$\{X: 2 < X \leq 5\}$ U=$\{9 < X < 12\}$

R=$\{X: 4 \leq X \leq 8\}$

List the members of U, P, Q, R and find

i) (PUR) UR

ii) PU (QNR)

iii) PN (QUR) (10maks)

b) i) Solve for x in x=$\log_3 9$

ii) Use a Venn diagram to illustrate disjoint sets (3maks)

ii)Simplify $\frac{x^2y^3 + x_{y^2}}{xy}$ (3maks)

iv) Solve the equation $3\tan^2 x - 4\tan x - 4 = 0$ (4maks)