GARISSA UNIVERSITY

UNIVERSITY EXAMINATION 2017/2018 ACADEMIC YEAR ONE THIRD TRIMESTER EXAMINATION

SCHOOL OF BIOLOGICAL AND PHYSICAL SCIENCE

FOR THE CERTIFICATE IN INFORMATION TECHNOLOGY

COURSE CODE: CIT 106

COURSE TITLE: BASIC MATHEMATICS

EXAMINATION DURATION: 2 HOURS

DATE: 09/08/18 **TIME: 9.00-11.00 AM**

INSTRUCTION TO CANDIDATES

- **The examination has FIVE (5) questions**
- **Question ONE (1) is COMPULSORY**
- **Choose any other TWO (2) questions from the remaining FOUR (4) questions**
- **Use sketch diagrams to illustrate your answer whenever necessary**
- **Do not carry mobile phones or any other written materials in examination room**
- **Do not write on this paper**

This paper consists of FOUR (4) printed pages ***please turn over***

QUESTION ONE (COMPULSORY)

A. a) List all the proper subsets of the set (purple, blue, green, orange). How many of them contain green and how many contain neither green nor blue? **[6 Marks]**

B. Simplify:

$$\frac{12!}{7!\,5!} + \frac{12!}{5!\,4!}$$ **[5 Marks]**

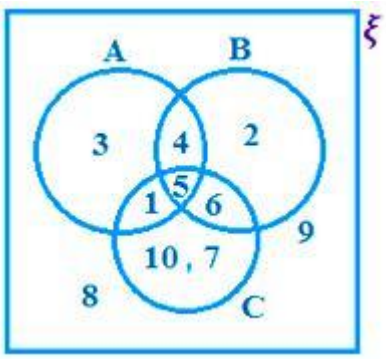
Evaluate : a) ${}^{12}P_7$ b) ${}^{9}C_4$ **[4 Marks]**

C. Express the following statements in set notation and illustrate each by a Venn diagram.

i. Not all who play handball can play basketball, but all those who play basketball can also play handball. **[3 Marks]**

ii. Some integers are not natural numbers but all integers are real numbers. **[3 Marks]**

D. **Find the following sets from the adjoining Venn diagram below .**



i. B ∪ C

ii. A ∩ C

iii. (B ∪ C)'

iv. (A ∪ B) ∩ C **[9 Marks]**

QUESTION TWO

A. If the universal set contains all the letters of the alphabet, *R*=(Letters in random) and *P*=(letters in panama), draw a Venn diagram to represent these sets, entering the number of elements in the appropriate regions. State the number of elements in the sets:

   a. ***P***∪***R***

   b. ***P***∪***R'***

   c. ***P***∪***P'***. **[9 Marks]**

B. Everyone in a group of 48 people bought at least one of the three newspapers A,B and C. 30 people bought A, 25 bought B and 15 bought C, 7 people had both A and B, 6 had both B and C, while 16 bought B only. How many in the group bought a) A and C but not B, b) all the three papers? **[7 Marks]**

C. A sequence is defined by S(n)=(-1) ($n^2 - 3n$) where n is a natural number. Find the first three terms and the tenth term of the sequence. **[4 Marks]**

QUESTION THREE

I. Given the domain (-2, -1 0, 1, 2,); g(x) = write down the range of the function g(x) = $x - x^2$.

[4 Marks]

II. Ɛ = (positive integers less than 13), *P* (= (m, i, s, t), Q = (s,c,e,n,t), *R* = (a, 1, m, o, s, t). State the number of elements in the sets (a) ***P'***, *(*c) ***P****uQuR,* (d) (P'*uR'*. **[6 Marks]**

IV. A mixed hockey team containing 5 men and 6 women is to be chosen from 7men and 9 women. In how many ways can this be done? **[3 Marks]**

V. Express 14x13x12x11 in factorial notation **[3 Marks]**

VI. In a group of 60 people, 27 like cold drinks and 42 like hot drinks and each person likes at least one of the two drinks. How many like both coffee and tea? **[4 Marks]**

QUESTION FOUR

(a) The sets X and Y are such that: X = (2X: 0 < X < 27). Y = (y2: 0 < y <] 1) where X and Y are integers. Find X ∩ Y. **[6 Marks]**

(b) Find the sum of the first 20 terms of the arithmetic progression 16 + 9 + 2 + (-5) + …… **[5 Marks]**

c) Find the domain of the function f(x)=2/x for the range $-2 \leq f(x) \leq -1/2$ **[4 Marks]**

(d) Prove that $n3 - n$ is divisible by 3, whenever *n* is a positive integer. **[5 Marks]**

QUESTION FIVE

(a) On William Street in Kampala, there are 60 shops. Of these 20 sell shoes, 25 sell electronic equipment, 30 sell textiles. 8 shops sell both shoes and textiles; 6 sell both shoes and electronic equipment; 10 sell both electronic equipment and textiles; and 4 shops sell all three items. How many of these shops do not sell any of these items? **[7 Marks]**

(b) A new sequence is obtained adding the corresponding terms of the sequence. Find the 5^{th}, 7^{th}, *and* n^{th} *terms of the new sequence.* **[3 Marks]**

(c) At Kibuli Secondary School, a group of 38 students doing Sciences take Physics, Mathematics, or Chemistry. The sets P, M and C are defined as follows:

M = (those who study Mathematics)

P = (those who study Physics)

C = (those who study Chemistry)

The venn diagram below shows the relation between P, M and C.

Given that 22 students study Maths, 12 students study neither Maths nor Physics and no students, study Physics only, find:

(a) (i) X

(ii) The number of students who study Physics.

(iii) The number of students who study Chemistry.

(iv) The number of students who study both Chemistry and Physics. **[8 Marks]**

(b) Copy the diagram and shade the region representing C ∩**P'** ∩**M'** where **P'**, **M**' represent the complement of P and M respectively. **[2 Marks]**