 **Nkumba University**

**SCHOOL OF EDUCATION**

**END OF AUGUST 2020/FEBRUARY 2021 SEMESTERS EXAMINATIONS**

**PAPER : VECTORS,MATRICES AND COMPLEX NUMBERS**

**LEVEL : UNDERGRADUATE**

**STUDY SESSION : ALL**

**TIME : 12 hours**

**INSTRUCTIONS**:

1. Apportion your time according to the marks allocated to each question.
2. Read the **QUESTIONS** and **INSTRUCTIONS** carefully before attempting to answer.
3. Nkumba University examinations are conducted in accordance with the ***Nkumba University Senate General Rules and Regulations 2009***. Breach of the above regulation, irregularity, or any other contravention of the examination regulations will automatically lead to disqualification and/or subsequent disciplinary action by University Senate.
4. Attempt any three questions

**Problem 1**

a).Write short notes about your understanding of a matrix.

b). Find A + B and A- B Such that

(i) A = , B =

(ii) A= B=

c). (i) Given that A= and B = find AB and BA

(ii) Find the transpose of the following matrices

A= B=

**Problem 2**

(i) Given A = , determine (i) lAl

(ii) Adj(A)

(ii) Find possible values,x can take given that A= , B= ,such that AB=BA

**Problem 3**

a). Given that x= and y= write down as column vectors.

(i) 2x (ii) 3y (iii) 3x-2y

b).Find the magnitude and direction of the vectors

(i)3i +4l (ii) -5i +12j (iii) i -j

**Problem 4**

Simplify (i) (ii) (iii) (iv) (v)(3 + i) + (1 + 2i) (vi) (3 +4i)(3-4i)

Express with real denominators.

(i).

(ii) (iii) (iv) +

**Problem 5**

1. Solve the cubic equation 2 + 3 + 8z -5 =0
2. Solve the following system of equations

(i)

X +2y – 3z =-1

3x-y +2z = 7

5x + 3y -4z = 2

(ii)

7x + 9y = 1

10x +13y =2

1. Find numbers m and n such that m + n=
2. Given that A is the point (0,5) and B is the point (10,-1) ,find the position vector of a point P on AB such that

(i) =

(ii) AP : PB = 2:3