QUESTION 1

1. Linear Combination of vectors – is the vector obtained by adding two or more vectors (with different directions) which are multiplied by scalar values.
2. Linear Dependence of vectors – is the property of one set of vector having at least one linear combination of its elements equal to zero when the coefficients are taken from another given set of vector and at least one of its coefficients is not equal to zero.

QUESTION 2

**2).** Uα+Vβ+Wγ= (a,b,c)

1 2 1 a

0 α + 1 β + 1 γ = b

-1 3 -4 c

α + 2β + γ = a ……..(i)

β + γ = b ……..(ii)

-α + 3β - 4γ = c ……..(iii)

From equ (ii)

β= b – γ …….(iv)

Put equ (iv) into (i) and (iii)

α+ 2(b – γ) + γ =a

α+ 2b – 2γ + γ =a

α+ 2b – γ =a

α – γ =a – 2b ……(v)

For equ (iii)

-α +3(b – γ) - 4γ = c

-α +3b – 3γ - 4γ = c

-α +3b – 7γ = c

-α – 7γ = c – 3b ……...(vi)

Compare equs (v) and (vi) by addition

α- γ = a – 2b

-α - 7γ = c – 3b

-8γ = a – 2b + c – 3b

-8γ = a – 5b + c

γ = (a – 5b + c )

-8

γ = - (a – 5b + c )

8

γ = -a +5b - c

8

Put γ in (ii)

β + -a +5b – c = b

8

β = b - -a +5b – c

8

β = b + a – 5b + c

8

β = 8b + a – 5b + c

8

β = a + 3b + c

8

Put β and γ into equ (i)

α + 2 a + 3b + c + -a + 5b – c = a

8 8

α + a + 3b + c + -a +5b – c =a

4 8

α = a - a + 3b + c - -a +5b – c

4 8

α = a – a – 3b – c + a – 5b + c

4 8

α = 8a +2(- a – 3b – c) + a – 5b +c

8

α = 8a – 2a – 6b – 2c + a – 5b + c

8

α = 7a – 11b – c

8

7a – 11b – c U + a + 3b + c V + - a + 5b – c W

8 8 8

QUESTION 3

Axioms of vector space:

Commutativity of vector addition

X + Y = Y + X

Associativity of vector addition

(X + Y) + Z = X + ( Y + Z)

Associativity of scalar multiplication

α ( βx ) = ( αβ ) x

Distributivity of scalar multiplication with respect to vector addition

α ( x + y ) = αx + αy