QUESTION BANK

BSC MATHEMATICS 6TH YEAR SEM VI

SUBJECT: LINEAR ALJEBRA

1)Define – Vector Spaces

2)Define – Linear Combination

3)Theorem – If S is a nonempty subset of a vector space V, them [S] = S if S is a subset of V.

4)Show that the ordered set {(1,1,2), (1,-1,1), (1,3,3), (-1,3,0), (1,0,1)} is Linearly dependent. Find the largest linearly independent subset of it.

5)Find whether the following subset of continues functions defined on the interval (0 ,00) are L.I. or L.D.

6)Prove that the vector (a,b) and (c,d) are L.D if ad = bc.

7)Find the coordinate vector of the vector (2,3,4,-1) of V4 relative to the standard basis for V4.

8) Prove that the vector (1,0,1), (1,1,0), and (-1,0,-1) are L.D.

9)If u, v and w are three linearly independent vectors of a vector space V , then show that u + v, v+ w and w+u are also L.I.

10)Theorem – In an n dimensional vector space V. any set of n linearly independent vector is a basis .

11)Define – Linear Transformation

12)Show that T: V3 → V3 define by T (x1,x2,x3) = (x1,x2,0) is a linear transformation

13)Show that T: V3→V1 define by T (x1,x2.x3) =$x1^2 + x2^2 + x3^2$ is not linear transformation

14)Let U and V be vector space over the field F and T: U→V be a linear map. Then

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14)Let U and V be vector space over the field F and T: U→V be a linear map. Then

a)T(0) =0 b)T(-u)= -(u), ∀ u € U

15) A linear transformation T is completely determined by its values on the element of a basis. Precisely , if B ={ u_1, u_2, ………..,un} is a basis for U and v_1, v_2,…., v_n be n vectors (not necessarily distinct) in V the there exists a unique linear transformation T: U→V such that (u_i) = v_i , for *i* = 1,2,….,n .

16) If U and V are finite dimensional vector spaces of same dimention , then a linear map T: U→V is one-one iff T is onto .

17) Define – Inverse of Linear Transformation.

18) Show that the linear map T:V3→ V3 defined by

T(x_1,x_2,x_3)= (x_1+x_2+x_3, x_2+x_3,x_3) is non-singular and find its inverse.

19) Prove that the linear map T:V3→V3 defined by T(e_1)= e_1 + e_2,

T(e_2) =e_2+e_3, T(e_3)= e_1+e_2+e_3 is non-singular and find its invers

20) Let T:V3→V3 be a linear map defined by.

21)Let T:v3→V3 and S: V3 → V3 be tow linear maps defined by.

22)Let a linear map T : V3 → V4 be defined by.

23)solve the equation T(u) = (1,1,0), where T ; V5 → V3 be a linear map defined by T(e1)=1/2f1, T(e2)=1/2f1,T(e3)=f2, T(e4)=f2, T(e5)=0

24)solve the linear differential equation dy/dx-xy/x2-1=x.

25)solve dy/dx+1/xsin2y=x2cos2y.

26)solve eydx=x(2xy+ey)y.

27)Determine the range kernel and pre-image of (1,2,3) for the linear transformation T: v3→v3 defind by T(e1)=e1-e2, T(e2)=e2, T(e3)=e1+e2-7e3 where, {e1,e2,e3} is the standard basis for V3.

28)solve dy/dx+1/x sin2y=x2cos2y.

29)solve eydx=x(2xy=ey)dy.

30)prove that A=$\begin{matrix} 1 & 2 \\ 0 & 1 \end{matrix}$ is non-singular and find its inverse.

40) Using the Gram-schmidt orthogonalisation process, orthonormalise the l I subset {(1,1,1),(0,1,1),(0,0,1)} of V3.

41)if U is unitary matrix then |detU|=1.

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