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Sub: Linear Algebra [Paper – XIV] (MCQ)

Practice Questions Paper

Q) Select the correct alternative for each of the following:

1) The number of vectors in any basis of a vector space V is called ------- of V.

i) Rank   ii) Nullity   iii) order   iv) dimension

2) If dim(V) = m , dim (W) = n then dim (V,W) = ------

i) m ii) n   iii) m n   iv) $m+n$

3) Inner product space over real field is called -----.

i) null space   ii) subspace   iii) Euclidean space   iv) Unitary space.

4) If T: V→W is a linear transformation and if dim V=10, dim kernel T = 6 then dim range T = -------

i) 4   ii) 6   iii) 10   iv) 5

5) If A= $\begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$ then the characteristic polynomial of A is

i) x^2+1 ii) x^2-1 iii) x^2+x iv) x^2+2x+1

6) If S is an Orthonormal set then for $\alpha \in S$ …

i) $\|\alpha\| > 2$ ii) $\|\alpha\| = 0$ iii) $\|\alpha\| < 1$ iv) $\|\alpha\| = 1$

7) The norm of vector u = (4, -3, 0, 1) is ---------.

i) 30   ii) $\sqrt{30}$ iii) 26   iv) $\sqrt{26}$

8) A non-zero vector is always --------

i) Linearly independent   ii) linearly dependent

iii) Both i) and ii)   iv) All of these.

9) Which of the following is not vector space ?

i) R(R)   ii) C(C)   iii) R(C)   iv)C(R)

10) Let V(F) be a vector space , $\alpha, \beta \in$ F and x , y $\in$ V .Then which of the following is incorrect ?

i) α(x-y) = αx - α y   ii) $(\alpha + \beta)$ (x+y) = $(\alpha - \beta)$ (x - y)

iii) $(\alpha + \beta)$ x = $\alpha x + \beta x$ iv) α(-x) = - (αx) = (-α) x

11) If S is set of linear independent vector then

i) $0 \in S$ ii) 0 may or may not be in S

iii) $0 \notin S$ iv) none of these

12) If V is vector space over field F, then the elements of F are called ---------.

i) Scalars   ii) vectors

iii) unit vectors   iv) numerical constants

13) The norm of v is -----

i) length of v   ii) $\| v \|$

iii) non-negative real number   iv) All of these

14) If A = $\begin{vmatrix} 0 & i \\ i & 0 \end{vmatrix}$ then charcaterstic polynomial of A is ---------.

i) x^2 ii) $x^2 + 1$ iii) $x^2 - 1$ iv) $(x-1)^2$

15) Finite dimensional vector space are isomorphic if and only if they have ------.

i) different dimensions   ii) zero dimensions

iii) same dimensions   iv) none of these.

16) Let λ = 4 is eigen value of invertible operator T then eigen value of T^{-1} is -----

i) 4   ii) ¼   iii) 2   iv) -2

17)If T: V→W and S: W→U are two linear transformation such that ST is one-one then ……….

i) S is one-one   ii) T is one-one

iii) S is onto   iv) T is onto.

18) The norm of vector u = (1,-3, 5) is ……

i) $\sqrt{35}$ ii) 35

iii) $\sqrt{34}$ iv) $\sqrt{30}$

19) A zero vector is always ……..

i) Linearly Dependent ii) Linearly Independent

iii) Both (i) and (ii) iv) none of these

20) If T: V→W is a linear transformation and if dim V=8, Rank T= 5 then nullity T=……

i) 3 ii) 8

ii) 5 iv) 1

21) If A= $\begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$ then the characteristic polynomial of A is

i) $(x+1)^2$ ii) $(x-1)^2$

iii) $(x-2)^2$ iv) $(x+2)^2$

22) If S is an Orthonormal set then for $\alpha \in S$, ……

i) $\|\alpha\| = 1$ ii) $\|\alpha\| = 0$

iii) $\|\alpha\| < 1$ iv) $\|\alpha\| > 2$

23) If dim V= n and S = $\{v_1, v_2, \ldots\ldots, v_n\}$ spans V then S is………

i) Basis of V ii) subspace of V

iii) not basis of V iv) none of these

24) if V and W are vector spaces over the field F then Hom (V,W) is called dual space of V over F, If……….

i) V=F ii) W=F

iii) V=W iv) V≠ W

25)A zero vector is always ……………………

i) Linearly Independent ii) Linearly Dependent

iii) Both (i) & (ii) iv) None of these

26) If T: V —> W is a linear transformation and if dim V = 28 and dim Range T = 20 then dim Ker T=….

i) 8 ii) 6 iii) 9 iv)10

27) A linear transformation is T: V —> W is said to be non-singular if ……..

i) Ker T = {0} ii) T is one-one

iii) T is Invertible iv)All Of these

28) V is linearly independent iff …….

i) V=0 ii) V $\neq$0 iii) V=W iv) V$\neq$W

29) dim (M_{mxn} (F)) =……

i) mn ii) m iii) n iv)None of these

30) Inner product space over complex field is called ----------.

i] Null space ii] Euclidean space iii] Unitary space iv] Subspace

31) The sum of two subspaces is -------------.

i] a group ii] a field iii] a ring iv] Subspace

32] Let T: U $\rightarrow$ V be homomorphism then kernel of T is ------------.

i] Subspace of V ii] Subspace of U iii] Quotient space of X iv] {0}

33] In the vector space V(F) the scalar multiplication ($\propto$ f) (x) for all x $\in$ V(F) , $\propto$ $\in$ F is given by ------------.

i] $\propto$f(x) ii] $\propto$ + f(x) iii] $\propto$ - f(x) iv] $\propto$ + x

34] A non empty subset W of a vector space V (F) is subspace of V If f

A] α x $\in$ V B] α x + β y $\in$ w

C] α x · β y $\in$ w D] none of them

35] Let T: V $\rightarrow$ U be a homomorphism then ker T = { 0 }

A] T is one one B] T is onto

C] T is one one and onto D] None of them

36] If S = { $V_{1}, V_{2.}$ ---- V_n } is basis of V then every element of V can be expressed as a linear combination of

A] $V_{1}, V_{2.}$ ---- V_{n+1} B] $V_{1}, V_{2.}$ ---- V_n

C] linear dependent vectors D] None of them

37] Any two basis of finite dimensional vector space of V have ------

A] finite number of elements

B] same number of elements

C] infinite number of elements

D] none of them

38] Finite dimensional vector space V has dimension n i f f

A] n is maximum no of L .I.

B] n is maximum no of L.D elements

C] n is zero elements of L.I

D] None of them

39] If V is finite dim. vector space , { $V_{1}, V_{2.}$ ---- V_r is a L.I subset of V then

A] r is max.no L.I elements

B] it can be extended to form basis

C] it can not be extended to form basis

D] none of them

40] Two finite dimensional vector space over F are isomorphic iff they have

A] finite dimension

B] disjoint dimension

C] Same l.D elements

D] same dimension

41] Let S be orthogonal set of non zero vectors in an inner product space V then

A] S is L.I set

B] S is L.D set

C] S is empty set

D] none of them