0 6 SEP 2019

Seat No.__________

M.Sc.(IT) Semester -2 Examination(OLD-CBCS)
Paper No-6: Linear Algebra.

[Time: 02:30 Hours] Code: 2938 [Total Marks: 70]

Q:1 [a] Define L.D. , L.I. , Span of Set, Basis. [7]

[b] Check whether the vectors {(1,2,1),(-1,1,0),(5,-1,2)}are L.I or not. [7]

OR

Q:1 [a] Define vector space with an example. [7]

[b] Let S be a non-empty subset of vector space V then S is a subspace of V if

$\alpha u + \beta v \in S$ for all scalars α , β and for all $u,v \in S$. [7]

Q:2 [a] Let T: $R^2 \rightarrow R^3$ be a linear map defined as T(x,y)=(x,y,x+y) prove that T is Linear map. [7]

[b] IF T:$R^3 \rightarrow R^2$ defined by T(a,b,c)=(2a+b-c,3a-2b+4c) and B1={(1,1,1),(1,1,0),(1,0,0)} and B2={(1,3),(1,4)} then find [T:B1,B2] [7]

OR

Q:2 [a] Define L.T. and Isomorphism with an example. [7]

[b] Let T: $R^3 \rightarrow R^3$ be a L.T. defined by T(x,y,z)=(2x-y,2y-z,2x-z). Find Ker T and Image T. [7]

Q:3 [a] If a triangle is a isosceles then the medians of the two sides of equal length are of equal.

[b] Find reflection with respect to X axis of $\begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix}$ [7]

OR

Q:3 [a] Prove that an angle inscribed by semicircle is an right angle. [7]

[b] Define for a matrix (1) row space (2) column space (3) row rank [7]

Q:4 [a] Define IPS with an example. [7]

[b] If $x,y \in R^2$ x=(x1,x2) , y=(y1,y2). Verify that <x,y>=|x+y| is an IPS or not. [7]

OR

Q:4 [a] Find angle between given two vectors: [7]

(1) (1,0) and (0,2)
(2) (-x,y) and (y,x)

[b] Let V be an IPS the norm f^n || || : V→R has the following properties: [7]

(i) $\|x\|\geq 0$ and $\|x\|=0$ iff $x=0$, for all $x\in V$

(ii) $\|\alpha x\|=|\alpha|\|x\|$, for all $x\in V$ and $\alpha\in R$

Q:5 state and prove Gram-Schmidt theorem. [14]

OR

Q:5 [a] Define - Prove that any orthonormal basis is orthogonal. [7]

[b] Apply Gram-Schmidt orthonormalization process to obtain orthonormal set from the set {(3,0,4),(-1,0,7),(2,9,4) } [7]