Printing Page(s) : 1 **Paper Code :DSC-302**

Roll No. | | | | | | | | | | |

B.Sc. (PCM)-18, B.A. (Math)-6

3rd Year Examination, Calendar Batch 2015

Mathematics-VI

Time : 3 Hours] *[Max. Marks : 100*

***Note**. Attempt any **five** questions. Each questions carry equal marks.*

Q.1. If the matrix of a linear transformation T on a vector space $V_2(C)$ with respect to the ordered basis $B = \{(1,0),(0,-1)\}\ is \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$. What is the matrix of T with respect to the ordered basis $B' = \{(1,1),(1,-1)\}$?

Q.2. If a finite-dimensional vector space V(F) be the direct sum of its two subspaces W_1 and W_2, then show that

$$\text{dim. } V = \text{dim. } W_1 + \text{dim. } W_2$$

Q.3. Find the dual basis of the basis set $B = \{(-1,1,1),(1,-1,1),(1,1,-1)\}$ for $V_3(R)$.

Q.4. Show that the mapping $d: R^2 \times R^2 \to R^2$ defined by $d(x,y) = max.(|x_1 - y_1|, |x_2 - y_2|)$, where $x = \leq; y = (y_1, y_2) \in R$ is metric on R^2.

Q.5. Let (X, d) be a metric space and let $d_1(x,y) = \min.\{1, d(x,y)\}$, then show that d_1 is a metric on X.

Q.6. Prove that the vectors $\{(2,1,4),(1,-1,2),(3,1,-2)\}$ form a basis for R^3.

Q.7. If S be an ideal of a ring and T be an ideal of R, containing S,then $/T \cong \frac{R/S}{T/S}$.

Q.8. (A) The intersection of any two subspaces of a vector space is a subspace.

(B) Is the vector $(2,-5,3)$ in the subspace of R^3 spanned by the vectors $(1,-3,2)$, $(2,-4,-1)$, $(1,-5,7)$?