

Assignment 2  
Subject: Mathematics  
3rd Semester (MAJOR) (arrear)  
Paper: 3.2 (Linear Algebra and Vector)

Full Marks: 25

**Instruction:** After completing your assignment, save it as pdf and name it as “NAME\_RollNo\_arrear(A2)\_3.2” and then mail it to [mathematics.adp.2021@gmail.com](mailto:mathematics.adp.2021@gmail.com)  
Here, type your name and roll no in the place of NAME and RollNo while naming the file.

**1. State True or False with justification:** **2 x 4 = 10**

- a. A subspace, S of the vector space  $\mathbf{R}^n$  having (n+1) number of vectors is linearly independent.
- b. The dimension of the vector space of all 30x30 symmetric matrices is 465.
- c. The dimension of the vector space of all 90x90 skew-symmetric matrices is 4005.
- d. There exists a discontinuous vector point function whose derivative exists.

**2. Answer the following:** **2 x 1 = 2**

Write two different bases for the vector space  $\mathbf{R}^n$ .

**3. Answer the following:** **5 x 3 = 15**

- a. Let,  $T: V \rightarrow V$  be a linear transformation such that  $T(f(x)) = f'(x)$ , where V is the vector space of all the polynomials of degree at most four and  $f'(x)$  is the derivative of  $f(x)$ . Then, find the matrix representation of the transformation, T.
- b. State and prove the rank nullity Theorem.
- c. State and prove Stoke's Theorem.