## V.P. AND R.P.T.P. SCIENCE COLLEGE

## B.Sc.SEMESTER -III

## INTERNAL EXAMINATION

## SUBJECT :MATHEMATICS (CALCULUS AND ALGEBRA - I) SUBJECT CODE : US03EMTH05

Date: 6/10/2016

Maximum Marks: 25

Day: Thursday

Time: 3 p.m. to 4 p.m.

3

4

6

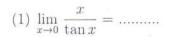
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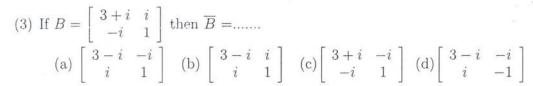
Que.1 Attempt the following.



(a) 0 (b) 1 (c) x (d) 2



(a) 
$$A^{\theta}$$
 (b)  $-A$  (c)  $A'$  (d)  $\overline{A}$ 



Que.2 Attempt the following.(any two)

- (1) Evaluate  $\lim_{x\to 0} \frac{e^x + \log(1-x) 1}{\tan x x}$
- (2) State Reversal, Associative and Distributive law for matrix.
- (3) Define Diagonal and Scalar matrix.

Que.3 [A] Evaluate 
$$\lim_{x\to 0} \frac{\log(\log(1-3x^2))}{\log(\log(\cos 2x))}$$

OR

Que.3 [B] Evaluate 
$$\lim_{x\to 1} (4-4x^2)^{\frac{1}{\log(2-2x)}}$$

Que.4 [A] For the following matrix show that AA' = I;  $A = \begin{pmatrix} 0 & 2m & n \\ l & m & -n \\ l & -m & n \end{pmatrix}$ 

where 
$$l = \frac{1}{\sqrt{2}}, m = \frac{1}{\sqrt{6}}, n = \frac{1}{\sqrt{3}}$$

OR

Que.4 [B] Prove that Every square matrix can be expressed in one and only one way as P + iQ where P and Q are Hermitian matrices.

Que.5 [A]If 
$$A = \begin{pmatrix} 3 & -4 \\ 1 & -1 \end{pmatrix}$$
 then show that  $A^k = \begin{pmatrix} 1+2k & -4k \\ k & 1-2k \end{pmatrix}$  where k is any positive number.

OR

Que.5 [B] Verify the results

$$(1)(AB)C = A(BC) (2) (A + B)C = AC + BC (3) A(B + C) = AB + AC$$
where  $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$ ,  $B = \begin{pmatrix} 2 & -7 \\ 5 & 8 \end{pmatrix}$ ,  $c = \begin{pmatrix} 1 & 5 \\ 0 & 2 \end{pmatrix}$