

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 : 10/10/2017
Day : Tuesday

Maximum Marks : 25
Time : 3 p.m. to 4 p.m.

Que.1 Attempt the following.

(1) $\log 0 = \dots\dots$
(a) 0 (b) $-\infty$ (c) 1 (d) -1

(2) If $A = \begin{bmatrix} 1 & 3 \\ 4 & 6 \\ 0 & 4 \end{bmatrix}$ then order of A is

(a) 2×3 (b) 3×3 (c) 2×2 (d) 3×2

(3) If A & B are not commutative to each other then $(A + B)^2 = \dots\dots$
(a) $A^2 - 2AB + B^2$ (b) $A^2 + B^2$
(c) $A^2 + 2AB + B^2$ (d) $A^2 + AB + BA + B^2$

Que.2 Attempt the following.(any two)

(1) Evaluate $\lim_{x \rightarrow 0} \frac{\log(\sin 2x)}{\log(\sin x)}$

(2) Define triangular matrix and identity matrix with example.

(3) Define Determinant and Minor of matrix with example.

Que.3 [A] Find a, b and c for which $\lim_{x \rightarrow 0} \frac{ae^x - 2b \cos x + 3ce^{-x}}{x \sin x} = 2$

OR

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

Que.4 [A] Prove that Every square matrix can be expressed in one and only one way as the sum of a symmetric and skew symmetric matrix.

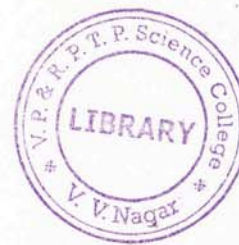
OR

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] State and prove Cayley-Hamilton theorem.

OR

Que.5 [B] If $A = \begin{pmatrix} 5 & 7 & 3 \\ 1 & 5 & 2 \\ 3 & 2 & 1 \end{pmatrix}$ then find $A^3 - 11A^2 + 15A$



3

4

6

6

6

6

6

6