V.P. & R.P.T.P.Science College, V.V.Nagar

Internal Test

B.Sc.SEMISTER -III

Subject : Mathematics (US03EMTH05)

Date : 07/10/2013 Maximum Marks:30

Day : Monday Time : 1:00pm to 2:00pm

Que.1 Attempt the following. 6

1. $\lim_{x\to 0}\frac{\sin x}{x}$ =.....

   (a) 0 (b) 1 (c) x (d) None

2. $\lim_{x\to 0}\frac{\log(\cos x)}{\sin x}$

   (a)$\infty-\infty$ (b) $\frac{0}{0}$ (c)$\frac{\infty}{\infty}$ (d) ∞^0

3. If A=$\begin{pmatrix} 3+2i & 0 \\ i & 1+i \end{pmatrix}$ then $\overline{A}$=.....

   (a) $\begin{pmatrix} 3-2i & 0 \\ -i & 1-i \end{pmatrix}$ (b) $\begin{pmatrix} 3-2i & 0 \\ i & 1+i \end{pmatrix}$ (c)$\begin{pmatrix} 3+2i & i \\ 0 & 1+i \end{pmatrix}$ (d) $\begin{pmatrix} 0 & 3+2i \\ 1+i & i \end{pmatrix}$

4. If A=$\begin{pmatrix} 3 & 2 \\ 0 & 1 \end{pmatrix}$ then A^1=.....

   (a) $\begin{pmatrix} -3 & 0 \\ -2 & -1 \end{pmatrix}$ (b) $\begin{pmatrix} 2 & 1 \\ 3 & 0 \end{pmatrix}$ (c)$\begin{pmatrix} 3 & 0 \\ 2 & 1 \end{pmatrix}$ (d) $\begin{pmatrix} 0 & 1 \\ 3 & 2 \end{pmatrix}$

5. Revérsal law for the transpose of a product is.....

   (a)$AB = BA$ (b)$A = B$ (c)$(AB)^1 = A^1B^1$ (d)$(AB)^1 = B^1A^1$

6. If A and B are commute to each other, then the value of $(A+B)^2$=.....

   (a)$A^2 + AB + AB + B^2$ (b)$A^2 + 2AB + B^2$ (c)$A^2 + B^2$ (d)$A^2 - 2AB + B^2$

Que. 2 Attempt the following(Any three) 6

1. Evaluate $\lim_{x\to a}(a-x)\tan(\frac{5\pi x}{2a})$

2. Evaluate $\lim_{x\to 0}\frac{\log(\sin 2x)}{\log(\sin x)}$

3. Define Submatrix with example.

4. Prove that $(AB)^\theta = (B)^\theta(A)^\theta$

5. If A=$\begin{pmatrix} 2 & 3 \\ 1 & 4 \end{pmatrix}$ then find charactristic matrix and charactrestic equation.

6. Determine minor of matrix with example.

Que.3 Find a,b,c so that $\lim_{x\to 0}\frac{ae^x - 2b\cos x + 3ce^{-x}}{x\sin x} = 2$ 6

OR

Que.3 Find the values of a, b so that $\lim_{x\to 0}\frac{x(1+a\cos x) - b\sin x}{x^3} = 1$ 6

Que.4 [A] If A=$\begin{pmatrix} 2 & 1 & 1 \\ -1 & -1 & 4 \end{pmatrix}$ and B=$\begin{pmatrix} 2 & -3 & 4 \\ -3 & 1 & -2 \end{pmatrix}$.Find 5A-2B 3

[B] If A=$\begin{pmatrix} 1 & 0 & -1 \\ 1 & 2 & 1 \\ 2 & 2 & 3 \end{pmatrix}$ and B=$\begin{pmatrix} -1 & 2 & -2 \\ 1 & 2 & -1 \\ -1 & -1 & 0 \end{pmatrix}$ if C=A+B then find C_{23} and C_{32} 3

OR

Que.4 Prove that Every square matrix can be expressed in one and only one way as P+iQ ,where P and Q are Hermitian matrices. 6

Que.5 State and prove Cayley -Hamilton theorem. 6

OR

Que.5 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. 6