P.S.SCIENCE & H.D.PATEL ARTS COLLEGE, KADI
INTERNAL EXAMINATION

05/03/2019 | **B.Sc. Sem -II** | **Marks 40**
Mathematics | **Time: 1.45 to 3.45**
CC-MATH- 122

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1. (A) State and Prove De'Moivre's theorem [04]

OR

Expand sin(nθ) and cos(nθ) in terms of sinθ and cosθ.

(B) Attempt any two [06]

1. Using De'Moivre's Theorem,

solve: $x^7 + x^4 + x^3 + 1 = 0$

2. Find the equation whose roots are

$2cos\frac{2\pi}{7}$, $2cos\frac{4\pi}{7}$ and $2cos\frac{6\pi}{7}$

3. Express $cos^6\theta$ in terms of $cos\theta$

2. (A) State and prove De'Almbert test. [04]

OR

State and prove Cauchy's root test.

(B) Attempt any two [06]

1. Prove that, $tanh^{-1}z = \frac{1}{2}log\left(\frac{1+z}{1-z}\right)$

2. Check convergence of the following series:

1)$\sum\left(1+\frac{5}{n}\right)^{n^2}$ 2)$\sum\left(1-\frac{1}{3n}\right)^{n^2}$

3. Check convergence of the following series:

$$\Sigma\left\{(n^3+1)^{\frac{1}{3}}-n\right\}$$

3. (A) State the linear Differential equation and solve it.

OR

State the Bernoulli's Differential equation and solve it. [04]

(B) Attempt any two: [06]

1. Sovle: $\frac{dy}{dx}+\frac{2}{x}y=\frac{y^3}{x^3}$
2. Solve: $2y\frac{dy}{dx}-\frac{y^2}{x}=-1$
3. Solve: $y=2px+p\sqrt{x}$ where p=$\frac{dy}{dx}$

4 . Attempt any three: [10]

1. find A^{-1} by row reduction method for the matrix

$$A=\begin{bmatrix}1 & 2 & 3\\ 0 & 1 & 2\\ -1 & 3 & 1\end{bmatrix}$$

2. Show that Matrix $A=\begin{bmatrix}3 & 7-4i & -2+5i\\ 7+4i & -2 & 3+i\\ -2-5i & 3-i & 4\end{bmatrix}$ is

a hermitian Matrix

3.Find the Rank of the matrix A=$\begin{bmatrix}1 & 2 & 3 & 4\\ 2 & 3 & 5 & 7\\ 3 & 4 & 7 & 10\end{bmatrix}$

4. Solve the following system of equations using row reduction method: $2x-3y=1$, 2x-y+z=2, 3x+y-2z=1

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