

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

07/03/2018

B.Sc. Sem -II
Mathematics
CC-MATH- 122

Marks 40
Time: 1.45 to 3.45

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

OR

Expand $\sin^m\theta$ and $\cos^n\theta$.

- (B) Attempt any two [06]

1. Using De'Moivre's Theorem,

solve: $x^3 + x^2 + x + 1 = 0$

2. Find the equation whose roots are $2\cos\frac{\pi}{7}$,

$2\cos\frac{3\pi}{7}$ and $2\cos\frac{5\pi}{7}$

3. Express $\cos^8\theta$ 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) $\sum \left(1 + \frac{3}{n}\right)^{n^2}$ 2) $\sum \left(1 - \frac{1}{2n}\right)^{n^2}$

3. Check convergence of the following series:

$$\sum \{(n^3 + 1)^{\frac{1}{3}} - n\}$$

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. Solve: $\frac{dx}{dy} = \frac{x+2y^3}{y}$

2. Solve: $\frac{dy}{dx} = y + xy^5$

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

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

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

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