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

Internal Examination

B. Sc. Semester - II [Mark : 40

14-3-2017] **Mathematics - 122** [1-30 to 3-30

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1. [A] state & prove De' Morve's theorem. 5

   [B] **Attempt any one** 5

   (1) Solve $x^7 + x^4 + x^3 + 1 = 0$ using De'Morve's theorem.

   (2) Prove that $\frac{\sin 7\theta}{\sin\theta} = 7 - 56\sin^2\theta + 112\sin^4\theta - 64\sin^6\theta$

2. [A] Prove that $\sum \frac{1}{\eta^P}$ is convergent for $P > 1$ and it is divergent for $P \leq 1$. 5

   [B] **Attempt any one.** 5

   (1) Prove that $\tan h^{-1}z = \frac{1}{2}\log\left(\frac{1+z}{1-z}\right)$ and

   $\sinh^{-1}z = \log(z + \sqrt{z^2+1})$

   (2) Discuss $\frac{x}{2.3} + \frac{x^2}{3.4} + \frac{x^3}{4.5} + \ldots\ldots$ is cgt OR dgt.

3. [A] State the Linear differential Equation and Obtain the Method for solving it. 5

   [B] **Attempt any one.** 5

   (1) Solve : $8y^2p^3 + 2xp - y = 0$

   (2) Solve : $(D^2 - 3D + 2)y = 3x^2 - 7x + 5$

[P.T.O.

4. Attempt any two. **10**

(3) Find Rank of Matrix $A = \begin{bmatrix} 2 & 3 & 4 & -1 \\ 5 & 2 & 0 & -1 \\ -4 & 5 & 12 & -1 \end{bmatrix}$

(1) Find inverse of Matrix $A = \begin{bmatrix} 1 & 1 & 0 \\ 1 & -1 & 1 \\ 1 & -1 & 2 \end{bmatrix}$

using Row reducation Method.

(2) Solve system of equation.

$2x - 3y = 1$

$2x - y + z = 2$

$3x + y - 2z = 1$

using Row Reduction method.
