M. P. SHAH ARTS & SCIENCE COLLEGE, SURENDRANAGAR.

Assignment-1 B. Sc. Semester-I (2019-20)

Mathematics Paper- 01(A)

Date of Submission: 13/08/2019 **Time: 12:00 to 12:30**

Q. 1 Answer the following questions.

1) State and prove Rolle's theorem.

2) State and prove Cauchy's mean value theorem.

3) For $f(x) = logx$ show that $\frac{b-a}{b} < log\frac{b}{a} < \frac{b-a}{a}$, where $0 < a < b$.

4) Prove that if $f'(x) < 0, \forall\, x \in (a, b)$, then f is strictly increasing in (a, b).

5) Expand e^x in ascending powers of $(x - 2)$.

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Assignment-2 B. Sc. Semester-I (2019-20)

Mathematics Paper- 01(A)

Date of Submission: 27/08/2019 **Time: 12:00 to 12:30**

Q. 1 Answer the following questions.

1) Evaluate $\lim_{x\to\frac{\pi}{2}}\left(Cot^2x-\frac{1}{x^2}\right)$.

2) If $\lim_{x\to\frac{\pi}{2}}\frac{cos^2x}{a-bcosecx}=1$, **then find value of** a **and** b.

3) Solve $\left(x^2+y^2\right)dx+2xydy=0$.

4) Prove that the necessary and sufficient conditions for the differential equation

$M(x,y)dx+N(x,y)dy=0$ **to be exact is** $\frac{\partial M}{\partial y}=\frac{\partial N}{\partial x}$.

5) Solve $y-2px=tan^{-1}\left(xp^2\right)$.

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Assignment-3 B. Sc. Semester-I (2019-20)

Mathematics Paper- 01(A)

Date of Submission: 06/09/2019 **Time: 12:00 to 12:30**

Q. 1 Answer the following questions.

1) Solve: $\frac{d^4y}{dx^4} - 2\frac{d^3y}{dx^3} + 5\frac{d^2y}{dx^2} - 8\frac{dy}{dx} + 4y = 0$.

2) Solve: $(D^4 + 4)y = 0$.

3) Solve: $\frac{d^2y}{dx^2} - 7\frac{dy}{dx} + 12y = e^{5x}$.

4) Solve: $\frac{d^3y}{dx^3} - 12\frac{d^2y}{dx^2} + 6\frac{dy}{dx} - 8y = e^{2x}$.

5) Prove that $\frac{1}{D^2+a^2}cosax = \frac{x}{2a}sinax, \frac{1}{D^2+a^2}sinax = -\frac{x}{2a}cosax$.

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Assignment-4 B. Sc. Semester-I (2019-20)

Mathematics Paper- 01(A)

Date of Submission: 14/09/2019 **Time: 12:00 to 12:30**

Q. 1 Answer the following questions.

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

2) Solve: $x^2\frac{d^2y}{dx^2} + 7x\frac{dy}{dx} + 5y = x^5$.

3) Solve: $(x^3D^3 + 2x^3D^2 + 2)y = 10\left(x + \frac{1}{x}\right)$.

4) Solve: $x^2\frac{d^2y}{dx^2} - x\frac{dy}{dx} + y = 2\log x$.

5) Solve: $x^3\frac{d^3y}{dx^3} + 3x^2\frac{d^2y}{dx^2} - 6x\frac{dy}{dx} + 6y = \left(x^2 - \frac{1}{x^2}\right)^2$.