

Special Internal Exam for Sem-I

Paper- GE Subject- Mathematics

Answer any three questions: -

a. If  $\frac{1}{y^m} - \frac{-1}{y^m} = 2x$  Prove that  $(x^2 + 1)y_2 + xy_1 - m^2y = 0$

b. State and prove Leibnitz's theorem.

c. Find asymptotes of the curve  $9x^4 - 4x^2y^2 + x^2 + y^2 = 1$

d. Find the reduction for  $\int \sin^n x dx$ .

e. Find the arc length of the cardioid  $r = a(1 - \cos\theta)$

f. The cardioid  $r = a(1 + \cos\theta)$  revolves about the initial line  $\theta = 0$ , Find volume and surface area of the solid of revolution.

Special Internal Exam for Sem-II

Paper- GE Subject- Mathematics

Answer any three questions: -

a. Solve :  $(x^2 + y^2 + x)dx - (2x^2 + 2y^2 - y)dy = 0$

b. Solve:  $(x + y)dy - (x - y)dx = 0$

c. Solve:  $x dx + y dy + 4y^3(x^2 + y^2)dy = 0$

d. Solve:  $p^2 + 2xp - 3x^2 = 0$

e. Solve:  $p^2y + 2px = y$

f. Solve:  $y = p^2x + p$

g. Solve by charpit method:  $p = (qy + z)^2$

Special Internal Exam for Sem-III

Paper- GE Subject- Mathematics

1. Answer any three questions but Q.N. 1 is compulsory.

a. Define finite and infinite set.

b. Define bounded set.

c. Define bounded sequence.

d. Define monotonic sequence.

e. Define infinite series.

2. Prove that every convergent sequence is bounded.

3. Prove that the sequence

$\sqrt{2}, \sqrt{2\sqrt{2}}, \sqrt{2\sqrt{2\sqrt{2}}}, \dots$  converge to 2.

4. Test the convergency of the series whose general term is  $\sqrt{n^2 + 1 - n}$

5. State and prove Ratio test.

OR

State and prove Leibnitz's Test.

Special Internal Exam for Sem-I

Paper- GE Subject- Mathematics

1. Answer any three questions. But Q.N.1 is compulsory.

a. Define group.

b. Define subgroup.

c. Define cyclic group.

d. Define normal subgroup.

e. Define centre of group.

2. Prove that  $(ab)^{-1} = b^{-1}a^{-1} \quad \forall a, b \in G$

3. Prove that Intersection of two subgroups is subgroup.

4. Prove that every cyclic group is an abelian group.

5. State and prove Lagrange's theorem.