Subject: Mathematics Session (19-22)

Internal Exam: for Sem - III

Core Paper: 5 Th. of Real functions.

Answer any three ques. but Q.N. 1 is Compulsory.

Q. (1) (a): Define ε-δ defination of limit

(b) Define Continuous functions.

(c) Define uniform continuity

(d) Define Relative extremum.

(e) state Rolle's Theorem.

(2) Discuss the differentiability of the following function at $x=0$

$$f(x) = \begin{cases} 2+x & \text{if } x \geq 0 \\ 2-x & \text{if } x < 0 \end{cases}$$

(3) state & prove Darboux's theorem,

(4) state & prove cauchy's mean value theorem.

(5) obtain the expansion of $(1+x)^n$.

Mathematics

Internal Exam for Sem III (19-22)

Core paper : 6 Gr. Theory.

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

Q(1) (a) Define Group.

(b) Define subgroup.

(c) Define cyclic group.

(d) Define External direct product.

(e) State Cayley's theorem.

(2) Prove that every subgroup of a cyclic group is cyclic.

(3) State & Prove Lagrange's theorem.

(4) Prove that Every cyclic group is abelian.

(5) State & Prove Fermat's theorem

Mathematics

Internal Exam for Sem-III (19-22)

Core paper- 7 PDE & system of ODE.

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

(1) (a) Define Partial differential equation.

(b) write Laplace equation in three variables.

(c) Define quasi-linear equation.

(d) write Lagrange auxilliary equation for $Pp + Qq = R$.

(e) solve : $px + qy = z$.

(2) solve: $x(y-z) + y(z-x)q = z(x-y)$

(3) Solve the equation

$$y^2p^2 + x^2q^2 = x^2y^2z^2$$

(4) Reduce the equation $r = x^2 t$ to canonical form.

(5) solve $(p^2+q^2)y = qz$

Mathematics

Internal Exam. for Sem III (19-22)

Paper- GE Real Analysis.

Answer any three ques but Q.N.01 is compulsory.

① (a) Define finite & 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

$\sqrt{2}, \sqrt{(2\sqrt{2})}, \sqrt{(2\sqrt{2(\sqrt{2})})}, \cdots$ converges to 2.

④ Test the convergency of the series whose general term is

$$\sqrt{n^2+1} - n.$$

⑤ Test for convergence the series whose general term is $\frac{1}{n^{1+\frac{1}{n}}}$.