

Generic Elective (Maths.)
(Mid Term: GE - 1)

Full Marks: 15.

Time : $1\frac{1}{2}$ hrs.

Solve any three questions.

1. Define Limit and Continuity of a real valued function. 5.
2. If $y = (\sin^{-1} x)^2$, prove that 5.
 $(1 - x^2) y_{n+2} - (2n + 1)xy_{n+1} - n^2y_n = 0$
3. State and prove Euler's theorem on homogeneous function. 5.
4. Find the reduction formula for $\int \tan^n x \, dx$. 5.
5. Find the length of the plane curve $y^2 = x^3$ for $0 \leq x \leq 1$ 5.

Generic Elective (Maths.)

(Mid Term: GE - 2)

Full Marks: 15.

Time : $1\frac{1}{2}$ hrs.

Solve any three questions.

1. $y(1 + xy)dx - x dy = 0$ 5.
2. $p^2 + 2px - 3x^2 = 0$ 5.
3. $y = px + \frac{a}{p}$ 5.
4. $(D^2 - 5D + 6)y = x^3 e^{2x}$ 5.

Generic Elective (Maths.)

(Mid Term: GE - 3)

Full Marks: 15.

Time : $1\frac{1}{2}$ hrs.

Answer three questions.

1. Define sequence of real numbers and its convergence with example. 5.
2. Define bounds of a sequence, Cauchy sequence and prove that convergence sequence has unique limit. 5.
3. Define a series of real numbers and its convergence . 5.
4. Prove that the series $\sum \frac{1}{n^p}$ is convergent for $p > 1$ 5.
5. State and prove Comparison test of convergence of an infinite series 5.

Generic Elective (Maths.)

(Mid Term: GE - 4)

Full Marks: 15.

Time : $1\frac{1}{2}$ hrs.

Answer any three questions.

1. Define abelian group with an example with finite elements 5.
2. Define addition modulo m and multiplication modulo p of integers 5.
3. Define subgroup, coset and index of a subgroup. 5.
4. State and prove Lagrange's theorem. 5.
5. Define Normal subgroup and Quotient group. 5.