

**Unit I: Differential Calculus:**

**30 Marks**

Successive derivatives, Leibniz's theorem, tangent and normal, derivative of arc length (Cartesian & Polar), Taylor's Series and Maclaurin's Series, expansion of functions, Asymptotes, curvature, curve tracing, Functions of two or more variables, Partial derivatives, Homogeneous function (Definition)

**Unit II: Integral**

**30 Marks**

**Calculus:**

Reduction formulae for indefinite integrals involving power of circular functions of x and Product of  $\sin^m x \cos^n x$ ; Deduction of

$$\int_0^{\pi/2} \sin^n x dx ; \int_0^{\pi/2} \cos^n x dx ; \int_0^{\pi/2} \sin^n x \cos^n x dx$$

Length of plane curves (Cartesian & Polar), Areas under Plane curves (Cartesian & Polar), Volume and surface area of solids of revolution of plane curves.

**Unit III Differential equations:**

**28 Marks**

Solution of ordinary first order and first degree differential equation of the following forms: Homogeneous, reducible to homogeneous, Linear, reducible to linear, Exact, reducible to exact. ODE of 1<sup>st</sup> order but not of first degree, higher order linear equation with constant coefficients, Cauchy's homogeneous linear equation, simultaneous linear equations with constant Co-efficient.

**Unit IV Vector algebra:**

**12 Marks**

Triple product of vector and their applications.

**Texts/ references:**

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|-------------------------------------|---|
| 1. Differential Calculus            | B.C. Das & B.N. Mukhejee                |
| 2. Integral Calculus Ltd B.         | B. C. Das & U. N Dhar & Sons Pvt        |
| 3. Calculus                         | James Stewart: Thomson books            |
| 4. A Text book of Vector algebra    | Shanti Narayan: S. Chand & CO.          |
| 5. A text book of Engineering Maths | N.P Bali,<br>Dr. N. Ch. Narayan Iyenger |