**Differential Calculus and Coordinate Geometry**

Calculus– James Stewart - 8th edition

**Syllabus for Finalterm exam** - Coordinate Geometry: Circles, Conic Sections: Parabola, Ellipse, Hyperbola, Shifted conics, Rotation of Axes, Three-dimensional coordinate systems: Vector Analysis, Equations of lines and planes; Function of severable variables: Partial derivatives, maximum and minimum values of function.

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| **Topics** | **Sub topics and Example** | **Exercise** | **Number of Lectures** | **Quiz** |
| **Coordinate Geometry of Two Dimensions** | **Circle** (A16) Equation of a circle. Example # 1, 2 | P-A23 E x# 5-9 | 3 |  |
|  | **Conic Sections**  Parabolas (P-674) # 1  Ellipses (P-676) # 2, 3  Hyperbolas(P-677) # 4, 5  Shifted Conics (P-679) # 7  Rotation of axes (lecture notes will be provided) | P-A23 Ex # 11-22, 24-32 |
| **Three-dimensional Coordinate Geometry** | **Vectors (P-798)**  Definition, terminal point, initial point, vector addition, triangle law, parallelogram law, scalar multiplication, Magnitude, Dot product(P-807) # 1, Angle between two vectors(P-809)#3, Perpendicular vectors (P-809)#4, Direction angle, Direction Cosine(P-810)# 5, Projection (P-811)# 6, Work done (P-812) # 7,8 | P-812-813  (a)Dot product # 4,8  (b)Angle # 17-20  (c)Vectors orthogonal, parallel # 23(b,c,d), 24  (d)Direction cosine, Direction angle #33-37  (e)Scalar projection #39, 41-44  (f)Work done # 49  (g)Unit vector (P-821 # 19, 20) | 3 | Quiz1 |
|  | Cross product (P-815) Theorem- P-817  **Application:**  Area (P-818 # 4), volume (P-820), Coplanar( # 5) | P-821  Area # 27, 28  Volume # 33, 34  Coplanar #37, 38 | 1 | Quiz2 |
| **Equations of lines and planes** | Equations of lines (P-824)  # 1,2,3  Equation of planes (P-827) # 4, 5  Points of intersection # 6  Angle between planes # 7 | P-831  Lines- #2, 4, 7, 10,11, 19-22  Planes- # 23, 24, 26, 27, 33, 34  Angle # 51, 53, 55 | 2 |  |
| **Function of several variables** | Definition-P-888 | P-925 # 59, 60, 63, 64, 65, 76 (a, e, f), 78(a, d) | 3 | Quiz3 |
| Partial derivatives, Notation of partial derivatives -P-914 Example # 1, 4 |  |  |
| Higher derivatives -P-918 Example # 7, 8 |  |  |
| Partial Differential Equation -P- 920, Example # 9, 10 |  |  |
| **Maximum and Minimum values** | P-959 Definition, Theorem, Critical Point, Second derivative test (P-961)  Example- #3 | P-968 # 6, 9, 11 |  |  |