

REVISED SYLLABUS INTERMEDIATE I YEAR
MATHEMATICS IB
(COORDINATE GEOMETRY AND CALCULUS)

COORDINATE GEOMETRY

(65 Periods)

2 DIMENSIONS:

1.	Locus	4
2.	Translation and rotation of axes	5
3.	Straight lines	20
4.	Pair of Straight lines	20

3 DIMENSIONAL;

5.	Coordinates	8
6.	Direction cosines and ratios	8

	Total:	65

CALCULUS:

7.	Functions, Limits and Continuity	16
8.	Derivatives, first order and second order derivatives	16
9.	Applications of derivatives	20
10.	Partial differentiation	08

	Total:	60

CO-ORDINATE GEOMETRY – 2D

S.No.	Topics/Chapter	Sub-topics/Sections/Sub-sections
1.	Locus	1.1 Definition of locus 1.2 Equation of locus 1.3 Illustrations
2.	Translation & Rotation of axes	2.1 Translation of axes 2.2 Rotation of axes 2.3 Illustrations
3.	Straight line	3.1 Recapitulation of a) General equation of a straight line and Forms of equation of a straight line i) slope intercept form ii) Intercepts form iii) Point-slope form iv) Two point form 3.2 Normal form $x\cos\alpha + y\sin\alpha = p$ 3.3 Symmetric form $\frac{x-x_1}{\cos\theta} = \frac{y-y_1}{\sin\theta} = r$ 3.4 To reduce the general equation into different forms 3.5 Point of intersection of two straight lines 3.6 Family of straight lines passing through the point of intersection of two given lines. 3.7 Condition for concurrency of three straight lines 3.8 Angle between two intersecting lines. Condition for perpendicularity and parallelism. 3.9 Length of perpendicular from a point to a straight line, distance between two parallel lines. 3.10 The medians of a triangle are concurrent 3.11 The altitudes of a triangle are concurrent

- 3.12 The internal bisectors of the angles of a triangle are concurrent
- 3.13 The perpendicular bisectors of the sides of a triangle are concurrent.
4. Pair of straight lines
- 4.1 $ax^2 + 2hxy + by^2 = 0$ a pair of line through the origin
- 4.2 Angle between the lines $ax^2 + 2hxy + by^2 = 0$ conditions for coincidence perpendicularities
- 4.3 Bi-sector of the angles between the lines $L_1=0, L_2 =0$
- 4.4 Combined equation of the bisectors of the angles between the lines $ax^2 + 2hxy + by^2 = 0$
- 4.5 If the general equation of the second degree in x & y i.e. $ax^2 + 2nxy + by^2 + 2gx + 2fy + c = 0$ represents a pair of straight lines then $abc + 2fgh - af^2 - bg^2 - ch^2 = 0$, $h^2 > ab$, $g^2 > ac$ and $f^2 > bc$
- 4.6 Converse of 4.5 without proof.
- 4.7 If $S = ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ represents a pair of straight lines then $ax^2 + 2hxy + by^2 = 0$ represents the line through the origin, parallel to the above lines. Angle between the lines $S=0$ condition for these line to be (i) Parallel (ii) Perpendicular
- 4.8 Point of intersection of the lines $S=0$
- 4.9 Homogenisation of the second degree equation with a first degree equation in x and y .

CO-ORDINATE GEOMETRY - 3D

5. Co-ordinates
- 5.1 Co-ordinate planes – Co-ordinates of a point – Distance between two points in space.
- 5.2 To find the Co-ordinates of a point which divides the join of two points

$(x, y, z), (x_1, y_1, z_1)$ internally in the ratio $m:n$ – centroid of a triangle and tetrahedron.

6. Direction cosines and ratios
- 6.1 Direction cosines of a line, relation between the cosines $l^2 + m^2 + n^2 = 1$
- 6.2 Direction cosines of a line, to find the direction cosines when direction ratios are given.

CALCULUS

7. Functions, Limits and Continuity
- 7.1 Function, Domain and Range of Function-Algebraic, Trigonometric, Inverse Trigonometric, Hyperbolic, Step-function and construction of graphs of $\log x, e^x, |x|, (x)$
- 7.2 Concepts of intervals and neighbourhood
- 7.3 Limits – Definition of right hand limit, left hand limit, limit. Limits of $f+g, f/g, f \cdot g$ (without proof)
Standard limits
- 1) $\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a}$
- 2) $\lim_{\theta \rightarrow 0} \frac{\sin \theta}{\theta}$
- 3) $\lim_{n \rightarrow \infty} (1 + 1/n)^n$
- 4) $\lim_{x \rightarrow 0} \frac{e^x - 1}{x}$
- 5) $\lim_{x \rightarrow 0} \frac{a^x - 1}{x}$
- (Limits 3,4, and 5 without proof)
- 7.5 Continuity – Definition and simple illustration

- 8. Differentiation
 - 8.1 Introduction – Definition
 - 8.2 Differentiation of a function at a point and on an Interval – Derivative of a function – Differentiation of sum, difference, product and quotient of functions.
Differentiation of algebraic, circular, exponential, logarithmic functions.
 - 8.3 Derivatives of composite, implicit, parametric, inverse circular, hyperbolic and inverse hyperbolic functions.
 - 8.4 Logarithmic differentiation, Derivative of a function with respect of another function.
 - 8.5 Derivatives of first and second order
- 9. Application of Derivative
 - 9.1 Infinitesimal – Differentials
 - 9.2 Errors and approximations
 - 9.3 Geometrical interpretation of a derivative
 - 9.4 Equations of tangent, normal sub-tangent, sub-normal at a point
 - 9.5 Lengths of tangent, normal sub-tangent, sub-normal at a point.
 - 9.6 Angle between two curves, orthogonality
 - 9.7 Derivative as a rate measurer
 - 9.8 Increasing and decreasing functions
 - 9.9 Maxima and minima
- 10. Partial Differentiation
 - 10.1 Partial derivatives - First and second orders only
 - 10.2 Homogeneous functions – Euler’s theorem on homogeneous functions – functions – simple applications.

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