

TOPICS/CONTENTS/NOTES**OBJECTIVES****SECTION I: NUMBER AND NUMERATION****1. Number bases:**

- (a) operations in different number bases from 2 to 10;
(b) conversion from one base to another including fractional parts.

Candidates should be able to:

- i. perform four basic operations (x, +, -, ÷)
ii. convert one base to another.

2. Fractions, Decimals, Approximations and Percentages:

- (a) fractions and decimals;
(b) significant figures;
(c) decimal places;
(d) percentage errors;
(e) simple interest;
(f) profit and loss percent;
(g) ratio, proportion and rate;
(h) shares and valued added tax (VAT).

Candidates should be able to:

- i. perform basic operations (x, +, -, ÷) on fractions and decimals;
ii. express to specified number of significant figures and decimal places;
iii. calculate simple interest, profit and loss percent; ratio proportion and rate;
iv. Solve problems involving share and VAT.

3. Indices, Logarithms and Surds:

- (a) laws of indices;
(b) standard form;
(c) laws of logarithm;
(d) logarithm of any positive number to a given base;
(e) change of bases in logarithm and application;
(f) relationship between indices and logarithm;
(g) surds.

Candidates should be able to:

- i. apply the laws of indices in calculation;
ii. establish the relationship between indices and logarithms in solving problems;
iii. solve problems in different bases in logarithms;
iv. simplify and rationalize surds;
v. perform basic operations on surds.

4. Sets:

Candidates should be able to:

- (a) types of sets
- (b) algebra of sets
- (c) venn diagrams and their applications.

- i. identify types of sets, i.e empty, universal, complements, subsets, finite, infinite and disjoint sets;
- ii. solve problems involving cardinality of sets;
- iii. solve set problems using symbol;
- iv. use venn diagrams to solve problems involving not more than 3 sets.

SECTION II: ALGEBRA.

1. Polynomials:

- (a) change of subject of formula
- (b) factor and remainder theorems
- (c) factorization of polynomials of degree not exceeding 3.
- (d) multiplication and division of polynomials
- (e) roots of polynomials not exceeding degree 3
- (f) simultaneous equations including one linear one quadratic;
- (g) graphs of polynomials of degree not greater than 3.

- Candidates should be able to:
- i. find the subject of the formula of a given equation;
 - ii. apply factor and remainder theorem to factorize a given expression;
 - iii. multiply and divide polynomials of degree not more than 3;
 - iv. factorize by regrouping difference of two squares, perfect squares and cubic expressions; etc.
 - v. solve simultaneous equations - one linear, one quadratic;
 - vi. interpret graphs of polynomials including applications to maximum and minimum values.

2. Variation:

- (a) direct
- (b) inverse
- (c) joint
- (d) partial
- (e) percentage increase and decrease.

- Candidates should be able to:
- i. solve problems involving direct, inverse, joint and partial variations;
 - ii. solve problems on percentage increase and decrease in variation.

3. Inequalities:

- (a) analytical and graphical solutions of linear inequalities;

- Candidates should be able to:
- i. solve problems on linear and quadratic inequalities;

(b) quadratic inequalities with integral roots only.	ii. interpret graphs of inequalities.
4. Progression: (a) nth term of a progression (b) sum of A. P. and G. P.	Candidates should be able to: i. determine the nth term of a progression; ii. compute the sum of A. P. and G.P; iii. sum to infinity of a given G.P.
5. Binary Operations: (a) properties of closure, commutativity, associativity and distributivity; (b) identity and inverse elements (simple cases only).	Candidates should be able to: i. solve problems involving closure, commutativity, associativity and distributivity; ii. solve problems involving identity and inverse elements.
6. Matrices and Determinants: (a) algebra of matrices not exceeding 3×3 ; (b) determinants of matrices not exceeding 3×3 ; (c) inverses of 2×2 matrices [excluding quadratic and higher degree equations].	Candidates should be able to: i. perform basic operations ($\times, +, -, \div$) on matrices; ii. calculate determinants; iii. compute inverses of 2×2 matrices.

SECTION III: GEOMETRY AND TRIGONOMETRY

1. Euclidean Geometry: (a) Properties of angles and lines (b) Polygons: triangles, quadrilaterals and general polygons; (c) Circles: angle properties, cyclic quadrilaterals and intersecting chords; (d) construction.	Candidates should be able to: i. identify various types of lines and angles; ii. solve problems involving polygons; iii. calculate angles using circle theorems; iv. identify construction procedures of special angles, e.g. 30° , 45° , 60° , 75° , 90° etc.
2. Mensuration:	Candidates should be able to:

<p>(a) lengths and areas of plane geometrical figures;</p> <p>(b) lengths of arcs and chords of a circle;</p> <p>(c) Perimeters and areas of sectors and segments of circles;</p> <p>(d) surface areas and volumes of simple solids and composite figures;</p> <p>(e) the earth as a sphere:- longitudes and latitudes.</p>	<p>i. calculate the perimeters and areas of triangles, quadrilaterals, circles and composite figures;</p> <p>ii. find the length of an arc, a chord, perimeters and areas of sectors and segments of circles;</p> <p>iii. calculate total surface areas and volumes of cuboids, cylinders, cones, pyramids, prisms, spheres and composite figures;</p> <p>iv. determine the distance between two points on the earth's surface.</p>
<p>3. Loci:</p> <p>locus in 2 dimensions based on geometric principles relating to lines and curves.</p>	<p>Candidates should be able to:</p> <p>identify and interpret loci relating to parallel lines, perpendicular bisectors, angle bisectors and circles.</p>
<p>4. Coordinate Geometry:</p> <p>(a) midpoint and gradient of a line segment;</p> <p>(b) distance between two points;</p> <p>(c) parallel and perpendicular lines;</p> <p>(d) equations of straight lines.</p>	<p>Candidates should be able to:</p> <p>i. determine the midpoint and gradient of a line segment;</p> <p>ii. find the distance between two points;</p> <p>iii. identify conditions for parallelism and perpendicularity;</p> <p>iv. find the equation of a line in the two-point form, point-slope form, slope intercept form and the general form.</p>
<p>5. Trigonometry:</p> <p>(a) trigonometrical ratios of angles;</p> <p>(b) angles of elevation and depression;</p> <p>(c) bearings;</p> <p>(d) areas and solutions of triangle;</p> <p>(e) graphs of sine and cosine;</p> <p>(f) sine and cosine formulae.</p>	<p>Candidates should be able to:</p> <p>i. calculate the sine, cosine and tangent of angles between $-360^\circ \leq \theta \leq 360^\circ$;</p> <p>ii. apply these special angles, e.g. 30°, 45°, 60°, 75°, 90°, 105°, 135° to solve simple problems in trigonometry;</p> <p>iii. solve problems involving angles of elevation and depression;</p> <p>iv. solve problems involving bearings;</p> <p>v. apply trigonometric formulae to find areas of triangles;</p> <p>vi. solve problems involving sine and cosine</p>

graphs.

SECTION IV: CALCULUS

I. Differentiation:

- (a) limit of a function
- (b) differentiation of explicit algebraic and simple trigonometrical functions - sine, cosine and tangent.

Candidates should be able to:

- i. find the limit of a function
- ii. differentiate explicit algebraic and simple trigonometrical functions.

2. Application of differentiation:

- (a) rate of change;
- (b) maxima and minima.

Candidates should be able to:

- solve problems involving applications of rate of change, maxima and minima.

3. Integration:

- (a) integration of explicit algebraic and simple trigonometrical functions;
- (b) area under the curve.

Candidates should be able to:

- i. solve problems of integration involving algebraic and simple trigonometric functions;
- ii. calculate area under the curve (simple cases only).

SECTION V: STATISTICS

1. Representation of data:

- (a) frequency distribution;
- (b) histogram, bar chart and pie chart.

Candidates should be able to:

- i. identify and interpret frequency distribution tables;
- ii. interpret information on histogram, bar chart and pie chart

<p>2. Measures of Location:</p> <p>(a) mean, mode and median of ungrouped and grouped data - (simple cases only);</p> <p>(b) cumulative frequency.</p>	<p>Candidates should be able to:</p> <p>i. calculate the mean, mode and median of ungrouped and grouped data (simple cases only);</p> <p>ii. use ogive to find the median, quartiles and percentiles.</p>
<p>3. Measures of Dispersion:</p> <p>range, mean deviation, variance and standard deviation.</p>	<p>Candidates should be able to:</p> <p>calculate the range, mean deviation, variance and standard deviation of ungrouped and grouped data.</p>
<p>4. Permutation and Combination:</p> <p>(a) Linear and circular arrangements;</p> <p>(b) Arrangements involving repeated objects.</p>	<p>Candidates should be able to:</p> <p>solve simple problems involving permutation and combination.</p>
<p>5. Probability:</p> <p>(a) experimental probability (tossing of coin, throwing of a dice etc);</p> <p>(b) Addition and multiplication of probabilities (mutual and independent cases).</p>	<p>Candidates should be able to:</p> <p>solve simple problems in probability (including addition and multiplication).</p>

RECOMMENDED TEXTS

Adelodun A. A (2000) Distinction in Mathematics: Comprehensive Revision Text, (3rd Edition) Ado -Ekiti: FNPL.

Anyebe, J. A. B (1998) Basic Mathematics for Senior Secondary Schools and Remedial Students in Higher/ institutions, Lagos: Kenny Moore.

Channon, J. B. Smith, A. M (2001) New General Mathematics for West Africa SSS 1 to 3, Lagos: Longman.

David -Osuagwu, M. et al (2000) New School Mathematics for Senior Secondary Schools, Onitsha: Africana - FIRST Publishers.

Egbe. E et al (2000) Further Mathematics, Onitsha: Africana - FIRST Publishers

Ibude, S. O. et al (2003) Algebra and Calculus for Schools and Colleges: LINCEL Publishers.

Tuttuh - Adegun M. R. et al (1997), Further Mathematics Project Books 1 to 3, Ibadan: NPS Educational