



THE WAEC PREPARATION KIT

From the Office of the Education Quality Assurance.



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INTRODUCTION

WAEC requires its candidates to write at least 450 words in essays but this is not the ultimate guarantee to passing the exam. Your essay has to be interesting, fun to read, explanatory and most of all, appealing to the examiner.

When I wrote my WAEC, I wrote an informal letter of up to 700 words and also got an A so I decided to share my trick with you.

In the next page, I shared some ways to write a good essay in WAEC.



Plan

Always write your points in your essays down. Make sure to keep it as short and specific as possible

Describe

Make sure to describe each event or important character as detailed as possible. This helps the examiner easily imagine the occasion and setting. Also, it helps to keep your essays longer.

Proper use of adjectives

This is very important if you want to catch your examiner's attention. Proper use of adjectives shows professionalism and intelligence in writing. Every WAEC examiner would be happy to read an essay that looks like the work of a professional.

Add humor

A little humor can't kill your essay. In fact, they will boost it. Adding humor in your essay shows how confident you are. Informal letters should have a good amount of humor while this should be reduced in formal letters.



Climax

This is the peak of your essay. This part catches the attention of any reader. Your climax should be as attractive as possible and should not divert from the main title of the essay.

Causes and effects

Causes and effects of each action should be included.

Reality

Sometimes, it is safe to add realities to your essays. Try to remember an experience related to that essay and tweak it into an appealing line.

Punctuations

Punctuations are very very important in English language. Take an example: "A woman: without her, man is nothing." "A woman without her man is nothing". Those are two similar sentences but with entirely different meanings. Your punctuations can give your paragraph or sentence a whole new meaning. Use commas, full stops, inverted commas, apostrophes and colons in the right frequency and manner."

Practice

Constant practices make good perfections. Before your exam, practice as much as possible and learn from mistakes. Use past questions, textbooks and news.



ENGLISH LANGUAGE PREP. KIT

ENGLISH LANGUAGE

This examination sets out to test the different basic skills of communicating in English using the mediums of speech and writing. The examination will test the receptive and productive abilities of candidates. These abilities will be demonstrated in the following forms: reading, comprehension, summary, vocabulary, lexis and structure, listening comprehension and recognition of different aspects of spoken English.

AIMS AND OBJECTIVES

The objective of the syllabus is to measure the extent to which the aims of the teaching syllabuses of member countries have been realized in candidates' secondary school career. The examination sets out to examine candidates' ability to

- (i) use correct English;
- (ii) write about incidents in English that are appropriate to specified audiences and situations;
- (iii) organize material in paragraphs that are chronologically, spatially and logically coherent;
- (iv) control sentence structures accurately;
- (v) exhibit variety in the use of sentence patterns;
- (vi) comply with the rules of grammar;
- (vii) spell and punctuate correctly;
- (viii) comprehend written and spoken English;
- (ix) recognize implied meaning, tones and attitudes;
- (x) use an acceptable pronunciation that can be comprehended by others;
- (xi) recognize the physical characteristics of English sounds and the letters that represent them.
- (xii) pick out and summarize relevant information from set passages.

SCHEME OF EXAMINATION

There will be three papers – Papers 1, 2 and 3, all of which must be taken. Papers 1 and 2 will be a composite paper to be taken at one sitting.

- PAPER 1: Will consist of eighty multiple choice questions, all of which should be answered within 1 hour for 40 marks.
- PAPER 2: Will consist of five essay topics and a passage each to test candidates' comprehension and summary skills. Candidates will be expected to write an essay on one of the topics and answer all the questions on the comprehension and summary passages. The paper will last 2 hours and carry 100 marks.
- PAPER 3: Will consist of sixty multiple choice items on Test of Orals for candidates in Nigeria and Liberia, and Listening Comprehension Test for candidates in the Gambia and Sierra Leone. All the questions should be answered in 45 minutes for 30 marks.

DETAILED SYLLABUS

PAPER 1: (For candidates in The Gambia, Nigeria, Sierra Leone and Liberia only)

This is an objective/multiple choice paper comprising eighty questions: forty lexical and forty structural questions. Each question will have four options lettered A to D.

A. LEXIS

In addition to items testing knowledge of the vocabulary of everyday usage (i.e. home, social relationships, and common core school subjects) questions will be set to test candidates' ability in the use of the general vocabulary associated with the following fields of human activity:

- I. (a) Building and Building Construction;
- (b) Agriculture;
- (c) Fishing;
- (d) Stock exchange;
- (e) Health;
- (f) Environment;
- (g) Culture, Institutions and Ceremonies;
- (h) Law and Order;
- (i) Motor Vehicles and Travelling;
- (j) Government and Administration;
- (k) Sports;
- (l) Religion;
- (m) Science and Technology;
- (n) Animal husbandry;
- (o) Advertising;
- (p) Human Internal Body system and function.

II. Idioms, i.e. idiomatic expressions and collocations (e.g. 'hook, line and sinker', 'every Tom, Dick and Harry' etc.) the total meaning of which cannot be arrived at simply by consideration of the dictionary meanings of the words in the structures in which they appear.

III. Structural elements of English e.g. sequence of tenses, matching of pronouns with their antecedents, correct use of prepositions etc.

IV. Figurative Usage

The term 'general' vocabulary refers to those words and usage of words normally associated with the fields of human activity in A1 above which are generally known, used and understood by most educated people who, while not engaged in that field of activity may have occasion to read, speak or write about it. Thus, for example, in the vocabulary of transportation by road, one would expect knowledge of terms such as 'pedestrian bridge' and 'traffic signs' which most educated people understand, but not 'berm' or 'camber' which are specialized.

All items will be phrased in such a way as to test the use and understanding of the required lexis, rather than dictionary definitions and explanations. In practice, the test of lexis will be so designed as to explore, not merely the extent of the candidates' vocabulary but more importantly their ability to respond to sense relations in the use of lexical items e.g. synonyms, antonyms and homonyms.

In the test of figurative language, candidates will be expected to recognize when an expression is used figuratively and not only when it is used literally.

B. STRUCTURE

Structure here includes:

- (i) The patterns of changes in word-forms which indicate number, tense, degree, etc;
- (ii) The patterns in which different categories of words regularly combine to form groups and these groups in turn combine to form sentences;
- (iii) The use of structural words e.g. conjunctions, determiners, prepositions, etc.

EDUCATION CONCEPT



PAPER 2: (For all candidates)

The paper will be divided into three sections: Sections A, B and C. Candidates will be required to spend 2 hours on this paper.

SECTION A: ESSAY WRITING (50 marks)

Candidates will be required to spend 50 minutes on this section. There will be five questions in all and candidates will be required to answer only one question.

The questions will test candidates' ability to communicate in writing. The topics will demand the following kinds of writing:

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| (i) letter; | |
| (ii) speech; | |
| (iii) narration; | (vi) report; |
| (iv) description; | (vii) article; |
| (v) argument/debate; | (viii) exposition; |
| | (ix) creative writing. |

Marks will be awarded for:

- (i) Content: relevance of ideas to the topic;
- (ii) Organization: formal features (where applicable), good paragraphing, appropriate emphasis and arrangement of ideas;
- (iii) Expression: effective control of vocabulary and sentence structure;
- (iv) Mechanical Accuracy: correct grammar, punctuation, spelling etc.

The minimum length will be 450 words.

SECTION B: COMPREHENSION (20 marks)

Candidates will be required to spend 30 minutes on this section. The section will consist of one passage of at least three hundred and fifty (350) words. Candidates will be required to answer all the questions on the passage.

The questions will test candidates' ability to:

- (i) find appropriate equivalents for selected words or phrases;
- (ii) understand the factual content;
- (iii) make inferences from the content of the passage;
- (iv) understand the use of English expressions that reveal/reflect sentiments/emotions/attitudes;
- (v) identify and label basic grammatical structures, words, phrases or clauses and explain their functions as they appear in the context;
- (vi) identify and explain basic literary terms and expressions;
- (vii) recast phrases or sentences into grammatical alternatives.

The passage will be chosen from a wide variety of sources all of which should be suitable for this level of examination in terms of theme and interest. The passage will be written in modern English that should be within the experience of candidates. The comprehension test will include at least four questions based on (ii) above.

SECTION C: SUMMARY (30 marks)

Candidates will be required to spend 40 minutes on this section. The section will consist of one prose passage of about five hundred (500) words and will test candidates' ability to

- (i) extract relevant information;
- (ii) summarize the points demanded in clear concise English, avoiding repetition and redundancy;
- (iii) present a summary of specific aspects or portions of the passage.

The passage will be selected from a wide variety of suitable sources, including excerpts from narratives, dialogues and expositions of social, cultural, economic and political issues in any part of the world.



PAPER 3: ORAL ENGLISH (30 marks)

This paper will test candidates' knowledge of Oral English. There will be two alternatives for this paper: Candidates in Ghana, The Gambia and Sierra Leone will be tested in listening comprehension and those in Nigeria and Liberia will take a paper on test of oral.

Test Of Orals (For candidates in Nigeria and Liberia)

The test will also be of the multiple-choice objective type consisting of sixty questions on a wide range of areas or aspects of Orals as contained in the syllabus.

The test will cover the following areas:

1. Vowels – pure vowels and diphthongs;
2. Consonants and clusters;
3. Rhymes;
4. Word stress/Syllable Structure;
5. Emphatic Stress/Intonation Patterns;
6. Phonetic Symbols.



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$$\begin{aligned} &= \log 15^4 - \log 5^2 - \log 3^2 \\ &= \log 15^4 - (\log 5^2 + \log 3^2) \\ &= \log \frac{15^4}{5^2 \cdot 3^2} \\ &= \log 45 \\ &423 \end{aligned}$$

MATHEMATICS PREP. KIT

GENERAL MATHEMATICS/MATHEMATICS (CORE)

1. AIMS OF THE SYLLABUS

The aims of the syllabus are to test candidates’:

- (1) mathematical competency and computational skills;
- (2) understanding of mathematical concepts and their relationship to the acquisition of entrepreneurial skills for everyday living in the global world;
- (3) ability to translate problems into mathematical language and solve them using appropriate methods;
- (4) ability to be accurate to a degree relevant to the problem at hand;
- (5) logical, abstract and precise thinking.

This syllabus is not intended to be used as a teaching syllabus. Teachers are advised to use their own National teaching syllabuses or curricular for that purpose.

1. EXAMINATION SCHEME

There will be two papers, Papers 1 and 2, both of which must be taken.

PAPER 1: will consist of fifty multiple-choice objective questions, drawn from the common areas of the syllabus, to be answered in 1½ hours for 50 marks.

PAPER 2: will consist of thirteen essay questions in two sections – Sections A and B, to be answered in 2½ hours for 100 marks. Candidates will be required to answer ten questions in all.

- Section A - Will consist of five compulsory questions, elementary in nature carrying a total of 40 marks. The questions will be drawn from the common areas of the syllabus.
- Section B - will consist of eight questions of greater length and difficulty. The questions shall include a maximum of two which shall be drawn from parts of the syllabuses which may not be peculiar to candidates' home countries. Candidates will be expected to answer five questions for 60marks.

2. DETAILED SYLLABUS

The topics, contents and notes are intended to indicate the scope of the questions which will be set. The notes are not to be considered as an exhaustive list of illustrations/limitations.



| TOPICS | CONTENTS | NOTES |
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| A. NUMBER AND NUMERATION (a) Number bases | (i) conversion of numbers from one base to another (ii) Basic operations on number bases | Conversion from one base to base 10 and vice versa. Conversion from one base to another base . Addition, subtraction and multiplication of number bases. |
| (b) Modular Arithmetic | (i) Concept of Modulo Arithmetic. (ii) Addition, subtraction and multiplication operations in modulo arithmetic. (iii) Application to daily life | Interpretation of modulo arithmetic e.g. $6 + 4 = k(\text{mod}7)$, $3 \times 5 = b(\text{mod}6)$, $m = 2(\text{mod}3)$, etc. Relate to market days, clock, shift duty, etc. |
| (c) Fractions, Decimals and Approximations | (i) Basic operations on fractions and decimals. (ii) Approximations and significant figures. | Approximations should be realistic e.g. a road is not measured correct to the nearest cm. |

| TOPICS | CONTENTS | NOTES |
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| (d) Indices | (i) Laws of indices | e.g. $a^x \times a^y = a^{x+y}$, $a^x \div a^y = a^{x-y}$, $(a^x)^y = a^{xy}$, etc where x, y are real numbers and $a \neq 0$. Include simple examples of negative and fractional indices. |
| | (ii) Numbers in standard form (scientific notation) | Expression of large and small numbers in standard form e.g. $375300000 = 3.753 \times 10^8$ $0.000000035 = 3.5 \times 10^{-7}$ Use of tables of squares, square roots and reciprocals is accepted. |

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| (e) Logarithms | <p>(i) Relationship between indices and logarithms e.g. $y = 10^k$ implies $\log_{10} y = k$.</p> <p>(ii) Basic rules of logarithms e.g. $\log_{10}(pq) = \log_{10} p + \log_{10} q$ $\log_{10}(p/q) = \log_{10} p - \log_{10} q$ $\log_{10} p^n = n \log_{10} p$.</p> <p>(iii) Use of tables of logarithms and antilogarithms.</p> | Calculations involving multiplication, division, powers and roots. |
| (f) Sequence and Series | <p>(i) Patterns of sequences.</p> <p>(ii) Arithmetic progression (A.P.) Geometric Progression (G.P.)</p> | <p>Determine any term of a given sequence. The notation U_n = the nth term of a sequence may be used.</p> <p>Simple cases only, including word problems. (Include sum for A.P. and exclude sum for G.P.).</p> |

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| (g) Sets | <p>(i) Idea of sets, universal sets, finite and infinite sets, subsets, empty sets and disjoint sets.</p> <p>Idea of and notation for union, intersection and complement of sets.</p> <p>(ii) Solution of practical problems involving classification using Venn diagrams.</p> | <p>Notations: \mathcal{E}, \subset, \cup, \cap, $\{ \}$, \emptyset, P' (the compliment of P).</p> <p>♦• properties e.g. commutative, associative and distributive</p> <p>Use of Venn diagrams restricted to at most 3 sets.</p> |
| (h) Logical Reasoning | Simple statements. True and false statements. Negation of statements, implications. | Use of symbols: \Rightarrow , \Leftarrow , use of Venn diagrams. |
| (i) Positive and negative integers, rational numbers | The four basic operations on rational numbers. | Match rational numbers with points on the number line. |
| | | Notation: Natural numbers (N), Integers (Z), Rational numbers (Q). |

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| (j) Surds (Radicals) | Simplification and rationalization of simple surds. | <p>Surds of the form $\frac{a}{\sqrt{b}}$, $a\sqrt{b}$ and $a \pm \sqrt{b}$ where a is a rational number and b is a positive integer.</p> <p>Basic operations on surds (exclude surd of the form $\frac{a}{b+c\sqrt{d}}$).</p> |
| •* (k) Matrices and Determinants | <p>(i) Identification of order, notation and types of matrices.</p> <p>(ii) Addition, subtraction, scalar multiplication and multiplication of matrices.</p> <p>(iii) Determinant of a matrix</p> | <p>Not more than 3 x 3 matrices. Idea of columns and rows.</p> <p>Restrict to 2 x 2 matrices.</p> <p>Application to solving simultaneous linear equations in two variables. Restrict to 2 x 2 matrices.</p> |

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| <p>(l) Ratio, Proportions and Rates</p> | <p>Ratio between two similar quantities. Proportion between two or more similar quantities.</p> <p>Financial partnerships, rates of work, costs, taxes, foreign exchange, density (e.g. population), mass, distance, time and speed.</p> | <p>Relate to real life situations.</p> <p>Include average rates, taxes e.g. VAT, Withholding tax, etc</p> |
| <p>(m) Percentages</p> | <p>Simple interest, commission, discount, depreciation, profit and loss, compound interest, hire purchase and percentage error.</p> | <p>Limit compound interest to a maximum of 3 years.</p> |

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| *(n) Financial Arithmetic | (i) Depreciation/ Amortization. | Definition/meaning, calculation of depreciation on fixed assets, computation of amortization on capitalized assets. |
| | (ii) Annuities (iii) Capital Market Instruments | Definition/meaning, solve simple problems on annuities. Shares/stocks, debentures, bonds, simple problems on interest on bonds and debentures. |
| (o) Variation | Direct, inverse, partial and joint variations. | Expression of various types of variation in mathematical symbols e.g. direct ($z \propto n$), inverse ($z \propto \frac{1}{n}$), etc. Application to simple practical problems. |

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| <p>B. ALGEBRAIC PROCESSES</p> <p>(a) Algebraic expressions</p> | <p>(i) Formulating algebraic expressions from given situations</p> <p>(ii) Evaluation of algebraic expressions</p> | <p>e.g. find an expression for the cost C Naira of 4 pens at x Naira each and 3 oranges at y naira each. Solution: $C = 4x + 3y$</p> <p>e.g. If $x = 60$ and $y = 20$, find C. $C = 4(60) + 3(20) = 300$ naira.</p> |
| <p>(b) Simple operations on algebraic expressions</p> | <p>(i) Expansion</p> <p>(ii) Factorization</p> | <p>e.g. $(a + b)(c + d)$, $(a + 3)(c - 4)$, etc.</p> <p>factorization of expressions of the form $ax + ay$, $a(b + c) + d(b + c)$, $a^2 - b^2$, $ax^2 + bx + c$ where a, b, c are integers.</p> |

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| | <p>♦•♣♠ (iii) Binary Operations</p> | <p>Application of difference of two squares e.g. $49^2 - 47^2 = (49 + 47)(49 - 47) = 96 \times 2 = 192$.</p> <p>Carry out binary operations on real numbers such as: $a*b = 2a + b - ab$, etc.</p> |
| (c) Solution of Linear Equations | (i) Linear equations in one variable | Solving/finding the truth set (solution set) for linear equations in one variable. |
| | (ii) Simultaneous linear equations in two variables. | Solving/finding the truth set of simultaneous equations in two variables by elimination, substitution and graphical methods. Word problems involving one or two variables |

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| (d) Change of Subject of a Formula/Relation | (i) Change of subject of a formula/relation (ii) Substitution. | e.g. if $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$, find v . Finding the value of a variable e.g. evaluating v given the values of u and f . |
| (e) Quadratic Equations | (i) Solution of quadratic equations (ii) Forming quadratic equation with given roots. (iii) Application of solution of quadratic equation in practical problems. | Using factorization i.e. $ab = 0 \Rightarrow$ either $a = 0$ or $b = 0$. •*♣♠By completing the square and use of formula Simple rational roots only e.g. forming a quadratic equation whose roots are -3 and $\frac{5}{2} \Rightarrow (x + 3)(x - \frac{5}{2}) = 0$. |

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| <p>(f) Graphs of Linear and Quadratic functions.</p> | <p>(i) Interpretation of graphs, coordinate of points, table of values, drawing quadratic graphs and obtaining roots from graphs.</p> <p>(ii) Graphical solution of a pair of equations of the form: $y = ax^2 + bx + c$ and $y = mx + k$</p> <p>*♣♠(iii) Drawing tangents to curves to determine the gradient at a given point.</p> | <p>Finding:</p> <p>(i) the coordinates of maximum and minimum points on the graph.</p> <p>(ii) intercepts on the axes, identifying axis of symmetry, recognizing sketched graphs.</p> <p>Use of quadratic graphs to solve related equations e.g. graph of $y = x^2 + 5x + 6$ to solve $x^2 + 5x + 4 = 0$. Determining the gradient by drawing relevant triangle.</p> |
| <p>(g) Linear Inequalities</p> | <p>(i) Solution of linear inequalities in one variable and representation on the number line.</p> | <p>Truth set is also required. Simple practical problems</p> |

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| | <p>*(ii) Graphical solution of linear inequalities in two variables.</p> <p>*(iii) Graphical solution of simultaneous linear inequalities in two variables.</p> | <p>Maximum and minimum values. Application to real life situations e.g. minimum cost, maximum profit, linear programming, etc.</p> |
| (h) Algebraic Fractions | <p>Operations on algebraic fractions with:</p> <p>(i) Monomial denominators</p> <p>(ii) Binomial denominators</p> | <p>Simple cases only e.g. $\frac{1}{x} + \frac{1}{y}$ $= \frac{x+y}{xy}$ ($x \neq 0, y \neq 0$).</p> <p>Simple cases only e.g. $\frac{1}{x-a} + \frac{1}{x-b} = \frac{2x-a-b}{(x-a)(x-b)}$ where a and b are constants and $x \neq a$ or b. Values for which a fraction is undefined e.g. $\frac{1}{x+3}$ is not defined for $x = -3$.</p> |

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| ♦•♣♠(i) Functions and Relations | Types of Functions | One-to-one, one-to-many, many-to-one, many-to-many. Functions as a mapping, determination of the rule of a given mapping/function. |
| C. MENSURATION (a) Lengths and Perimeters | (i) Use of Pythagoras theorem, *♣♠sine and cosine rules to determine lengths and distances. (ii) Lengths of arcs of circles, perimeters of sectors and segments. ♦*♣♠(iii) Longitudes and Latitudes. | No formal proofs of the theorem and rules are required. Distances along latitudes and Longitudes and their corresponding angles. |
| (b) Areas | (i) Triangles and special quadrilaterals – rectangles, parallelograms and trapeziums | Areas of similar figures. Include area of triangle = $\frac{1}{2}$ base x height and $\frac{1}{2}ab\sin C$. Areas of compound shapes. |

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| | <p>(ii) Circles, sectors and segments of circles.</p> <p>(iii) Surface areas of cubes, cuboids, cylinder, pyramids, righttriangular prisms, cones andspheres.</p> | Relationship between the sector of a circle and the surface area of a cone. |
| (c) Volumes | <p>(i) Volumes of cubes, cuboids, cylinders, cones, right pyramids and spheres.</p> <p>(ii) Volumes of similar solids</p> | Include volumes of compound shapes. |
| D. PLANE GEOMETRY | | |
| (a) Angles | <p>(i) Angles at a point add up to 360°.</p> <p>(ii) Adjacent angles on a straight line are supplementary.</p> <p>(iii) Vertically opposite angles are equal.</p> | <p>The degree as a unit of measure.</p> <p>Consider acute, obtuse, reflex angles, etc.</p> |

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| <p>(b) Angles and intercepts on parallel lines.</p> | <p>(i) Alternate angles are equal. (ii) Corresponding angles are equal. (iii) Interior opposite angles are supplementary *♣♠(iv) Intercept theorem.</p> | <p>Application to proportional division of a line segment.</p> |
| <p>(c) Triangles and Polygons.</p> | <p>(i) <u>The sum of the angles of a triangle is 2 right angles.</u> (ii) <u>The exterior angle of a triangle equals the sum of the two interior opposite angles.</u> (iii) Congruent triangles. (iv) Properties of special triangles - Isosceles, equilateral, right-angled, etc (v) Properties of special</p> | <p>*The formal proofs of those underlined may be required.</p> <p>Conditions to be known but proofs not required e.g. SSS, SAS, etc.</p> <p>Use symmetry where applicable.</p> |

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| | <p>quadrilaterals – parallelogram, rhombus, square, rectangle, trapezium.</p> <p>(vi) Properties of similar triangles.</p> <p>(vii) The sum of the angles of a polygon</p> <p>(viii) Property of exterior angles of a polygon.</p> <p>(ix) Parallelograms on the same base and between the same parallels are equal in area.</p> | <p>Equiangular properties and ratio of sides and areas.</p> <p>Sum of interior angles = $(n - 2)180^\circ$ or $(2n - 4)$ right angles, where n is the number of sides</p> |
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| (d) Circles | <p>(i) Chords.</p> <p>(ii) <u>The angle which an arc of a circle subtends at the centre of the circle is twice that which it subtends at any point on the remaining part of the circumference.</u></p> <p>(iii) Any angle subtended at the circumference by a diameter is a right angle.</p> <p>(iv) Angles in the same segment are equal.</p> <p>(v) <u>Angles in opposite segments are supplementary.</u></p> <p>(vi)Perpendicularity of tangent and radius.</p> <p>(vii)<u>If a tangent is drawn to a circle and from the point of contact a chord is drawn, each angle which this chord makes with the tangent is</u></p> | <p>Angles subtended by chords in a circle and at the centre. Perpendicular bisectors of chords.</p> <p>*the formal proofs of those underlined may be required.</p> |
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| | <u>equal to the angle in the alternate segment.</u> | |
| ♦*♣♠(e) Construction | <p>(i) Bisectors of angles and line segments</p> <p>(ii) Line parallel or perpendicular to a given line.</p> <p>(iii)Angles e.g. 90°, 60°, 45°, 30°, and an angle equal to a given angle.</p> <p>(iv) Triangles and quadrilaterals from sufficient data.</p> | Include combination of these angles e.g. 75° , 105° , 135° , etc. |
| ♦*♣♠(f) Loci | <p>Knowledge of the loci listed below and their intersections in 2 dimensions.</p> <p>(i) Points at a given distance from a given point.</p> <p>(ii) Points equidistant from two given points.</p> <p>(iii)Points equidistant from two given straight lines.</p> <p>(iv)Points at a given distance from a given straight line.</p> | Consider parallel and intersecting lines. Application to real life situations. |

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| E. COORDINATE GEOMETRY OF STRAIGHT LINES | <p>(i) Concept of the x-y plane.</p> <p>(ii) Coordinates of points on the x-y plane.</p> | <p>Midpoint of two points, distance between two points i.e. $PQ = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$, where $P(x_1, y_1)$ and $Q(x_2, y_2)$, gradient (slope) of a line $m = \frac{y_2 - y_1}{x_2 - x_1}$, equation of a line in the form $y = mx + c$ and $y - y_1 = m(x - x_1)$, where m is the gradient (slope) and c is a constant.</p> |
| F. TRIGONOMETRY | <p>(a) Sine, Cosine and Tangent of an angle.</p> <p>(i) Sine, Cosine and Tangent of acute angles.</p> <p>(ii) Use of tables of trigonometric ratios.</p> <p>(iii) Trigonometric ratios of 30°,</p> | <p>Use of right angled triangles</p> <p>Without the use of tables.</p> |

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| | <p>45° and 60°.</p> <p>(iv) Sine, cosine and tangent of angles from 0° to 360°.</p> <p>(v)Graphs of sine and cosine.</p> <p>(vi)Graphs of trigonometric ratios.</p> | <p>Relate to the unit circle. $0^\circ \leq x \leq 360^\circ$.</p> <p>e.g. $y = a \sin x$, $y = b \cos x$</p> <p>Graphs of simultaneous linear and trigonometric equations. e.g. $y = a \sin x + b \cos x$, etc.</p> |
| (b) Angles of elevation and depression | <p>(i) Calculating angles of elevation and depression.</p> <p>(ii) Application to heights and distances.</p> | Simple problems only. |
| ♦*♣♠ (c) Bearings | <p>(i) Bearing of one point from another.</p> <p>(ii) Calculation of distances and angles</p> | <p>Notation e.g. 035°, $N35^\circ E$</p> <p>Simple problems only. Use of diagram is required.*♣♠ Sine and cosine rules may be used.</p> |

***G. INTRODUCTORY
CALCULUS**

(i) Differentiation of algebraic functions.

Concept/meaning of differentiation/derived function, $\frac{dy}{dx}$, relationship between gradient of a curve at a point and the differential coefficient of the equation of the curve at that point. Standard derivatives of some basic function e.g. if $y = x^2$, $\frac{dy}{dx} = 2x$. If $s = 2t^3 + 4$, $\frac{ds}{dt} = v = 6t^2$, where s = distance, t = time and v = velocity. Application to real life situation such as maximum and minimum values, rates of change etc.

(ii) Integration of simple Algebraic functions.

Meaning/ concept of integration, evaluation of simple definite algebraic equations.

H. STATISTICS AND PROBABILITY.

(A) Statistics

(i) Frequency distribution

Construction of frequency distribution tables, concept of class intervals, class mark and class boundary.

(ii) Pie charts, bar charts, histograms and frequency polygons

Reading and drawing simple inferences from graphs, interpretation of data in histograms.

(iii) Mean, median and mode for both discrete and grouped data.

Exclude unequal class interval.

Use of an assumed mean is acceptable but not required. For grouped data, the mode should be estimated from the histogram while the median, quartiles and percentiles are estimated from the cumulative frequency curve.

| | | |
|-------------------|--|--|
| | <p>(iv) Cumulative frequency curve (Ogive).</p> <p>(v) Measures of Dispersion: range, semi inter-quartile/inter-quartile range, variance, mean deviation and standard deviation.</p> | <p>Application of the cumulative frequency curve to every day life.</p> <p>Definition of range, variance, standard deviation, inter-quartile range. Note that mean deviation is the mean of the absolute deviations from the mean and variance is the square of the standard deviation. Problems on range, variance, standard deviation etc.</p> <p>*♣♠ Standard deviation of grouped data</p> |
| (b) Probability | <p>(i) Experimental and theoretical probability.</p> <p>(ii) Addition of probabilities for mutually exclusive and independent events.</p> | <p>Include equally likely events e.g. probability of throwing a six with a fair die or a head when tossing a fair coin.</p> <p>With replacement. *♣♠ without replacement.</p> |

| | | |
|---|--|---|
| | (iii) Multiplication of probabilities for independent events. | Simple practical problems only. Interpretation of "and" and "or" in probability. |
| ♦♣♠I. VECTORS AND TRANSFORMATION (a) Vectors in a Plane | Vectors as a directed line segment. Cartesian components of a vector Magnitude of a vector, equal vectors, addition and subtraction of vectors, zero vector, parallel vectors, multiplication of a vector by scalar. | (5, 060°) e.g. $\begin{pmatrix} 5 \sin 60^\circ \\ 5 \cos 60^\circ \end{pmatrix}$. Knowledge of graphical representation is necessary. |

| | | |
|---|--|--|
| (b) Transformation in the Cartesian Plane | Reflection of points and shapes in the Cartesian Plane. | Restrict Plane to the x and y axes and in the lines $x = k$, $y = x$ and $y = kx$, where k is an integer. Determination of mirror lines (symmetry). |
| | Rotation of points and shapes in the Cartesian Plane. | Rotation about the origin and a point other than the origin. Determination of the angle of rotation (restrict angles of rotation to -180° to 180°). |
| | Translation of points and shapes in the Cartesian Plane. | Translation using a translation vector. |
| | Enlargement | Draw the images of plane figures under enlargement with a given centre for a given scale factor. Use given scales to enlarge or reduce plane figures. |

3. UNITS

Candidates should be familiar with the following units and their symbols.

(1) Length

1000 millimetres (mm) = 100 centimetres (cm) = 1 metre(m).

1000 metres = 1 kilometre (km)

(2) Area

10,000 square metres (m²) = 1 hectare (ha)

(3) Capacity

1000 cubic centimeters (cm³) = 1 litre (l)

(4) Mass

1000milligrammes (mg) = 1 gramme (g)

1000 grammes (g) = 1 kilogramme(kg)

1000 ogrammes (kg) = 1 tonne.

(5) Currencies

| | | |
|--------------|---|--|
| The Gambia | - | 100 bututs (b) = 1 Dalasi (D) |
| Ghana | - | 100 Ghana pesewas (Gp) = 1 Ghana Cedi (GH¢) |
| Liberia | - | 100 cents (c) = 1 Liberian Dollar (LD) |
| Nigeria | - | 100 kobo (k) = 1 Naira (N) |
| Sierra Leone | - | 100 cents (c) = 1 Leone (Le) |
| UK | - | 100 pence (p) = 1 pound (£) |
| USA | - | 100 cents (c) = 1 Dollar (\$) |

French Speaking territories: 100 centimes (c) = 1 Franc (fr)

Any other units used will be defined.



4. OTHER IMPORTANT INFORMATION

(1) **Use of Mathematical and Statistical Tables**

Mathematics and Statistical tables, published or approved by WAEC may be used in the examination room. Where the degree of accuracy is not specified in a question, the degree of accuracy expected will be that obtainable from the mathematical tables.

(2) **Use of calculators**

The use of non-programmable, silent and cordless calculators is allowed. The calculators must, however not have the capability to print out **nor to receive or send any information. Phones with or without calculators are not allowed.**

(3) **Other Materials Required for the examination**

Candidates should bring rulers, pairs of compasses, protractors, set squares etc required for papers of the subject. They will not be allowed to borrow such instruments and any other material from other candidates in the examination hall. Graph papers ruled in 2mm squares will be provided for any paper in which it is required.

(4) **Disclaimer**

In spite of the provisions made in paragraphs 4 (1) and (2) above, it should be noted that some questions may prohibit the use of tables and/or calculators.

Reference

WAEC Syllabus - Uploaded online by
www.myschoolgist.com.ng





Office of the Education
Quality Assurance, Lagos State
Alausa, Ikeja