NORTHERN IRELAND

JUNIOR CERTIFICATE EXAMINATIONS

RULES AND PROGRAMME

1967 AND 1968

GB
Z-68
(1,66)

CONTENTS

EXAMINATION ARRANGEMENTS

1. (1) The Ministry of Education will each year conduct examinations leading to the award of the Northern Ireland Junior Certificate at centres in Northern Ireland in accordance with these Rules.

   (2) As far as is practicable, candidates will be examined at the centres selected by them, or on their behalf, at entry.

2. (1) Candidates should normally have attained the age of 14 years on 1st July, in the year of the examination.

   (2) Applications may be accepted from candidates who will not have attained the age of 14 years on 1st July, in the year of examination, where:

   (a) the candidate is in regular attendance at a school approved for this purpose by the Ministry of Education; and

   (b) the Principal of the school certifies:

   (i) that it is educationally desirable that the candidate should enter in the subject(s)proposed; and

   (ii) that the candidate has pursued a course of study with such a degree of competence as to make it very probable that he will pass in the subject(s) offered.

   (3) Evidence of age may be required.

SUBJECTS

3. (1) Examinations will be held in the following subjects:

English	~~Alternative~~ Mathematics B
Greek	Science
Latin	Domestic Science
French	Mechanical Drawing
German	Art
Irish	Music
Spanish	Woodwork
History	Metalwork
Geography	
Mathematics A	

   (2) (a) The examinations in French, German, Irish and Spanish will include an oral test.

   (b) The examination in Music will include a practical test.

   (c) The examinations in Woodwork and Metalwork will include a practical test.

4. (1) (a) Within the limitations imposed by the examination time-table any number or combination of subjects may be offered.

   (b) Only in exceptional circumstances can special arrangements be made for individual candidates.

5. (1) Performances will be classified into four numerical grades in descending order of merit. Pass grades will be numbered 1 to 3.

   (2) Candidates will be penalised for slovenly English or disorderly presentation of material.

CERTIFICATES

6.   (1)   The Junior Certificate will record the name of the candidate and subject(s) in which the candidate has passed.

      (2)   A Certificate destroyed or otherwise lost will be replaced only in exceptional circumstances.

ENTRIES

7.   (1)   Entries of candidates must be made by the principal or other competent authority of the school or, in the case of private candidates ,by the candidate himself, on the prescribed forms obtainable from the Ministry of Education, Dundonald House, Upper Newtownards Road, Belfast, 4.

      (2)   Completed entry forms, accompanied by the prescribed fee(s) payable, must reach the Ministry of Education not later than 31st January, in the year of the examination.

      (3)   Where special arrangements are made for any candidate an additional fee may be charged.

8.   (1)   If a late application is accepted, a late fee may be charged in addition to the ordinary fee.

      (2)   Any application received after 1st March in any year will be accepted only if good reason is given for the late application and if the entry can be accepted without an unreasonable disturbance of examination arrangements already made.

9.   (1)   A refund of the fee(s) paid may be made in respect of candidates who withdraw not later than 31st March in any year.

      (2)   Any application for a refund which reaches the Ministry of Education after 31st March in any year will be considered only if accompanied by a medical certificate testifying to the incapacity of the candidate to take the examination.

      (3)   Applications for refunds in respect of candidates enrolled in a school must be made by the principal or other competent authority of the school.

      (4)   Applications for refunds which reach the Ministry of Education after 30th June in any year will not be accepted.

      (5)   If an application for admission to an examination is refused, the fee tendered will be returned.

      (6)   Additional fees, including late fees,will not be returnable.

CONDUCT

10.   A candidate who is adjudged to have failed to observe any examination instruction or any instruction given to him by an examination superintendent, or in any way to have acted unfairly or improperly during an examination, may be excluded from subsequent examinations and may be deprived of credit in all the subjects taken or in such subjects as may be considered appropriate.

ISSUE OF RESULTS

11.   (1)   The examination results will be issued in August each year to schools which have entered candidates.

      (2)   The examination results of privately entered candidates will be notified to the candidates direct from the Ministry of Education.

(3)   Results will be issued only in the form indicated in Rule 5.

(4)   Any candidate will, upon payment of an additional fee, be supplied
       with a certified statement of his results as issued under (1) or
       (2) on previous page.

SYLLABUSES

ENGLISH 1967

(Two papers each of 2 hours)

PAPER I

Candidates will be required to write a composition and to show their understanding of a prose passage of suitable difficulty.

Marks will be allocated as follows:

	% of Marks
Composition	25
Comprehension	25

PAPER II

This paper will consist of questions on prescribed texts.

The prescribed texts will be:

Poetry: Poems of Spirit and Action /Edward Arnold (Publishers) Ltd./, pages 42 to 64, 76 to 95 and 106 to 179.

Drama: Shakespeare: Julius Caesar[*]

Prose: THREE of the following:

Sutcliff: Simon (Oxford Children's Library)
Williamson: Tarka the Otter
Buchan: The Thirty-nine Steps[*]
Wells: The Invisible Man[*]
Durrell: The Overloaded Ark (Allen and Unwin - school edition)[*]
Blackwood: Push and Pull (Murray)[*]
Dickens: David Copperfield's Boyhood (Nelson's Teaching of
              English Series)[*]
Brontë: Jane Eyre
Haggard: King Solomon's Mines[*]

[*]These books will not be prescribed for the examination to be held in 1968.

Marks will be allocated as follows:

	% of Marks
Poetry	10
Drama	10
Prose	30

ENGLISH 1968

(Two papers each of 2 hours)

PAPER I

Candidates will be required to write a composition and to show their understanding of a prose passage of suitable difficulty.

Marks will be allocated as follows:

	% of Marks
Composition	25
Comprehension	25

PAPER II

This paper will consist of questions on prescribed texts.

The prescribed texts will be:

Poetry: Poems of Spirit and Action /Edward Arnold (Publishers) Ltd./, pages 42-64, 76 to 95, and 106 to 179.

Drama: Shakespeare: A Midsummer Night's Dream OR Henry V

Prose: THREE of the following:

Brontë: Jane Eyre
Meade Falkner: Moonfleet
Schaefer: Shane
Sutcliff: Simon (Oxford Children's Library)
White: The Master (available from Penguin Books Ltd.)
Williamson: Tarka the Otter.

Marks will be allocated as follows:

	% of Marks
Poetry	10
Drama	10
Prose	30

GREEK 1967

(One paper of 2½ hours)

The paper will consist of:-   <u>% of Marks</u>

1.   TRANSLATION INTO ENGLISH   60

    (a) Sentences.

    (b) Passages of continuous prose. These will be graded in
        difficulty, the last being no more difficult than a
        straightforward passage of Xenophon.

        Equal totals will be allotted to (a) and each passage in
        (b). (a) and each passage in (b) will carry equal marks.

2.   TRANSLATION INTO GREEK   25

    A number of sentences graded in difficulty, to test the
candidates' knowledge of: elementary case usage; direct statement,
question and command; participial constructions; indirect statement,
question and command; purpose and result clauses; relative and
temporal clauses, excluding the indefinite construction.

    The vocabulary needed for these sentences will be based in
part on the words used in the passages set for translation into
English.

3.   GREEK HISTORY AND BACKGROUND   15

    An elementary knowledge will be required. The topics on
which questions will be asked are those treated in chapters 1 to
16 of Limebeer, <u>The Greeks</u> (C.U.P.). Candidates will be given a
choice of questions.

GREEK 1968

(One paper of 2½ hours)

    The syllabus will be the same as for 1967 except that the
topics on which questions will be asked on GREEK HISTORY AND BACK-
GROUND (section 3) will be those treated in Robinson, <u>Everyday Life
in Ancient Greece</u>. (Clarendon Press).

(One paper of 2½ hours)   % of Marks

1.   TRANSLATION INTO ENGLISH   60

(a)   Sentences.

(b)   Passages of continuous prose. These will be graded
       in difficulty, the last being no more difficult than
       a straightforward passage of Caesar.

Equal totals will be allotted to (a) and each passage in (b).

2.   TRANSLATION INTO LATIN   25

A number of sentences graded in difficulty, to test the
candidates' knowledge of: elementary case usage; direct
statement, question and command; simple relative, causal and
temporal clauses; indirect statement and command; purpose
and result clauses; use of the participles.

The vocabulary needed for these sentences will be based
in part on the words used in the passages set for translation
into English.

3.   ROMAN HISTORY AND BACKGROUND   15

An elementary knowledge will be required. The topics on
which questions will be asked are those treated in chapters
1 to 14 and 17 of Limebeer, The Romans (C.U.P.). Candidates
will be given a choice of questions.

MODERN LANGUAGES 1967 AND 1968

French, German, Irish, Spanish

(One paper of two hours and an oral test in each language)

(NOTE: (i) The examination paper in German will be printed wholly in "Roman" type and not in "German Gothic" type.

(ii) In the examination paper in Irish all Irish script will appear both in Gaelic script and in Roman script and in standardized spelling only.)

I   WRITTEN SECTION

1. Translation into English: two passages of combined length 180-200 words, the first easier than the second.

2. Free Composition: a composition of approximately 100 words, based on a picture or connected series of pictures.

3. General Questions: fifteen general questions in the language, ten of which are to be answered in the language.

Marks will be allocated as follows:-

	% of Marks
Translation	20
Free Composition	20
General Questions	20

II ORAL SECTION

1. Dictation: a passage of 80-100 words.

2. Reading Test: an extract of 50-60 words.

3. Aural Test: a passage of 250-280 words on which five questions will be set in English to be answered in English.

Marks will allocated as follows:-

	% of Marks
Dictation	10
Reading Test	15
Aural Test	15

HISTORY 1967

(one paper of 2½ hours)

ASPECTS OF BRITISH AND IRISH HISTORY <u>EITHER</u> FROM 1485 TO 1815 <u>OR</u> FROM 1660 TO RECENT TIMES (with occasional references to significant events abroad).

It will be assumed that candidates have previously been taught the outlines of British history from early times to the beginning of the period chosen.

Candidates will be required to answer questions from <u>either</u> Sections A and B <u>or</u> Sections B and C of the syllabus given below.

Each Section of the examination paper will contain -

		% of Marks
1.	Miscellaneous questions requiring only very brief answers.	20
2.	Questions requiring the fuller treatment of a single theme or of two or more related themes.	30

The questions on the examination paper will be selected from the following general topics and will be based on the items to which special reference is made. There will be a wide choice of questions and it will be possible to answer the paper from a knowledge of five out of the seven general topics in each of the chosen sections.

Certain questions will require a knowledge of historical geography to be shown.

SECTION A.   1485 - 1660.

The Great Voyages of Exploration.

Diaz: Columbus: Vasco da Gama: the Cabots: Magellan.

Changes in Religion 1485 - 1553.

Martin Luther: Wolsey: Henry VIII: Sir Thomas More: Thomas Cromwell: Thomas Cranmer.

Changes in Religion 1553 - 1660.

Mary Tudor: Elizabeth I: John Knox: Edmund Campion: Mary, Queen of Scots.

English Maritime and Colonial Activity 1553 - 1660.

The famous seamen: Tudor warships: the Armada: the early colonisation of America: the East India Company.

The Stuarts and their Opponents 1603 - 1660.

The Hampton Court Conference: the Gunpowder Plot: John Hampden: Archbishop Laud: the Scottish National Covenant: the Long Parliament: the Civil Wars: Oliver Cromwell (excluding details of constitutional experiments:)

Ireland 1485 - 1660.

Poynings' Law: the Fitzgeralds: Hugh O'Neill: the Plantation of Ulster: the rebellion of 1641: Cromwell.

Social Life in England 1485 - 1660.

William Caxton: sheep farming, the wool trade and the cloth manufacture: the Elizabethan Poor Law: Shakespeare and the theatre.

SECTION B. 1660 - 1815.

The Stuarts and their Opponents 1660 - 1746.

   The Clarendon Code, the Test Act and the Declarations of Indulgence:
   The Revolution of 1688-9: the Toleration Act: the Union of England and
   Scotland: the Hanoverian succession: the 1745 Rebellion.

Wars with France and Changes in the Empire 1660 - 1763.

   The Colonisation of America after 1660: Marlborough, Blenheim and the
   Treaty of Utrecht: India and America 1748 - 63.

Wars with France and Changes in the Empire 1763 - 1815.

   The American War of Independence: the voyages of Captain Cook and the
   early settlement of Australia: Nelson, Wellington and Napoleon.

Changes in Agriculture.

   New Agricultural methods: enclosures.

Changes in Industry and Transport.

   Iron production: coal mining: inventions in the textile industry: the
   steam engine: roads and canals.

Ireland

   James II and William III: the Penal Laws: the growth of Belfast and of
   the Linen industry: Georgian Dublin: the Act of Union.

Social Life 1660 - 1815.

   The Great Plague and the Great Fire: Samuel Pepys: Sir Christopher
   Wren: Sir Isaac Newton: Robert Boyle: Edward Jenner: John and
   Charles Wesley: William Wilberforce.

SECTION C. 1815 TO RECENT TIMES.

Some Reform Movements.

   The abolition of religious tests: parliamentary reform 1832 - 1928:
   changes in education in the 19th and 20th centuries.

Some Statesmen.

   Shaftesbury: Peel: Gladstone: Disraeli: Lloyd George.

Overseas Development and Exploration.

   The expansion of Canada: the development of Australia: Livingstone:
   Cecil Rhodes: Polar exploration: the ascent of Everest.

New Materials, New Sources of Power and New Methods of Communication: Some
Inventors.

   Steamships (e.g. I.K. Brunel): railways (e.g. Stephenson): electricity
   (e.g. Faraday): the telegraph (e.g. Morse): steel production
   (e.g. Bessemer): the internal combustion engine and the motor car
   (e.g. Daimler): wireless (e.g. Marconi): aviation (e.g. the Wright
   Brothers).

Improvements in Medicine.

   Anaesthetics (e.g. Simpson): investigation of bacteria (Pasteur):
   antiseptic surgery (Lister): nursing (Florence Nightingale): use of
   radium (Marie Curie): malaria control (Ross): penicillin (Fleming).

Ireland 1815 - 1922.

    Daniel O'Connell: the Famine: Gladstone: the Home Rule movement: land
purchase: the setting up of two separate governments 1921 - 22.

The Two World Wars.

    How the leading Powers became involved in the 1st world war: the Treaty
of Versailles: the Russian Revolution: how the leading Powers became
involved in the 2nd world war.

HISTORY 1968

(one paper of $2\frac{1}{2}$ hours)

ASPECTS OF BRITISH AND IRISH HISTORY <u>EITHER</u> FROM 1485 TO 1815 <u>OR</u> FROM 1660 TO RECENT TIMES (with occasional references to significant events abroad).

It will be assumed that candidates have previously been taught the outlines of British history from early times to the beginning of the period chosen.

Candidates will be required to answer questions from <u>either</u> Sections A and B <u>or</u> Sections B and C of the syllabus given below.

Each Section of the examination paper will contain -

<u>% of Marks</u>

1. Miscellaneous questions requiring only very brief answers.   20

2. Questions requiring the fuller treatment of a single theme
   or of two or more related themes.   30

The questions on the examination paper will be selected from the following general topics and will be based on the items to which special reference is made. There will be a wide choice of questions and it will be possible to answer the paper from a knowledge of five out of the seven general topics in each of the chosen sections.

Certain questions will require a knowledge of historical geography to be shown.

SECTION A.   1485 - 1660.

The Great Voyages of Exploration.

   Diaz: Columbus: Vasco da Gama: the Cabots: Magellan.

Changes in Religion 1485 - 1553.

   Martin Luther: Wolsey: Henry VIII: Sir Thomas More: Thomas Cromwell:
   Thomas Cranmer.

Changes in Religion 1553 - 1660.

   Mary Tudor: Elizabeth I: John Knox: Edmund Campion: Mary, Queen of Scots.

English Maritime and Colonial Activity 1553 - 1660.

   The famous seamen: Tudor warships: the Armada: the early colonisation
   of America: the East India Company.

The Stuarts and their Opponents 1603 - 1660.

   The Hampton Court Conference: the Gunpowder Plot: John Hampden:
   Archbishop Laud: the Scottish National Covenant: the Long Parliament:
   the Civil Wars: Oliver Cromwell (excluding details of constitutional
   experiments).

Ireland 1485 - 1660.

   Poynings' Law: the Fitzgeralds: Hugh O'Neill: the Plantation of Ulster:
   the rebellion of 1641: Cromwell.

Social Life in England 1485 - 1660.

   William Caxton: sheep farming, the wool trade and the cloth manufacture:
   the Elizabethan Poor Law: Shakespeare and the theatre.

SECTION B.   1660 - 1815.

The Stuarts and their Opponents 1660 - 1746.

The Clarendon Code, the Test Act and the Declarations of Indulgence: the
Revolution of 1688-9:   the Toleration Act: the Union of England and
Scotland: the Hanoverian succession: the 1745 rebellion.

Wars with France and Changes in the Empire 1660 - 1763.

The colonisation of America after 1660:   Marlborough, Blenheim and the
Treaty of Utrecht: India and America 1748 - 63.

Wars with France and Changes in the Empire 1763 - 1815.

The American War of Independence: the voyages of Captain Cook and the
early settlement of Australia: Nelson, Wellington and Napoleon.

Changes in Agriculture.

New agricultural methods: enclosures.

Changes in Industry and Transport.

Iron production: coal mining: inventions in the textile industry: the
steam engine: roads and canals.

Ireland

James II and William III: the Penal Laws: the growth of Belfast and of
the linen industry: Georgian Dublin: the Act of Union.

Social Life 1660 - 1815.

The Great Plague and the Great Fire: Samuel Pepys: Sir Christopher Wren:
Sir Isaac Newton: Robert Boyle: Edward Jenner: John and Charles Wesley:
William Wilberforce.

SECTION C.   1815 TO RECENT TIMES.

Some Reformers.

Elizabeth Fry: Francis Place: Robert Owen: Sir Robert Peel: Shaftesbury:
Rowland Hill.

Some Reforms.

The abolition of religious tests: parliamentary reform 1832-1928:   changes
in education in the 19th and 20th centuries.

Exploration and Overseas Development.

The expansion of Canada: the development of Australia: Mungo Park,
Livingstone, Cecil Rhodes, the Boer War 1899-1902:   Polar exploration:
the ascent of Everest.

New Materials, New Sources of Power and New Methods of Communication: Some
Inventors.

Steamships (e.g. I.K. Brunel):   railways (e.g., Stephenson):
electricity (e.g., Faraday):   the telegraph (e.g., Morse):   steel
production (e.g., Bessemer):   the internal combustion engine and the
motor car (e.g., Daimler):   wireless (e.g., Marconi):   aviation (e.g.,
the Wright Brothers).

Improvements in Medicine.

Anaesthetics (e.g., Simpson): investigation of bacteria (Pasteur):

antiseptic surgery (Lister): nursing (Florence Nightingale): use of radium (Marie Curie): Malaria control (Ross): penicillin (Fleming).

Ireland 1815-1922.

Daniel O'Connell: the Famine: Gladstone: the Home Rule movement: land purchase: the setting up of two separate governments 1921-22.

The Two World Wars.

The 1914-1918 war (the Western Front, Gallipoli, the war at sea): the Treaty of Versailles: the 1939-1945 war (Winston Churchill, the Battle of Britain, Field Marshal Montgomery): the atomic bomb.

GEOGRAPHY 1967 AND 1968

(one paper of 2½ hours)

The paper will consist of THREE Sections.

Candidates will be required to answer SIX questions; the two questions in Section A, which will be compulsory, two questions chosen from Section B and one from Section C. The sixth question may be chosen from either Section B or Section C. In Sections B and C a reasonable choice of questions will be given. All questions will carry equal marks.

(NOTE: In testing the candidates' knowledge, the examiner may also seek to assess their skill in the interpretation of maps, diagrams and pictures and their ability to express and illustrate their knowledge with the aid of simple sketch maps and diagrams.)

Section A. Map Work

A simple exercise will be set in the reading and elementary interpretation of an extract from a One-Inch Ordnance Survey Sheet. This exercise will test the candidates' ability to recognise symbols and obvious examples of land forms and to make use of direction, scale and grid references.

A question based on an outline map of the World will also be set to test the candidates' knowledge of the position and distribution of salient geographical features, major cities, trade routes and communications.

Section B. General Principles

(1) Physical:

The earth and its movements in so far as a knowledge of them is required to account for day and night, the seasons, local time zones, latitude and longitude.

The formation of rocks, simple structural forms and the action of rivers, sea, ice and wind in producing basic land forms. (N.B. A simple descriptive treatment only is required of basic land forms.)

The measurement of temperature, pressure and rainfall. The wind systems of the earth and their movement. The factors of climate. An elementary descriptive treatment of the major types of climate and of natural vegetation.

(2) Human:

A simple study, within the framework of the major natural regions, of peoples and societies: their life and settlements in relation to their environment, their work and chief agricultural products. (N.B. A descriptive treatment of significant examples will suffice.)

Section C. The British Isles

A survey of the general pattern of life, work and settlement in relation to position, relief, climate and natural resources. (N.B. Questions may be set which involve simple regional studies.)

MATHEMATICS A 1967

(One paper of $2\frac{1}{2}$ hours)

Tables of logarithms, square roots, reciprocals, trigonometrical functions etc., may be used when they give the required degree of accuracy.

The order of topics in the syllabuses is not intended to indicate an order of treatment.

The elementary principles and processes of arithmetic; fractions, decimals, approximations and significant figures; weights and measures; areas of rectangles, triangles, circles and figures compounded of these; volumes of right prisms with rectangular, triangular and circular cross section; metric system; ratio and proportion; averages; percentages; simple interest; compound interest and depreciation for short periods; profit and loss.

The use of logarithms to calculate products, quotients, integral powers and roots.

Generalization of simple arithmetical processes; algebraic notation and basic algebraic processes; interpretation, evaluation and transformation of formulae; equations of the first degree containing one or two variables and problems soluble by such equations; factors; solution of quadratic equations by factors, by completion of the square or by formula, with applications to easy problems.

Graphical representation of statistical data; graphs of $y = ax + b$, $y = ax^2 + bx + c$ and $xy = a$; interpretation of graphs; graphical solutions of problems and of algebraic equations.

MATHEMATICS B 1967

(One paper of $2\frac{1}{2}$ hours)

Candidates for Mathematics B will be expected to have a knowledge of the content of the syllabus in Mathematics A.

Tables of logarithms, square roots, reciprocals, trigonometrical functions etc., may be used when they give the required degree of accuracy.

The order of topics in the syllabuses is not intended to indicate an order of treatment.

Numerical, practical and deductive exercises may be set on the following:-

Measurement of lines and angles; use of ruler, compasses, set square and protractor.

Angles at a point; angles made with parallel lines by a transversal.

Sum of the angles of a triangle; angles of regular polygons.

Construction of triangles and quadrilaterals from given data.

Conditions for congruency of triangles; properties of isosceles and equilateral triangles.

Construction of bisectors of lines and angles, perpendiculars, angles equal to given angles and lines parallel to given lines.

Properties of the parallelogram derived from the definition of a parallelogram as a quadrilateral with both pairs of opposite sides parallel. Properties of rhombus, trapezium and kite.

Area. Calculation of the areas of rectangles, triangles, circles and of figures compounded from these.

Areas of triangles and parallelograms on the same or equal bases and between the same parallels.

Theorem of Pythagoras and converse.

Volume. Calculation of the volumes and surface areas of solids with uniform cross-section which may be a simple combination of rectangles, triangles and circles.
Scale drawing. Similar figures.
Equiangular triangles have their corresponding sides in proportion, and converse.

Definitions of the sine, cosine and tangent of an acute angle, and the elementary relations among them.

The sine, cosine and tangent of 30°, 45°, 60° in surd form. (these values need not be memorized.)

Solution of right-angled triangles and easy problems thereon.

Locus of a moving point which is -

(a) at a constant distance from a fixed point;
(b) equidistant from two fixed points;
(c) at a constant distance from a fixed line;
(d) equidistant from two fixed lines.

Proofs may be required of the following theorems and constructions marked ✻. Knowledge of the converses of the theorems is expected, but their proofs will not be asked for.

✻ Bisection of chord by perpendicular from centre.

✻ Equality of chords equidistant from the centre.

✻ Construction of the circle through three non-collinear points.

✻ Property of angle at centre and angle at circumference standing on same arc.

✻ Equality of angles in the same segment.

✻ Angle in a semi-circle is a right angle.

✻ Angle properties of cyclic quadrilaterals.

Tangent to a circle is perpendicular to the radius through the point of contact and converse.

✻ Construction of tangents from an external point.

✻ Equality of tangents from an external point.

✻ Equality of angle between tangent and chord and angle in alternate segment.

Collinearity of centres and point of contact of touching circles.

Concurrency of medians, internal bisectors of angles and perpendicular bisectors of sides of a triangle.

In deductive exercises candidates will be expected to give reasons for each step in the argument.

Mathematics 1968

Tables of logarithms, square roots, reciprocals and trigonometrical functions may be used when they give the required degree of accuracy.

Slide rules may be used where appropriate. Candidates should indicate by the letters (S.R.) that a slide rule has been used.

The order of topics in the syllabuses is not intended to indicate an order of treatment. Candidates for Mathematics B will be expected to have a knowledge of the context of the syllabus for Mathematics A.

NOTE: The syllabus for 1967 may be followed as an alternative to this syllabus for this year only.

Mathematics A
(one paper of $2\frac{1}{2}$ hours)

The elementary principles and processes of arithmetic; square and cube roots by factors; vulgar and decimal fractions, percentages; numbers in bases other than 10, place value; basic arithmetical processes using binary numbers; weights and measures in common use; metric system.

Application of percentage to discount, profit and loss, simple interest, compound interest and depreciation (involving not more than three single period calculations); foreign exchange, income tax, rates, hire purchase.

Generalization of simple arithmetical processes; algebraic notation and basic algebraic processes; interpretation, transformation and evaluation of formulae.

The language of sets: concept of a set; elements or members; subsets; null and universal sets; complement of a set; Venn diagrams. The following symbols will be used:- $n(A)$ for the number of elements in a set A, $\in \subset \emptyset \; \xi \; \cup \cap$ $\Rightarrow \Leftrightarrow \{x : \}$

Directed numbers; negative numbers; the number line.

Equations and inequations of the first degree in one variable, solution sets; problems soluble by such equations and inequations.

Rules for positive integral indices, meaning of a^n when n is negative, fractional or zero; $a \times 10^n$ notation where n is a positive or negative integer and $1 \leqslant a < 10$; significant figures.

The use of logarithms to calculate products, quotients, integral powers and roots; use and reliability of approximations; limits of accuracy; calculation of square roots by an iterative method.

The collection, classification, tabulation and the diagrammatic representation of statistical data; pictograms, bar graphs, pie charts, time charts.

Calculation of arithmetic mean.

Interpretation of statistical diagrams.

Numerical and practical exercises may be set on the following topics:-

Solids and their nets.

Properties of the rectangle, square, triangle, rhombus, kite, trapezium, parallelogram and regular polygons.

Angles at a point; angles made with parallel lines by a transveral; angle properties of triangles and polygons.

Construction of triangles, quadrilaterals and polygons from given data.

Area. Estimation of areas by counting squares or by the use of off-sets. Calculation of the areas of rectangles, triangles, circles and of figures compounded of these.

Theorem of Pythagoras and converse.

Volume. Calculation of the volumes and surface areas of solids with uniform cross-section, pyramids, cones and spheres (formulae for the pyramid cone and sphere need not be memorized).

Mathematics B

(One paper of $2\frac{1}{2}$ hours)

Candidates will not be required to reproduce formal proofs of geometrical theorems, but will be expected to show their ability to deduce solutions of geometrical problems in an orderly, logical and reasoned manner. Solutions using traditional methods or based on transformation geometry will be accepted.

Conditions for congruency and similarity of triangles; similar figures; areas and volumes of similar solids.

Co-ordinates: location of a point on a plane by rectangular cartesian co-ordinates; distance between two points and gradient of the straight line joining them; algebraic and graphical solution of linear simultaneous equations in two variables; graphical representation of linear inequations in two variables applied to simple problems in linear programming.

Loci treated geometrically. Examples of loci treated as sets of ordered pairs or as the intersection of sets.

Construction of bisectors of lines and angles, perpendiculars, angles equal to given angles and lines parallel to given lines.

The circle: chord and arc properties; angle properties; cyclic quadrilaterals; tangent at a point and tangents from a point; angle between tangent and chord; properties of chords intersecting inside and outside a circle; area of sectors and lengths of arcs as fractions of the area and circumference of a complete circle.

Definitions of the sine, cosine and tangent of an acute angle, and the elementary relations among them.

The sine, cosine and tangent of 30°, 45°, 60° in surd form. (These values need not be memorized).

Easy problems in two and three dimensions based on right-angled triangles.

The commutative, associative and distributive laws; product of binomials; factorisation of expressions of the form: $ac + bc$, $a^2 - b^2$, $a^2 \pm 2ab + b^2$, $ax^2 + bx + c$.

Solution of $ax^2 + bx + c = o$ by factors, completion of the square or by formula, with applications to easy problems.

Graphs of the form: $y = ax + b$, $y = ax^2 + bx + c$ and $xy = a$; graphical solutions of problems and of algebraic equations.

Introduction to the measures of probability; elementary calculations involving related and mutually exclusive events.

Science 1967

(One paper of $2\frac{1}{2}$ hours)

(Note: Candidates will be allowed an additional period of 15 minutes to read the paper before commencing to write their answers).

Either syllabus A (the existing Junior Certificate Examination syllabus) or syllabus B (the existing Junior Technical Certificate examination syllabus) may be followed. The examination paper will be arranged so that a candidate may obtain full marks by answering questions set on the syllabus followed.

The paper will consist of two parts.

Part I will consist of forty short questions of which the candidate will be expected to answer thirty in about $1\frac{1}{2}$ hours. These will be in four groups:-

	No. of Questions
Physics (General Physics: Heat: Electricity and Magnetism)	10
Chemistry (topics common to both syllabuses)	10
Biology	10
Additional Physics (Mechanics: Light)	10

Part II will consist of twelve longer questions of the traditional type arranged in the same groups as in Part I. Candidates will be expected to answer _four_ questions in about one hour, of which at least one question must be chosen from three separate groups.

Marks will be allocated as follows:-

Part I	-	60% of the total marks.
Part II	-	40% of the total marks.

Syllabus A

Section A - Physics

Mechanics

Elementary treatment of mass, weight, centre of gravity, equilibrium, force, work, energy, power, horse-power. Principle of moments and applications. Friction. Simple pendulum.

Determination of density of solids and liquids by direct measurement of mass and volume. Density of air.

Pressure. Thrust due to liquids and gases. U-tube as a pressure gauge.

Principle of Archimedes. Specific gravity. Flotation in air and in liquids. Common hydrometer.

Atmospheric pressure. Mercury and aneroid barometers. Pumps. Relation between pressure and volume of a gas. Boyle's law.

Heat

Heat as a form of energy. Sources and transmission of heat. Conduction, convection, radiation, domestic hot-water system. Thermal expansion of solids, liquids, gases; applications to everyday life. Temperature, thermometers, comparison of Fahrenheit and centigrade scales. Charles' law. Measurement of coefficient of linear expansion.

Melting, evaporation, boiling; melting and boiling points; latent heat. Measurement of quantity of heat; calorie, British Thermal Unit, therm. Heat capacity.

Magnetism and Electricity

Natural magnet; artificial magnets. Poles of magnet. Lines of force, treated simply. The compass.

Magnetic effect of current. Electromagnets. Simple experiments on electromagnetic induction.

Heating effect of current. Voltage, current, resistance, Ohm's law.

Chemical effect of current: electroplating. Simple cell, Leclanché cell, dry cell, secondary cell.

Distinction between alternating and direct currents. Types of lamp, wattage. Safety precautions necessary in the use of electrical appliances.

Section B - Chemistry

The Atmosphere: Oxygen

The air and its constituents; air in relation to burning, rusting and respiration; preparation and properties of oxygen.

Water and Hydrogen

Natural sources; water as a solvent; effect of temperature on solubility; saturated solutions; evaporation; filtration; distillation. Hard water, water softeners. Crystallisation and water of crystallisation.

Liberation of hydrogen from steam by magnesium and from water by alkali metals. Preparation of hydrogen from dilute acids; properties. Synthesis of water by burning hydrogen. Reduction of metallic oxides by hydrogen. Electrolysis of water.

Carbon

Forms of carbon; action of heat and acids on sodium carbonate, sodium bicarbonate and calcium carbonate, with practical applications; preparation and properties of carbon dioxide; action of carbon dioxide on caustic alkalis and limewater; carbon monoxide.

Destructive distillation of coal; combustion of coal-gas, the Bunsen burner; carbon dioxide produced by combustion of fuels and food.

Sulphur

Extraction, properties, forms and uses of sulphur. Sulphur dioxide, sulphur trioxide. Contact process for sulphuric acid.

Acids, Bases and Salts

Acidity. Preparation of nitric and hydrochloric acids. Properties of the three mineral acids. Potassium, sodium and calcium hydroxides. Neutralisation and salts. Preparation and properties of ammonia; importance of ammonium salts and of nitrates as fertilisers.

Metals

Preparation of copper and lead by reduction of the oxides; extraction of iron from its ores in the blast furnace.

The metals copper, zinc, magnesium, aluminium, lead and iron; their characteristic properties and everyday uses. Simple chemistry of the oxides, sulphates and chlorides of these metals.

Atomic Theory

The use of symbols, formulae and equations. Equivalents.

<p style="text-align: center;">Section C - Biology</p>

Animals and Plants in their Environment

Characteristics of living things as shown by observation of common animals and plants in an aquarium (or sea-shore pool or pond) and in a garden. Relationship between animals and plants; food chains; seasonal changes; dependence of all life on sun's energy; carbon compounds as food.

Human Biology

Simple study of a mammal: general structure and functions, including skeleton and movement; food canal and nutrition; heart and blood circulation; the lungs and respiration; nervous system and control.

Development and Growth

Life History of the frog and flowering plant.

Flowering Plant

Simple structure and functions of the flowering plant; structure and functions of a flower; pollination; fertilisation; fruits and seeds; seed dispersal; germination.

Applied Biology

Simple study of the nature of soil; the soil as a basis for farming or gardening operations; living organisms in soil; bacteria and fungi as agents of decay; fermentation. Carbon and nitrogen cycles.

<p style="text-align: center;">Syllabus B</p>

General Physics

The simple pendulum and an outline of its application to time measurement.

Density and specific gravity: determination for solids and liquids using direct reading balances.

Pressure: distinction between pressure and thrust; characteristics of fluid pressure; hydraulic pressure. Pressure gauges; mercury and water manometers. Siphon. Hydraulic press and jack. Lift and force pumps. Atmospheric pressure; mercury and aneroid barometers.

Archimedes' principle: upthrust in fluids; application to density determination. Flotation; hydrometers.

Mechanics

An elementary treatment of force, weight and mass. Types of forces. Measurement of forces by extension of a spring: the spring balance.

Friction: a simple treatment of sliding friction. Lubrication.

A study of levers leading to moments, the turning effect of forces. Simple lever illustration of the principle of moments. Examples of levers. Like and unlike parallel forces. Couples. Principle of moments applied to parallel forces and couples.

Centre of gravity as centre of symmetry: experimental determination for laminae; movement of C.G. with additional load; simple treatment of stability, with applications.

A simple experimental treatment of the equilibrium of a body acted on by three forces in a plane: triangle of forces and its applications, e.g., to jib crane. Resultant; parallelogram of forces. Resolution of a force.

<p style="text-align: center;">23</p>

Work as force x distance (ft. lb.)

The lever as a machine: mechanical advantage and velocity ratio. Work done by the machine equal to work done on the machine (in absence of friction). Machines with friction: experiments with pulleys. Efficiency: applications to various machines – bicycle, wheel and axle, inclined plane. Gears as a means of changing velocity ratio.

Power: rate of doing work; horse power.

Energy: a qualitative treatment of kinetic and potential energy: conservation of energy illustrated by consideration of practical energy transformations.

Heat

Heat as a form of energy. Sources and transmission of heat: conduction, convection and radiation.

Thermal expansion of solids, liquids and gases: applications. Coefficients of linear, superficial and cubical expansion. Determination of coefficient of linear expansion.

Distinction between heat and temperature. Thermometers: comparison between centigrade and Fahrenheit scales. Heat units. Specific heat and heat capacity. Determination of specific heats of solids and liquids.

Melting, evaporation, boiling: melting and boiling points; cooling by evaporation; refrigeration. Influence of pressure on boiling point and of pressure and dissolved substances on freezing point. Anomalous expansion of water.

Light

Straight-line propagation: shadows; eclipses.

A simple introduction to reflection and refraction, including –

(1)   reflection at a plane surface: formation of image in a plane mirror; periscope;

(2)   reflection at concave and convex mirrors; centre of curvature and principle focus;

(3)   refraction at air/glass and air/liquid surfaces; real and apparent depth. Converging and diverging properties of lenses.

Dispersion of white light by a prism: spectrum; additive and substrative colour effects.

Magnetism and Electricity

Properties of magnets; magnetisation; natural magnets; magnetic poles; lines of force shown using iron filings.

The compass: earth's magnetism.

Electric current as electron flow. Conductors and insulators.

Simple electrical circuits; resistance; practical units of current, potential difference and resistance; Ohm's law.

Magnetic effect of a current in a straight wire and in a coil.

Heating effect of a current; fuses; electric fires, etc.

Chemical effect of a current: electrolytic conductors; electroplating.

Simple treatment of electromagnetic induction: electromagnets; electric bell.

Simple cell; dry cell; secondary cells.

Chemistry

Chemistry as a study of man's use of his material environment.

Composition of the air: oxygen; air in relation to burning, rusting and respiration. Carbon dioxide. Increase in weight on oxidation: oxidation of iron, copper, magnesium.

A simple treatment of pure substances and mixtures. Elements and compounds.

Water: natural sources; filtration; distillation; water as a solvent; crystallisation.

Action of metals on water: hydrogen; synthesis of water by burning hydrogen; analysis of water by electrolysis.

The earth's crust and man's use of minerals: chalk; quicklime; slaked lime; lime water. Carbonates. Building materials: mortar.

Sulphur: sulphuric acid; sulphates.

Acids, bases and salts; salts from sea water; sodium hydroxide and sodium carbonate.

Coal and coal distillation products. Fuels. Gas and candle flames; explosion of gas/air mixtures.

Winning metals from their ores: reduction by coal gas and carbon.

Metals: a simple treatment of their proportion as reflected in their uses. Corrosion. Alloys.

(One paper of $2\frac{1}{2}$ hours)

(Note: Candidates will be allowed an additional period of 15 minutes to read the paper before commencing to write their answers).

The paper will consist of two parts. Part I will comprise a number of compulsory short questions on all parts of the syllabus to be answered in about $1\frac{1}{2}$ hours. Part II will consist of three sections (Physics, Chemistry and Biology); candidates will be expected to answer four questions, of which at least <u>one</u> must be selected from each section, in about one hour.

Marks will be allocated as follows:-

Part I - 60% of the total marks.
Part II - 40% of the total marks.

Note: The syllabus for 1967 may be followed as an alternative to this syllabus for this year only.

SECTION A - PHYSICS

MATERIALS

Solids, liquids, gases	Natural and man-made: investigation and classification of samples.
Crystalline form	Common examples of crystals: crystal models using polystyrene spheres. Hand lens examination of crystals: crystal growth demonstration.
Atoms and molecules	Introduction to idea: kinetic descriptions of states of matter.
Materials and measurement	Use of measuring instruments (ruler, balance, graduated cylinder, etc.) to find out more about materials.
	Weighing (simple lever and direct reading balance) and measuring samples of solids, liquids, gases.
	Use of more sensitive measuring devices: weighing very small objects with microbalance (home-made): thickness of paper, metal foils, etc. Estimations: guessing rough measurements.
Density	Idea of density as qualitative concept.
Vacuum	Evacuating vessel and weighing air.

FORCES IN ACTION

Muscles	Push and pull forces: muscular sense of force. Concept of work.
Levers	Everyday examples of forces in action, e.g., seesaw, lever balance leading to simple law of lever.
Moments	Moments as turning effects; simple everyday examples.
Equilibrium	Class investigations of stability in terms of the position of the centre of gravity.
Gravity	Gravitational forces: spring balances.
Hooke's law	Class experiments stretching helical spring or rubber cord: simple plot of extension against stretching force.
Elastic limit	Further stretching of copper wire to get idea of elastic limit.

Motion and forces	Class experiments on velocity and acceleration using inclined planes, trolleys, bicycles, etc., with timing devices, e.g., speedometers, electric clocks, ticker-tape and vibrators.

PRESSURE

Gas and liquid pressures	Demonstrations of gas and liquid pressures. Pressure as force per unit area. Qualitative treatment of buoyancy and flotation. Class experiments with manometers: gas and lung pressures. Distinction between pressure and thrust.
Atmospheric pressure	Air has weight: simple barometer. Pressure at varying depths and altitudes.
Applications	Pressure devices, e.g., pumps, hydraulic systems. (A detailed treatment will not be required for examination purposes.)

MOLECULES IN MOTION
AND IN ACTION

Evidence for fine division of matter	Brownian movement in air and liquids: smoke cell, etc.
	Diffusion experiments, e.g., movement of vapour: movement of dissolved chemicals.
Size of molecules	Progressive dilution experiment. Molecular movement models leading to simple idea of kinetic theory.

ENERGY

Forms of energy	Introduction to energy as something needed to do work. Fuels and foods: springs and gravity: batteries and motors. (A detailed treatment will not be required for examination purposes.)
Force and energy changes	Work as a measure of transfer of energy from one form to another.
Machines	Comparison of output with input; easy numerical problems on the lever, simple pulley systems, bicycle. Power as rate of doing work; simple measurement of personal horse-power.
Conservation	Idea of conservation of energy.
Friction	Frictional forces with solids. Lubricants.

HEAT AND THERMAL EFFECTS

Thermal expansion	Expansion and contraction of solids, liquids and gases; applications.
Temperature	Application of liquid expansion to scale of temperature: mercury thermometer as temperature measurer: centigrade scale thermometer.
Heat transfer	Conduction, convection and radiation; applications.
Heat as molecular motion	Pressure changes leading to further development of kinetic theory.
Heat measurements	Simple measurement of heat in terms of mass X temperature rise (heat capacity); calorie.
Changes of state	Melting: boiling: evaporation. Simple cooling experiments; cooling curves.

MAGNETIC AND ELECTRIC
FORCES

Magnetism	Class experiments with magnets: attractive and repulsive forces. Simple demonstration of magnetic forces. Magnetic fields and lines of force. Magnetic induction: magnetisation and demagnetisation.
Earth's magnetism	Direction finding property of magnets. Compass.
Electricity at rest	Experiments with charged bodies. Simple treatment of electric fields and the electroscope. Induction.
Current electricity	Class experiments with electrical circuit boards. Ammeter as current measurer. Conductors and insulators: class experiments.
Heating effect	Heating effect of current from everyday examples. Use of fuses; house wiring.
Electron flow	Current flow through gases shown in sparks, neon tube, vacuum tube, fine beam tube or cathode ray oscilloscope. (A detailed treatment will not be required for examination purposes.)
Resistance	Simple introduction to idea of electrical resistance.
Chemical effect	Current flow through liquids: electrolysis; practical applications (link with ions in Chemistry).
Magnetic effect	Qualitative treatment of magnetic fields associated with a current carrying conductor, e.g., straight wire, solenoid. Electromagnets.
Electro-magnetic induction	Simple investigation of electromagnetic induction: experiments with a bicycle dynamo.
Alternating current and direct current	Demonstration of difference between alternating current and direct current by electrolysis, cathode ray oscilloscope, etc.

LIGHT

Rays	Propagation in straight lines and refraction at interfaces in liquids and solids. Shadows.
Camera	Pinhole camera: class experiments on image formation with convex lens; simple lens camera; magnifying glass.
Reflection	Class experiments with raybox and plane mirror.
Waves	Wave models, e.g., ropes, springs, ripples. Class use of ripple tanks to investigate pulses and waves, wave travel, reflection, refraction and interference. Concept of "rays" as guide lines for the movement of the wave-fronts.
Colour	Radiant energy and colour change. Sun. Dispersion of light by prism: spectrum. Colours of transparent and opaque objects.

SECTION B - CHEMISTRY

MATERIALS

Pure substances and mixtures	Need to isolate a pure substance to investigate its properties. Methods of isolating pure materials based on differences in physical properties - filtration, crystallisation, distillation, centrifugation, chromatography, etc. Use of physical properties for identification purposes.

Changes in materials	Physical changes - changes of state, colour etc., on heating. Examples of chemical changes to bring out new substance formation as essential criterion. Idea of conservation of mass and energy.
Classification of materials	Elements and compounds. Mixtures. Simple physical differences between metals and non-metals as reflected in uses of common examples of each class, (gradation of properties). Alloys.
Solubility and crystallisation	Saturated solutions. Preparation of crystals from saturated solutions and from melts. The differing solubilities of various substances and the factors influencing solubility.

AIR AND WATER

Air and the nature of burning	Role of and changes in air during burning: fraction of air used up. Weight changes in burning of elements.
	Methods of obtaining oxygen. Combustion of metals and non-metals in oxygen: acidic and basic oxides. Nitrogen obtained by removal of oxygen from air. Composition of the air.
	Action of heat on a variety of metallic oxides - link with ease of formation of oxides.
The burning of carbon and carbon containing compounds	Lime water test. Carbon dioxide. Burning and breathing: energy release in these processes. - Simple application to fuels and food.
Water	Purification (treated simply) and the effect of purification on the properties of water. Water as a frequent product of burning. Action of metals on water or steam (order). Volumetric composition of water by electrolysis.
Hydrogen	Action of metals on dilute acids (order): 'replacement'. Electrochemical series - link with relative ease of other reactions investigated. Reduction of oxides by hydrogen and synthesis of water: some oxides not reduced by hydrogen. Manufacture and uses of hydrogen.
Rusting	Study of the factors which promote rusting leading to methods of rust prevention; electrolytic treatment of rusting.

ACIDS, BASES, SALTS

Acidity	Use of universal indicator to establish an acidity/alkalinity scale and a simple idea of relative strengths of acids and alkalis. Typical properties of hydrochloric, sulphuric and nitric acids, and of sodium hydroxide, calcium hydroxide, ammonia and copper oxide.
	Action of dilute acids on metals, oxides/hydroxides and carbonates: simple techniques for the preparation of soluble and insoluble salts. Salt nomenclature.
	Activity and electrochemical series.

MATERIALS OF EARTH'S CRUST

Naturally occurring elements	Why are there so few?

Important natural oxides and sulphides	Haematite, bauxite; zinc blende, galena: sources of metals and sulphur compounds: extraction of metals from ores.
Naturally occurring carbonates	Carbonates of Ca, Mg, Na, Zn, Cu: relative ease of decomposition. Special importance of calcium carbonate: quicklime and slaked lime; hard water.
Sulphur	Heating and burning of sulphur. Sulphur dioxide and its properties. Action of dilute acids on sulphites, (of carbonates).
Conversion of sulphur dioxide to trioxide	Catalysis. Common properties and uses of sulphuric acid.

ATOMS, MOLECULES AND IONS

Symbols, formulae and equations	Quantitative nature of chemical reactions. Use of atomic weights (gram atoms) and formula weights (gram formulae). Simple ionic equations.
Conduction of electricity by substances	Electronic and electrolytic conductors; non-electrolytes; ions. Aqueous acids and alkalis and molten and aqueous salts as electrolytes.
Chemical combination	Charged particles in salts - simple idea of electro valency. /Indication, only, of different mode of combination between atoms of more similar elements (covalency)./
Oxidation/reduction	A simple idea of oxidation and reduction obtained from examples of addition and removal of oxygen and of simple electron transfer (Fe^{2}-Fe^{3+}). Complementary behaviour of oxidant/reductant (cf. acid/base).
Energy	Association of energy changes with chemical reactions wherever possible. Qualitative appreciation of heat of reaction (solution).

SECTION C - BIOLOGY

CHARACTERISTICS OF LIVING THINGS

Study of living organisms	An understanding of what "being alive" means, obtained from an elementary study of selected animals and plants. Observation of common animals in an aquarium (or pond or sea-shore pool) and in a garden.
Cycle of materials and energy	Assimilation of materials from the environment into living things for fuel, growth and reproduction: an elementary treatment of feeding, digestion, absorption, transport of materials in animals; an introduction to the nature of food materials in plants and a simple investigation of the conditions under which food materials are formed in plants. Liberation of energy from food; simple treatment of animal and plant respiration.
Integration and regulation	Co-ordination of activities in animals: elementary study of brain and sense organs in man. Hormones in animals and plants. Maintenance of balanced internal environment: water intake and output in animals and plants; temperature control in animals; transport systems in plants and animals.

CELLS AS UNITS OF LIFE

Living things composed of cells	An elementary, practical examination of living cells using microscope or microprojector: relation of structure and function.
Reproduction and development	How living things begin: sexual reproduction, development and life history in frog, chick, and a plant (with large seeds). Nonsexual reproduction, e.g., simple experimental treatment of plant cuttings, spores, etc.
Multicellular organism	Cells organised into tissues, organs, and organisms: treated only in relation to the characteristics of living things.

INTERDEPENDENCE OF LIVING THINGS

Variety of living things	Diversity and unity of pattern in a range of representative species, studied by a practical examination of living plants and animals and by demonstrations of preserved specimens. Classification treated broadly as a means of sorting living things into groups, each of which contains organisms with common features.
Interdependence of man, plants and animals	A simple treatment of (a) the energy cycle in living things with the uptake and storage of energy (photosynthesis) on one hand, and the release of energy (respiration) on the other; (b) man's dependence on plants and animals; conservation.

APPLIED BIOLOGY

Micro-organisms	Discovery: Leeuwenhoek, Spallanzini, Pasteur. Yeast, a useful micro-organism. Culture of bacteria from milk, air, soil, etc. Transfer of germs by insects, dirty hands, etc.
Health and hygiene	Good health as a balanced state of living (within the organism) with the right amount of exchange with the outside environment. Disturbance of balance by malnutrition, vitamin deficiency, parasites, poisons, mechanical injury. Body reaction to infection: antisepsis and asepsis: vaccination (Jenner, Pasteur, Salk). Antibiotics: penicillin (Fleming).
Soil	Elementary study of soil as a basis for farming and gardening operations: micro-organisms in soil; bacteria and fungi as agents of decay.
Insects	Insects as pollinators, pests, vectors of disease, through observations on living insects, e.g., bees, locusts, aphides, cabbage white butterfly, houseflies, etc.

Domestic Science 1967 and 1968

(One paper of 2½ hours and a practical test)

The written paper will consist of two parts:-

Part I will consist of about sixteen questions, requiring brief answers on both sections of the syllabus. One hour will be allowed
Percentage of total marks - 40.

In Part II candidates will be expected to answer four questions, two from each section of the syllabus. 1½ hours will be allowed
Percentage of total marks - 50.

Practical test; percentage of total marks - 10.

These marks will be given for an outer garment made by the pupil during the examination year; they will be awarded by the teacher according to a prescribed mark scheme, and the mark sheet will be countersigned by the Principal or the Senior Mistress.

Section A - Homecraft

Planning, preparation and serving of meals.

Practice in the primary methods of cooking, illustrated by suitable dishes using common foodstuffs. The preparation of beverages and the preparation and cooking of stock, soups (broths, purees) vegetables, fish, meat, puddings (milk, batter, cake mixture, fruit), pastries (suet, short, flaky), scones (oven, griddle), plain and rich cake mixtures.

Use of foundation recipes and of standard proportions.

Choice, cost and nutritive value of common foods (dairy products, eggs, meat, fish, fats, cereals, sugar, vegetables, fruits) and the effect of cooking upon them.

Care and cleaning of solid fuel, gas and electric stoves, sinks and kitchen equipment; the action of modern cleaning agents. Personal hygiene.

Prevention of accidents in the home.

Treatment of cuts, burns and scalds.

Section B - Needlework

The aim should be to encourage the pupil's imaginative and creative abilities.

(a)   Use of the sewing machine and embroidery stitches to make and decorate a variety of small articles, e.g., beach bags, toys, pictures, aprons.

(b)   Stitches and processes used in the making of under and outer wear in the current fashion, including the application of a collar.

(c)   Classification of fibres and a brief knowledge of their origin.

Experiments should be carried out using the ordinary domestic equipment to illustrate basic scientific principles in both sections of the syllabus.

Practical test

Marks will be awarded for an outer garment made during the examination year for the pupil's own use, e.g., cotton dress, blouse, cotton housecoat, sun-suit.