

# SCHEME OF WORK - FORM I TERM I

## 1. NUMBER THEORY (I)

1. (a) Distinguish among sets of numbers, for example,
- (i) Natural \_\_\_\_\_
  - (ii) Whole \_\_\_\_\_
  - (iii) Even \_\_\_\_\_
  - (iv) Odd \_\_\_\_\_
  - (v) Prime \_\_\_\_\_
  - (vi) *Square Numbers* \_\_\_\_\_
- (b) Identify
- (i) Integers, \_\_\_\_\_
  - (ii) Rational \_\_\_\_\_
  - (iii) Irrational Nos. \_\_\_\_\_
- (c) Describe Positive Integers as being Prime OR Composite \_\_\_\_\_
- (d) *Real Numbers,  $\mathbf{R}$ , the union of rational & irrational numbers.* \_\_\_\_\_
2. Order a set of real numbers, for example, the use of inequality symbols, *listing in ascending order.* \_\_\_\_\_
3. Identify a given set of numbers as a subset of another set; recognize the Inclusion Relations among subsets of the Number System; for example,  $\mathbf{N} \subset \mathbf{W} \subset \mathbf{Z} \subset \mathbf{Q} \subset \mathbf{R}$ . \_\_\_\_\_
4. List the
- set of Factors OR \_\_\_\_\_
  - a set of Multiples of a given Positive Integer \_\_\_\_\_
5. Compute the (Bk 1, 2<sup>nd</sup> Edn., p14 – 23)
- H.C.F \_\_\_\_\_
  - OR L.C.M of two or more positive integers \_\_\_\_\_
6. (i) Number bases & their conversion \_\_\_\_\_
- (ii) State the value of a digit in a numeral in base  $n$ , where  $2 \leq n \leq 10$ :  
Place Value & Face Value of numbers in bases 2 to 10. \_\_\_\_\_

## 2. COMPUTATION (I)

1. Perform computation using any of the FOUR basic operations (Addition, Subtraction, Multiplication, Division) with real numbers, namely,

Whole numbers \_\_\_\_\_  
Fractions \_\_\_\_\_  
Decimals \_\_\_\_\_

2. Convert among

Fractions \_\_\_\_\_  
Percentages \_\_\_\_\_  
Decimals \_\_\_\_\_

3. Convert from one set of units to another. \_\_\_\_\_

4. Approximate a Value to a given number of Significant Figures (1, 2 or 3) and express any Decimal to a given number of Decimal Places (1, 2 or 3) \_\_\_\_\_

5. Calculate any Fraction or Percentage of a given quantity \_\_\_\_\_

6. Express one quantity as a Fraction or Percentage of another \_\_\_\_\_

7. Compare two quantities using Ratios \_\_\_\_\_

8. Divide a quantity in a given Ratio \_\_\_\_\_

9. Solve problems involving:

(a) Fractions \_\_\_\_\_

(b) Decimals \_\_\_\_\_

(c) Percentages \_\_\_\_\_

(d) Ratio, Rates & Proportions \_\_\_\_\_

(e) Arithmetic Mean (or Average) \_\_\_\_\_

(f) Squares & Square Roots [**No Tables/Calculators**] \_\_\_\_\_

### 3. ALGEBRA (I)

1. Use symbols to represent
  - (i) Numbers \_\_\_\_\_
  - (ii) Operations \_\_\_\_\_
  - (iii) Variables \_\_\_\_\_
  - (iv) Relations \_\_\_\_\_
2. Translate *between* Algebraic Symbols & *worded expressions*. \_\_\_\_\_
3. Perform operations involving Directed Numbers (integers)
  - (a) Addition \_\_\_\_\_
  - (b) Subtraction \_\_\_\_\_
  - (c) Multiplication \_\_\_\_\_
  - (d) Division \_\_\_\_\_
4. Perform the Four Basic Operations with Algebraic Expressions \_\_\_\_\_
5. Substitute numbers for Algebraic Symbols in Simple Algebraic Expressions \_\_\_\_\_
6. Solve Linear Equations in One Unknown  
[e.g. Including transposition & collection of numbers & variables;  
Fractional Form] \_\_\_\_\_

### **SCHEME OF WORK – FORM I TERM II**

#### 4. CONSUMER ARITHMETIC (I)

1. Calculate
  - (i) Discount \_\_\_\_\_
  - (ii) Sales Tax \_\_\_\_\_
  - (iii) Profit or Loss \_\_\_\_\_
2. Express
  - (i) A Profit \_\_\_\_\_
  - (ii) Loss \_\_\_\_\_
  - (iii) Discount \_\_\_\_\_
  - (iv) Markup \_\_\_\_\_
  - (v) Purchase Tax \_\_\_\_\_

as a Percentage of some Value

3. Solve problems involving

- (i) Marked Price (or Selling Price), \_\_\_\_\_
- (ii) Cost Price \_\_\_\_\_
- (iii) Percentage Profit \_\_\_\_\_
- (iv) Percentage Loss or \_\_\_\_\_
- (v) Discount \_\_\_\_\_

4. Solve simple problems involving payments by Installments as in the case of

- (i) Hire Purchase \_\_\_\_\_
- (ii) Mortgages \_\_\_\_\_

5. SETS (I)

- 1. (i) Describe a Set \_\_\_\_\_
- (ii) Give Examples & Non-examples of Sets \_\_\_\_\_
- (iii) Identify the Empty Set \_\_\_\_\_
- (iv) Identify the Cardinal number (No. of elements) of a Set \_\_\_\_\_
- (v) Distinguish between Finite & Infinite Sets \_\_\_\_\_
- 2. (i) list the members of a set from a given description \_\_\_\_\_
- (ii) Use Set Builder Notation to describe a set \_\_\_\_\_
- 3. Identify & distinguish between sets which are Equivalent and sets which are Equal, *disjoint sets* \_\_\_\_\_
- 4. (i) Identify & Construct Subsets of a given set \_\_\_\_\_
- (ii) Calculate the number of subsets of a set of  $n$  elements \_\_\_\_\_
- 5. (i) Determine the Complement of a given set, given the Universal set \_\_\_\_\_
- (ii) Determine & Count the elements in the Intersection & Union of not more than three sets \_\_\_\_\_

6. MEASUREMENT (I)

- 1. Polygons & Circles \_\_\_\_\_
- Calculate the Perimeter of
- (i) A Polygon \_\_\_\_\_
- (ii) A Circle & \_\_\_\_\_
- (iii) A combination of Polygon & Circle \_\_\_\_\_

2. Calculate the area of the region enclosed by
- (i) a square, \_\_\_\_\_
  - (ii) a rectangle, \_\_\_\_\_
  - (iii) a triangle, \_\_\_\_\_
  - (iv) a parallelogram, \_\_\_\_\_
  - (v) a trapezium, \_\_\_\_\_
  - (vi) a rhombus, \_\_\_\_\_
  - (vii) a circle & \_\_\_\_\_
  - (viii) any combination of these \_\_\_\_\_
3. Estimate the area of irregularly-shaped plane figures \_\_\_\_\_
4. Convert units of
- (i) Length \_\_\_\_\_
  - (ii) Area \_\_\_\_\_
  - (iii) Capacity \_\_\_\_\_
  - (iv) Time (including the 24-hour clock) & \_\_\_\_\_
  - (v) Speed \_\_\_\_\_
- within the SI system.
5. Use the appropriate SI unit of measure for
- (i) Area \_\_\_\_\_
  - (ii) Mass \_\_\_\_\_
  - (iii) Temperature (Degrees & Fahrenheit) \_\_\_\_\_
  - (iv) Other derived quantities \_\_\_\_\_
6. Solve simple problems involving Time (for example, Timetable Extracts such as Bus & Airline schedules) \_\_\_\_\_
7. (i) Estimate the margin of error for a given measurement, *sources of error* \_\_\_\_\_
- (ii) Give to a degree of accuracy (appropriate to the margin of error for a given measurement), the results of calculations involving numbers derived from a set of measurements \_\_\_\_\_
8. Solve problems involving Measurements \_\_\_\_\_

## SCHEME OF WORK – FORM I TERM III

### 7. GEOMETRY (I)

1. Explain concepts relating to geometry:

- (i) Point \_\_\_\_\_
- (ii) Line \_\_\_\_\_
- (iii) Parallel lines & Perpendicular lines \_\_\_\_\_
- (iv) Line segment \_\_\_\_\_
- (v) Ray \_\_\_\_\_
- (vi) Curve \_\_\_\_\_
- (vii) Plane angles, *types of* (acute, reflex, right, straight) \_\_\_\_\_
- (viii) Faces \_\_\_\_\_
- (ix) Edges \_\_\_\_\_
- (x) Vertices \_\_\_\_\_

2. Use Instruments (Ruler & Protractor) to Draw & Measure

- (i) Angles \_\_\_\_\_
- (ii) Line segments \_\_\_\_\_

3. Solve problems using the properties of

- (i) Lines (parallel, transversals) \_\_\_\_\_
- (ii) Angles
  - Vertically opposite \_\_\_\_\_
  - Alternate \_\_\_\_\_
  - Adjacent \_\_\_\_\_
  - Corresponding \_\_\_\_\_
  - Co-interior \_\_\_\_\_
  - Angles at a point \_\_\_\_\_
  - Complementary \_\_\_\_\_
  - Supplementary \_\_\_\_\_

### 8. STATISTICS (I)

1. Construct a Frequency Table for a given set of Data  
(Ungrouped & Grouped) \_\_\_\_\_

2. Draw (using compass & protractor as appropriate) & Use [**Using Graph Paper**]

- (i) Line graph \_\_\_\_\_
- (ii) Pie charts \_\_\_\_\_
- (iii) Bar charts (Vertical & Horizontal) \_\_\_\_\_
- (iv) Pictograms \_\_\_\_\_

3. Interpret data presented in any Tabular, Graphical or Pictorial form \_\_\_\_\_

## REVISION EXERCISES, TESTS & PAST PAPERS

**SCHEME OF WORK – FORM 2 TERM I**  
***CALCULATORS ARE ALLOWED IN SECOND FORM***

1. NUMBER THEORY (II)

7. Generate a term of a Sequence given a rule \_\_\_\_\_
8. Derive an appropriate rule given the terms of a sequence \_\_\_\_\_
9. Use properties of Numbers & Operations in computational tasks:
- Additive & Multiplicative identities & inverses \_\_\_\_\_  
concept of Closure \_\_\_\_\_
- Properties of operations such as
- Commutativity \_\_\_\_\_  
Distributivity \_\_\_\_\_  
Associativity \_\_\_\_\_
- Order of operations in problems with mixed operations (BODMAS). \_\_\_\_\_
10. Solve problems involving concepts in number theory (including Reciprocals & powers of numbers) \_\_\_\_\_
- Compute powers of real numbers of the form  $x^a$ ,  $a \in \mathcal{Q}$ ; including squares, square roots, cubes & cube roots.* \_\_\_\_\_

2. ALGEBRA (II)

7. Apply the Distributive Law to insert (factorize) or remove brackets in algebraic expressions, for e.g.,  $ax \pm bx \equiv (a \pm b)x$  \_\_\_\_\_
8. Simplify algebraic fractions \_\_\_\_\_
9. Formulae (change of subject) \_\_\_\_\_
10. Use linear equation to solve
- (i) given algebraic equations \_\_\_\_\_  
(ii) word problems \_\_\_\_\_
11. Solve a *simple* linear inequality in one unknown & represent the solution using
- (a) set notation \_\_\_\_\_  
(b) the number line (line graphs) \_\_\_\_\_  
(c) Cartesian graphs \_\_\_\_\_

3. SETS (II)

6. Construct & use Venn diagrams to show (not more than 3 sets)

- (i) subsets \_\_\_\_\_
- (ii) complements \_\_\_\_\_
- (iii) the Intersection & Union of sets \_\_\_\_\_

7. Determine the number of elements in named subsets of two intersecting sets, given the number of elements in some of the other subsets; \_\_\_\_\_

8. Solve problems involving the use of Venn diagrams (**involving x**) with not more than three sets. \_\_\_\_\_

4. CONSUMER ARITHMETIC (II)

5. Solve problems involving Simple Interest to find:

- Principal \_\_\_\_\_
- Time \_\_\_\_\_
- Rate \_\_\_\_\_
- Amount \_\_\_\_\_

6. Solve problems involving measures & money p174

- (a) Utility bills \_\_\_\_\_
- (b) Invoices & Shopping bills \_\_\_\_\_
- (c) Insurances \_\_\_\_\_
- (d) Salaries & Wages, Overtime, Commission \_\_\_\_\_

**SCHEME OF WORK – FORM 2 TERM II**

5. COMPUTATION (II)

10. Convert from one set of units to another, given a conversion scale for e.g., converting within the metric scale (Volume); \_\_\_\_\_

11. (i) Write any Rational Number in **Standard Form** (scientific notation) \_\_\_\_\_

(ii) Add, Subtract, Multiply & Divide Large & Small Numbers written in Standard Form \_\_\_\_\_

6. STATISTICS (II)

4. Represent Numerical & Statistical Data by a Line graph on the Rectangular Cartesian plane \_\_\_\_\_



## 7. RELATIONS, FUNCTIONS & GRAPHS (I)

### 1. Draw & Interpret

Distance-Time graphs (straight line only, using **Graph Paper**) to determine

- (i) Distance \_\_\_\_\_
- (ii) Time \_\_\_\_\_
- (iii) Speed \_\_\_\_\_

## 8. GEOMETRY (II)

### 4. Use instruments (**not necessarily restricted to ruler & compasses**) to construct

- (a) Triangles: *equilateral, isosceles, scalene, obtuse, right, acute* \_\_\_\_\_
- (b) Parallel lines (using ruler & set square) \_\_\_\_\_
- (c) Perpendicular lines (using ruler & set square) \_\_\_\_\_

### 5. Use the properties of Perpendicular & Parallel lines to

- (i) Draw accurate Geometrical Figures \_\_\_\_\_
- (ii) Solve problems. \_\_\_\_\_
- (iii) *Lines of Symmetry* \_\_\_\_\_

### 6. Use instruments (**not necessarily restricted to Ruler & Compasses**) to

- (a) Construct a line segment \_\_\_\_\_
- (b) Bisect a line \_\_\_\_\_
- (c) Bisect an angle \_\_\_\_\_
  
- (d) Construct Angles *and their combinations*
  - (i)  $30^{\circ}$ ,  $45^{\circ}$ ,  $60^{\circ}$  \_\_\_\_\_
  - (ii)  $90^{\circ}$  (from a point on the line segment; to a line segment from a point) \_\_\_\_\_
  - (iii)  $120^{\circ}$  \_\_\_\_\_
  
- (e) Triangles: *equilateral, isosceles, scalene, obtuse, right, acute* \_\_\_\_\_
- (f) Quadrilaterals \_\_\_\_\_
- (g) Polygons: regular & irregular (e.g. pentagon to decagon) \_\_\_\_\_
- (h) Circles \_\_\_\_\_

### 7. Solve problems using:

#### (a) the properties of

#### (i) Polygons (including interior & exterior angles where appropriate)

- Triangles: equilateral, right, isosceles \_\_\_\_\_
- Square \_\_\_\_\_
- Rectangle \_\_\_\_\_
- Rhombus \_\_\_\_\_
- Kite \_\_\_\_\_
- Parallelogram \_\_\_\_\_

- Trapezium \_\_\_\_\_
- Other polygons \_\_\_\_\_
- (b) the properties of circles (not including circle theorems) \_\_\_\_\_
- (c) the properties of congruent triangles \_\_\_\_\_
- (d) the properties of similar figures (*for e.g. similar triangles*) \_\_\_\_\_
- 8. Use Pythagoras' Theorem to solve problems \_\_\_\_\_

**SCHEME OF WORK – FORM 2 TERM III**

**9. MEASUREMENT (II)**

- 9. (a) Properties of faces, edges & vertices of solids:
  - Cube \_\_\_\_\_
  - Cuboid \_\_\_\_\_
  - Prism \_\_\_\_\_
  - Pyramid \_\_\_\_\_
- (b) Calculate the Volume & Surface Area of Solids:
  - Cube \_\_\_\_\_
  - Cuboid \_\_\_\_\_
  - Prism \_\_\_\_\_
  - Pyramid \_\_\_\_\_
- 10. Use Maps & Scale Drawings to determine Distances & Areas. \_\_\_\_\_

**REVISION EXERCISES, TESTS & PAST PAPERS**

## SCHEME OF WORK – FORM 3 TERM I

### 1. ALGEBRA (III)

12. Use symbols to represent Binary Operations (other than the four basic ones) & perform simple computations with them. \_\_\_\_\_
13. Use the Laws of Indices to manipulate expressions with integral indices (*include fractional / rational indices*) \_\_\_\_\_
14. Formulae (change of subject, *include roots & powers*). \_\_\_\_\_
15. Use Linear Inequalities to solve word problems \_\_\_\_\_
16. Solve Simultaneous Linear Equations in two unknowns algebraically \_\_\_\_\_
17. Use simultaneous linear equations to solve word problems \_\_\_\_\_
18. Represent Direct & Inverse Variations symbolically \_\_\_\_\_
19. Solve problems involving direct variation & inverse variation \_\_\_\_\_

### 2. CONSUMER ARITHMETIC (III)

7. Calculate (for not more than 3 years)
- Compound Interest \_\_\_\_\_
  - Appreciation \_\_\_\_\_
  - Depreciation \_\_\_\_\_
  - Amount \_\_\_\_\_
8. Solve problems involving measures & money (**including exchange rate**) \_\_\_\_\_
9. Solve problems involving
- (a) Rates & Taxes (including Income Tax) \_\_\_\_\_
  - (b) Investments \_\_\_\_\_

**3. MEASUREMENT (III)**

11. Calculate the length of an arc of a circle \_\_\_\_\_

12. Calculate the area of a sector of a circle \_\_\_\_\_

Use Hero's formula for the area of a triangle \_\_\_\_\_

13. Solve problems using: the properties of faces, edges & vertices of solids,

(i) Cylinder \_\_\_\_\_

(ii) Sphere \_\_\_\_\_

(iii) Cone \_\_\_\_\_

14. Calculate the area of a segment of a circle \_\_\_\_\_

15. Calculate the surface area of solids

(a) Cylinder \_\_\_\_\_

(b) Sphere \_\_\_\_\_

(c) Cone \_\_\_\_\_

16. Calculate the volume of solids

(a) Cylinder \_\_\_\_\_

(b) Sphere \_\_\_\_\_

(c) Cone \_\_\_\_\_

**SCHEME OF WORK – FORM 3 TERM II**

**4. STATISTICS (III)**

5. Differentiate between sample & population attributes – sample statistics & population parameters \_\_\_\_\_

6. Measurement scales – Nominal, Ordinal, Interval & Ratio \_\_\_\_\_

7. Differentiate between types of data:

Discrete & Continuous variables \_\_\_\_\_

Ungrouped & Grouped data \_\_\_\_\_

8. Construct a Frequency Table for a given set of data:

Ungrouped \_\_\_\_\_

Grouped data \_\_\_\_\_

9. Determine class features for a given set of data:

Max / Min \_\_\_\_\_  
Range \_\_\_\_\_  
Extreme values & their effect \_\_\_\_\_  
Class interval \_\_\_\_\_  
Class boundaries \_\_\_\_\_  
Class limits \_\_\_\_\_  
Class midpoint \_\_\_\_\_  
Class width \_\_\_\_\_

10. Represent numerical & statistical data by

Histogram \_\_\_\_\_  
Frequency polygon \_\_\_\_\_

11. Interpret data presented in any of the graphical or pictorial forms named in **objective 10** above \_\_\_\_\_

12. Determine measures of central tendency (mean, median & mode) for

Raw \_\_\_\_\_  
Ungrouped \_\_\_\_\_  
Grouped data (no median) \_\_\_\_\_

13. Determine when it is most appropriate to use as the average for a set of data

Mean \_\_\_\_\_  
Median \_\_\_\_\_  
Mode \_\_\_\_\_

14. Determine the measures of dispersion /spread (e.g. Range, Interquartile & Semi-interquartile range), for

(i) Raw \_\_\_\_\_  
(ii) Ungrouped data. \_\_\_\_\_

15. Analyze statistical data & diagrams, commenting on the

averages \_\_\_\_\_  
the Dispersion (Spread) \_\_\_\_\_  
the Shape of the Frequency Distribution \_\_\_\_\_  
**effect of extreme values** \_\_\_\_\_

**16. Use standard deviation to compare sets of data. No calculation of the standard deviation is required.** \_\_\_\_\_

17. Determine the Proportion or Percentage of the sample above or below a given value from Raw data or Table \_\_\_\_\_

18. Identify the Sample Space for a simple experiment, *including the use of contingency tables* \_\_\_\_\_

19. Determine Experimental & Theoretical probabilities of simple events \_\_\_\_\_

20. Apply statistical methods to analyze data & make appropriate inference(s) from:

- Raw data \_\_\_\_\_
- Tables \_\_\_\_\_
- Diagrams \_\_\_\_\_

5. RELATIONS, FUNCTIONS & GRAPHS (II)

2. Explain concepts associated with relations:

- Types of relations \_\_\_\_\_
- Examples & Non-examples \_\_\_\_\_
- Domain \_\_\_\_\_
- Range \_\_\_\_\_
- Image \_\_\_\_\_
- Co-domain \_\_\_\_\_

3. Represent a relation in various ways:

- Set of Ordered Pairs \_\_\_\_\_
- Arrow diagrams \_\_\_\_\_
- Graphically \_\_\_\_\_
- Algebraically \_\_\_\_\_

4. State the characteristics that define a Function:

- Many-to-one or One-to-one relation \_\_\_\_\_
- Examples & Non-examples \_\_\_\_\_

5. Use the functional notations, for example,  $f:x \rightarrow x^2$ ; or  $f(x) = x^2$ ; as well as  $y = f(x)$  for given domains \_\_\_\_\_

6. Distinguish between a Relation & a Function:

- Ordered pairs \_\_\_\_\_
- Arrow diagrams \_\_\_\_\_
- Graphically (vertical Line Test) \_\_\_\_\_

7. Draw & Interpret graphs of Linear Functions:

- $y = c$ ; \_\_\_\_\_
- $x = k$ ; \_\_\_\_\_
- $y = mx + c$ . where  $m, c$  &  $k$  are real numbers. \_\_\_\_\_

8. Determine the Intercepts of the graph of linear functions:

- $x$ - &  $y$ - intercepts; \_\_\_\_\_
- Graphically \_\_\_\_\_
- Algebraically \_\_\_\_\_

9. Determine the Gradient of a straight line: slope - the ratio of the vertical rise to the horizontal shift \_\_\_\_\_

- 10.** Determine the Equation of a line *using*:
- (a) the graph of the line \_\_\_\_\_
  - (b) the co-ordinates of two points on the line \_\_\_\_\_
  - (c) the gradient & one point on the line \_\_\_\_\_
  - (d) the gradient of the line & its relationship to another line. \_\_\_\_\_
- 11.** Solve problems involving the Gradient of Parallel & Perpendicular lines \_\_\_\_\_
- 12.** Determine from the co-ordinates on a line segment:
- (a) the length \_\_\_\_\_
  - (b) the co-ordinates of the mid-point \_\_\_\_\_
- 13.** Solve graphically a system of two linear equations in two variables \_\_\_\_\_

### **SCHEME OF WORK – FORM 3 TERM III**

#### 6. GEOMETRY & TRIGONOMETRY (I)

- 1.** Determine the
- (i) Sine \_\_\_\_\_
  - (ii) Cosine \_\_\_\_\_
  - (iii) Tangent ratios of acute angles in a right-angled triangle \_\_\_\_\_
- 2.** Use the
- (i) Sine \_\_\_\_\_
  - (ii) Cosine \_\_\_\_\_
  - (iii) Tangent ratios in the solution of right-angled triangles \_\_\_\_\_
- 3.** Use simple trigonometrical ratios to solve problems based on measures in the physical world
- (a) Heights & Distances \_\_\_\_\_
  - (b) Angles of Elevation & Depression \_\_\_\_\_
- 4.** Represent the relative position of two points given the Bearing of one point with respect to the other (include Cardinal points) \_\_\_\_\_
- 5.** Determine the Bearing of one point relative to another point given the position of the points \_\_\_\_\_
- 6.** Solve problems involving Bearings \_\_\_\_\_

### **REVISION EXERCISES, TESTS & PAST PAPERS**

## SCHEME OF WORK – FORM 4 TERM I

### 1. SETS (III)

9. Apply the result  $n(A \cup B) = n(A) + n(B) - n(A \cap B)$   
in the solution of simple numerical problems \_\_\_\_\_
- Determine & count the elements in the intersection of not more than two  
sets \_\_\_\_\_
- Determine & count the elements in the union of not more than two sets \_\_\_\_\_
10. Solve numerical problems arising from the intersection of not more than  
three sets \_\_\_\_\_
11. Solve problems involving the use of Venn diagrams with not more than  
three sets \_\_\_\_\_

### 2. ALGEBRA (IV)

20. Change the subject of Formulae including those involving roots & powers \_\_\_\_\_
21. Factorize expressions of the forms;
- (a)  $a^2 - b^2$  \_\_\_\_\_
  - (b)  $a^2 \pm 2ab + b^2$  \_\_\_\_\_
  - (c)  $ax + bx + ay + by$  \_\_\_\_\_
  - (d)  $ax^2 + bx + c$  \_\_\_\_\_  
**including  $x^2 + yx + px + yp$**
- where  $a, b, c$  are integers &  $a \neq 0$ .
22. Recognize the difference between those algebraic statements that represent  
Equations & those that represent Identities \_\_\_\_\_
23. Prove two algebraic expressions to be identical \_\_\_\_\_
- Complete the square on Quadratic expressions** \_\_\_\_\_
24. Solve quadratic equations by:
- (a) Factorization \_\_\_\_\_
  - (b) Using the Quadratic Formula \_\_\_\_\_
  - (c) Completing the square \_\_\_\_\_
25. Solve problems involving quadratic equations e.g. word problems \_\_\_\_\_
26. Solve a pair of equations in two variables when one equation is Quadratic  
or Non-linear & the other Linear \_\_\_\_\_



3. RELATIONS, FUNCTIONS & GRAPHS (III)

14. Draw & use the graph of a Quadratic Function to identify its features:

- (a) roots of the equation \_\_\_\_\_
- (b) an element of the Domain that has a given image \_\_\_\_\_
- (c) the image of a given element in the domain \_\_\_\_\_
- (d) the Maximum or Minimum value of the function \_\_\_\_\_
- (e) the equation of the Axis of Symmetry ( $x = -\frac{b}{2a}$ ) \_\_\_\_\_

15. Interpret the graph of a quadratic function to determine:

- (a) the interval of the domain for which the elements of the range may be greater than or less than a given point \_\_\_\_\_
- (b) an estimate of the value of the gradient at a given point \_\_\_\_\_
- (c) Intercepts of the function \_\_\_\_\_

16. Determine the

- (i) Equation of the Axis of symmetry \_\_\_\_\_
- (ii) Maximum or Minimum value \_\_\_\_\_  
of a quadratic function expressed in the form  $a(x + h)^2 + k$ ;

17. Sketch the graph of a quadratic function expressed in the form  $a(x + h)^2 + k$  & determine the number of roots \_\_\_\_\_

18. (a) Derive Composite Functions: (p801 - 814)

- (i)  $fg$  \_\_\_\_\_
- (ii)  $f^2$  \_\_\_\_\_  
given  $f$  and  $g$

(b) Non-commutativity of composite functions ( $fg \neq gf$ ) \_\_\_\_\_

19. State the relationship between a function & its inverse (*the composition of inverse functions  $f(x)$  and  $f^{-1}(x)$  is commutative and results in  $x$* ) \_\_\_\_\_

20. Derive the inverse of a function:  $f^{-1}, (fg)^{-1}$  \_\_\_\_\_

21. Evaluate

- (i)  $f(a)$  \_\_\_\_\_
- (ii)  $f^{-1}(a)$  \_\_\_\_\_
- (iii)  $fg(a)$  \_\_\_\_\_
- (iv)  $(fg)^{-1}(a)$  \_\_\_\_\_  
where  $a \in R$

22. Use the relationship  $(fg)^{-1} = g^{-1}f^{-1}$  \_\_\_\_\_

**SCHEME OF WORK – FORM 4 TERM II**

**4. GEOMETRY & TRIGONOMETRY (II)**

7. Identify simple plane figures possessing
- (a) Translational \_\_\_\_\_
  - (b) Bilateral \_\_\_\_\_
  - (c) Rotational symmetry, *order of rotational symmetry* \_\_\_\_\_
8. Define Translations in a plane as Vectors, written as Column Matrices, & recognize them when specified \_\_\_\_\_
9. State the relationships between an object and its image in a plane when it undergoes a translation in that plane: *vector notation; orientation, similarity, congruency* \_\_\_\_\_
10. (a) State the relationships between an object & its image in a plane when reflected in a line in that plane: *mirror line / axis of symmetry; orientation, similarity, congruency* \_\_\_\_\_
- (b) State the relationship between an object & its image in a plane when it is rotated about a point (the centre of rotation, *angle of rotation, direction of rotation*) in that plane: *orientation, similarity, congruency* \_\_\_\_\_
- (c) State the relationships between an object & its image in a plane under a given enlargement / reduction in that plane: *centre; scale factor  $k$  such that  $|k| > 1$  or  $0 < |k| < 1$ ; orientation, similarity, congruency* \_\_\_\_\_
11. a) Locate the image of a set of points under a combination of transformations, any TWO of:
- Enlargement/Reduction \_\_\_\_\_
  - Translation \_\_\_\_\_
  - Rotation \_\_\_\_\_
  - Reflection \_\_\_\_\_
- b) State the relations between an object & its image as the result of a combination of two transformations \_\_\_\_\_
12. Use the
- (a) Sine rule in the solution of problems involving triangles \_\_\_\_\_
  - (b) Cosine rule in the solution of problems involving triangles \_\_\_\_\_
  - (c) Do examination type questions including Bearings \_\_\_\_\_

5. MEASUREMENT (IV)

- 17. Calculate the area of a triangle given two sides & the included angle by means of the formula: Area of  $\Delta ABC = \frac{1}{2} ab \sin C$  \_\_\_\_\_
- 18. Calculate the area of a segment of a circle (no radians) \_\_\_\_\_

6. VECTORS & MATRICES

- 1. Explain concepts associated with vectors: *scalar multiples, parallel, equal, inverse* \_\_\_\_\_
- 2. Combine vectors written as 2x1 column matrices (TIP-TO-TAIL concept):
  - (i) Triangle law \_\_\_\_\_
  - (ii) Parallelogram law \_\_\_\_\_
- 3. Vector algebra: *addition, subtraction, scalar multiplication* \_\_\_\_\_

Note  $\begin{pmatrix} a \\ b \end{pmatrix} + \begin{pmatrix} c \\ d \end{pmatrix} = \begin{pmatrix} a + c \\ b + d \end{pmatrix}$

- 4. Associate a Position vector  $\vec{OP} = \begin{pmatrix} a \\ b \end{pmatrix}$  with a given point P (a, b) where O is the origin (0, 0) \_\_\_\_\_
- 5. Determine the Magnitude of a vector: including unit vectors \_\_\_\_\_
- 6. Determine the direction of a vector \_\_\_\_\_
- 7. Use vectors to represent & solve problems in geometry:
  - (i) Collinearity (*common point*) \_\_\_\_\_
  - (ii) Midpoint \_\_\_\_\_
  - (iii) Parallel \_\_\_\_\_
  - (iv) Displacement \_\_\_\_\_
  - (v) Velocity \_\_\_\_\_
  - (vi) Weight \_\_\_\_\_

## SCHEME OF WORK – FORM 4 TERM III

### 6. VECTORS & MATRICES CONT'D

8. Explain concepts associated with matrices:

- (i) Row \_\_\_\_\_
- (ii) Column \_\_\_\_\_
- (iii) Order \_\_\_\_\_
- (iv) Types of matrices: *square, rectangular, identity* \_\_\_\_\_
- (v) Practical use (to represent information) \_\_\_\_\_

9. Perform with matrices

- (i) Addition \_\_\_\_\_
- (ii) Subtraction \_\_\_\_\_
- (iii) Multiplication by a scalar \_\_\_\_\_
- (iv) Multiplication: Non-commutativity of matrix multiplication \_\_\_\_\_

10. Evaluate the Determinant of a 2x2 matrix \_\_\_\_\_

11. solve problems involving a 2x2 singular matrix \_\_\_\_\_

12. Obtain the inverse of a non-singular 2x2 matrix: Determinant & Adjoint of a matrix \_\_\_\_\_

13. Use matrices to solve simple problems in

- (a) Arithmetic \_\_\_\_\_
- (b) Algebra & Geometry: Linear simultaneous equations \_\_\_\_\_

(Matrices of order greater than **3x3** will not be set)

14. Determine a 2x2 matrix associated with specified transformations:

[Use of  $\begin{pmatrix} 1 \\ 0 \end{pmatrix}$ ,  $\begin{pmatrix} 0 \\ 1 \end{pmatrix}$  to find the matrix for a transformation]

- (a) Enlargements / Reduction *with centre at origin* \_\_\_\_\_
- (b) Rotations: *clockwise, anticlockwise, general rotation matrix* \_\_\_\_\_
- (c) Reflections: *x-axis, y-axis,  $y = x$ ,  $y = -x$*  \_\_\_\_\_

15. Determine a 2x2 matrix representation of the single transformation which is equivalent to the composition of two linear transformations in a plane (where the origin remains fixed) \_\_\_\_\_

### REVISION EXERCISES, TESTS & PAST PAPERS

## SCHEME OF WORK – FORM 5 TERM I

### 1. STATISTICS (IV)

21. Determine the measures of Dispersion / Spread (Range, Interquartile & Semi-interquartile range) for **grouped data** \_\_\_\_\_
22. Construct a Cumulative Frequency Table for ungrouped & grouped data \_\_\_\_\_
- 16. Use standard deviation to compare sets of data. No calculation of the standard deviation is required.* \_\_\_\_\_
23. Draw & use cumulative frequency curve (Ogive):
- (i) Appropriate scales for axes \_\_\_\_\_
  - (ii) Class boundaries as domain \_\_\_\_\_
24. Analyze statistical data & diagrams, commenting on the
- (i) Averages \_\_\_\_\_
  - (ii) Dispersion (spread) \_\_\_\_\_
  - (iii) Shape of the frequency distribution \_\_\_\_\_
25. Determine the Proportion or Percentage of the sample above or below a given value from
- (i) Raw data \_\_\_\_\_
  - (ii) *Frequency* Table or \_\_\_\_\_
  - (iii) Cumulative Frequency curve. \_\_\_\_\_
26. Identify the Sample Space for a simple experiment *including use of contingency tables* \_\_\_\_\_
27. Determine Experimental & Theoretical probabilities of events *including use of contingency tables* \_\_\_\_\_

### 2. RELATIONS, FUNCTIONS & GRAPHS (IV)

23. Draw a graph to represent a Linear Inequality in two variables. \_\_\_\_\_
24. Use Linear Programming techniques to *graphically* solve problems involving two variables \_\_\_\_\_
25. Draw & use the graphs of the functions of other non-linear functions:  
 $y = ax^n$  where  $n = -1, -2$  &  $+3$ , \_\_\_\_\_

26. Draw & Interpret (straight line only);

(A) Distance-Time graphs to determine:

- (i) distance \_\_\_\_\_
- (ii) time \_\_\_\_\_
- (iii) speed \_\_\_\_\_

(B) Speed-Time graphs to determine:

- (i) distance \_\_\_\_\_
- (ii) time \_\_\_\_\_
- (iii) speed \_\_\_\_\_
- (iv) magnitude of acceleration. \_\_\_\_\_

### 3. GEOMETRY & TRIGONOMETRY (III)

15. Solve practical problems involving Heights & Distances in three-dimensional situations \_\_\_\_\_

## **SCHEME OF WORK – FORM 5 TERM II**

### 3. GEOMETRY & TRIGONOMETRY (III) CONT'D

16. Solve problems using the following theorems related to the properties of a circle

- (i) the angle which an arc of a circle subtends at the centre of a circle is twice the angle it subtends at any point on the remaining part of the circumference \_\_\_\_\_
- (ii) the angle in a semicircle is a right angle \_\_\_\_\_
- (iii) angles in the same segment of a circle & subtended by the same arc are equal \_\_\_\_\_
- (iv) the opposite angles of a cyclic quadrilateral are supplementary \_\_\_\_\_
- (v) the exterior angle of a cyclic quadrilateral is equal to the interior opposite angle \_\_\_\_\_
- (vi) a tangent of a circle is perpendicular to the radius of that circle at the point of contact \_\_\_\_\_
- (vii) the lengths of two tangents from an external point to the points of contact on the circle are equal \_\_\_\_\_
- (viii) the angle between a tangent to a circle & a chord through the point of contact is equal to the angle in the alternate segment \_\_\_\_\_
- (ix) the line joining the centre of a circle to the midpoint of a chord is perpendicular to the chord \_\_\_\_\_

## **REVISION**

## □ **FORMAT OF CSEC GENERAL PROFICIENCY EXAMINATION**

The examination will consist of two papers: Paper 01, an objective type paper and Paper 02, an essay or problem-solving type paper.

**Paper 01** (1 hour 30 minutes). The Paper will consist of 60 multiple-choice items, from all Sections of the syllabus as outlined below. Each item will be allocated one mark.

<b>Sections</b>	<b>No. of items</b>
Number Theory and Computation	6
Consumer Arithmetic	8
Sets	6
Measurement	8
Statistics	6
Algebra	6
Relations, Functions and Graphs	8
Geometry and Trigonometry	8
Vectors and Matrices	4
<b>Total</b>	<b>60</b>

**Paper 02** (2 hours and 40 minutes)

The Paper consists of ten compulsory structured type questions.  
The marks allocated to the topics are:

<b>Sections</b>	<b>No. of marks</b>
Number Theory, Consumer Arithmetic and Computation	9
Measurement	9
Statistics	9
Algebra	10
Relations, Functions and Graphs	20
*Investigation	10
Geometry and Trigonometry	21
Vectors and Matrices	12
<b>Total</b>	<b>100</b>

\*The investigation question may be set on any combination of objectives in the syllabus.

## **SCHOOL BASED ASSESSMENT: Paper 031 and Paper 032 (Examination Year 2018)**

### **Paper 031 (20 per cent of Total Assessment)**

**Paper 031 comprises a project.**

The project requires candidates to demonstrate the practical application of Mathematics in everyday life. In essence it should allow candidates to probe, describe and explain a mathematical area of interest and communicate the findings using mathematical symbols, language and tools. The topic(s) chosen may be from any section or combination of different sections of the syllabus.

See Guidelines for School Based Assessment on pages **43 – 47**.

### **Paper 032 (Alternative to Paper 031) (1 hour)**

This paper is an alternative to Paper 031 and is intended for private candidates. This paper comprises two compulsory questions. The given topic(s) may be from any section or combination of different sections of the syllabus.

## **□ CERTIFICATION AND PROFILE DIMENSIONS**

The subject will be examined for certification at the General Proficiency.

In each paper, items and questions will be classified, according to the kind of cognitive demand made, as follows:

**Knowledge** require the recall of rules, procedures, definitions and facts, that is, items characterized by rote memory as well as simple computations and constructions.

**Comprehension** requires algorithmic thinking that involves translation from one mathematical mode to another. Use of algorithms and the application of these algorithms to familiar problem situations.



**Reasoning** requires:

- (i) translation of non-routine problems into mathematical symbols and then choosing suitable algorithms to solve the problems;
- (ii) combination of two or more algorithms to solve problems;
- (iii) use of an algorithm or part of an algorithm, in a reverse order, to solve a problem;
- (iv) inferences and generalisations from given data;
- (v) justification of results or statement; and,
- (vi) analysis and synthesis.

Candidates' performance will be reported under Knowledge, Comprehension and Reasoning.

### **WEIGHTING OF PAPER AND PROFILES**

The percentage weighting of the examination components and profiles is as follows:

<b>PROFILES</b>	<b>PAPER 01</b>	<b>PAPER 02</b>	<b>PAPER 03</b>	<b>TOTAL (%)</b>
Knowledge ( <b>K</b> )	18	30	6 (12)	60 (30%)
Comprehension ( <b>C</b> )	24	40	8 (16)	80 (40%)
Reasoning ( <b>R</b> )	18	30	6 (12)	60 (30%)
<b>TOTAL</b>	<b>60</b>	<b>100</b>	<b>20 (40)</b>	<b>200</b>
<b>%</b>	<b>30%</b>	<b>50%</b>	<b>20%</b>	<b>100%</b>

### **□ REGULATIONS FOR RESIT CANDIDATES**

Resit candidates must complete Papers 01 and 02 and Paper 03 of the examination for the year for which they re-register.

Resit candidates may opt to complete the School-Based Assessment (SBA) or may opt to re-use their previous SBA score which satisfies the condition below.

A candidate who rewrites the examination within two years may reuse the moderated SBA score earned in the previous sitting within the preceding two years. Candidates

reusing SBA scores in this way must register as “Resit candidates” and provide their previous candidate number.

All resit candidates may register through schools, recognised educational institutions, or the Local Registrar’s Office.

#### **□ REGULATIONS FOR PRIVATE CANDIDATES**

Private candidates must be registered for the examination through the Local Registrar in their respective territories and will be required to sit Papers 01, 02 and 032, Paper 032 is designed for candidates whose work cannot be monitored by tutors in recognised educational institutions. The Paper will be of 1-hour duration and will consist of two questions.

#### **□ GUIDELINES FOR THE SCHOOL-BASED ASSESSMENT**

##### **RATIONALE**

School-Based Assessment (SBA) is an integral part of student assessment in the course covered by this syllabus. It is intended to assist students in acquiring certain knowledge, skills and attitudes that are critical to the subject. The activities for the School-Based Assessment are linked to the “Suggested Practical Activities” and should form part of the learning activities to enable the student to achieve the objectives of the syllabus.

During the course of study of the subject, students obtain marks for the competencies they develop and demonstrate in undertaking their SBA assignments. These marks contribute to the final marks and grades that are awarded to students for their performance in the examination.

The guidelines provided in this syllabus for selecting appropriate tasks are intended to assist teachers and students in selecting assignments that are valid for the purpose of the SBA. These guidelines are also intended to assist teachers in awarding marks according to the degree of achievement in the SBA component of the course. In order to ensure that

the scores awarded by teachers are not out of line with the CXC standards, the Council undertakes the moderation of a sample of SBA assignments marked by each teacher. School-Based Assessment provides an opportunity to individualise a part of the curriculum to meet the needs of students. It facilitates feedback to the students at various stages of the experience. This helps to build the self-confidence of the students as they proceed with their studies. School-Based Assessment further facilitates the development of critical skills and that allows the students to function more effectively in their chosen vocation. School-Based Assessment' therefore, makes a significant and unique contribution to the development of relevant skills by the students. It also provides an instrument for testing them and rewarding them for their achievements.

The Caribbean Examinations Council seeks to ensure that the School Based Assessment scores are valid and reliable estimates of accomplishment. The guidelines provided in this syllabus are intended to assist in doing so.

## **THE PROJECT**

The project may require candidates to collect data or demonstrate the application of Mathematics in everyday situations. The activities related to the Project should be integrated into the classroom instruction so as to enable the candidates to learn and practice the skills needed to complete the project. Some time in class should be allocated for general discussion of project work; allowing for discussion between teacher and student, and student and student.

### **Role of the Teacher**

The role of the teacher is to:

- 1. Guide students in identifying suitable topics for the project for the SBA.**
- 2. Provide guidance throughout the project and guide the candidate through the SBA** by helping to resolve any issues that may arise.

3. Ensure that the project is developed as a continuous exercise that occurs during scheduled class hours as well as outside class times.
4. Assess the project and record the marks. Hardcopies of the completed documents should be kept by both the teacher and the student. The teacher should use the mark scheme provided by CXC and include comments pertinent to the conduct of the assessment.

### **Assignment**

The School Based Assessment consists of **ONE** project to be marked by the teacher in accordance with CXC guidelines.

### **ASSESSMENT CRITERIA**

The project will be presented in the form of a report and will have the following parts.

1. Project Title
2. Introduction
3. Method of Data Collection
4. Presentation of Data
5. Analysis of Data
6. Discussion of Findings
7. Conclusion

It will be marked out of a total of **20 marks** and the marks will be allocated to each task and profile as outlined below.

<b>Project Descriptors</b>	<b>Mark</b>			<b>Total</b>
	<b>K</b>	<b>C</b>	<b>R</b>	
<b>Project Title</b>				<b>1</b>
<input type="checkbox"/> Title is clear and concise and relates to a real-world problem	1			
<b>Introduction</b>				<b>4</b>
<input type="checkbox"/> Objectives are clearly stated	1			
<input type="checkbox"/> Comprehensive description of the project		2		
<input type="checkbox"/> Limited description of the project		(1)		
<input type="checkbox"/> Detailed contents page with page numbers	1			
<b>Method of Data Collection</b>				<b>2</b>
<input type="checkbox"/> Data collection method is clearly described, appropriate and without flaws		2		
<input type="checkbox"/> Data collection method is stated		(1)		
<b>Presentation of Data</b>				<b>5</b>
<input type="checkbox"/> Data is accurate and well organised		2		
<input type="checkbox"/> Data is presented but is not well organised		(1)		
<input type="checkbox"/> Tables/graphs included, correctly labelled and used appropriately		2		
<input type="checkbox"/> Tables/graphs included		(1)		
<input type="checkbox"/> Accurate use of mathematical concepts	1			
<b>Analysis of Data</b>				<b>2</b>
<input type="checkbox"/> Detailed analysis done which is coherent			2	
<input type="checkbox"/> Limited analysis of findings			(1)	
<b>Discussion of findings</b>				<b>2</b>
<input type="checkbox"/> Statement of findings clearly stated			1	
<input type="checkbox"/> Statement of findings follows from data collected			1	
<b>Conclusion</b>				<b>2</b>
<input type="checkbox"/> Conclusion was based on findings and related to the purpose of the project			2	
<input type="checkbox"/> Conclusion related to the purpose of the project			(1)	
<b>Overall Presentation</b>				<b>2</b>
<input type="checkbox"/> Information was communicated logically using correct grammar	2			
<input type="checkbox"/> Information was poorly organised or difficult to understand at times			(1)	
<b>Maximum for each profile</b>	<b>6</b>	<b>8</b>	<b>6</b>	<b>20</b>