TECHNICAL MATHEMATICS

Dear Grade 12 Learner

Congratulations on reaching your final year at school. More importantly, congratulations on choosing Technical Mathematics as a subject. You have no doubt realised how important this subject is for your career and future job opportunities. Grade 12 is hard work but the satisfaction and joy you will experience in passing Grade 12 is most definitely worth it.

Subject Requirements

You will need the following:

- A Technical Mathematics textbook
- Scientific calculator
- Notebook, in which Paper 1 and Paper 2 work is recorded separately.
- Summaries and a lot of revision.
- Access to the Exemplar examination question papers and memorandum.

The marks in brackets next to the topics below is an indication of the approximate mark of that topic in the final examination paper.

Paper 1

Algebra (50 ± 3 Marks)

- Expressions, Quadratic equations and inequalities
- Simultaneous equations
- Exponents, Surds and Logarithms
- Nature of roots
- Changing the subject of the formulae
- Factorize a cubic using factor theorem
- Complex Numbers

Functions and Graphs (35 ± 3 Marks)

- Straight Lines, Parabola, hyperbola and Exponential functions and their properties
- Transformations of functions and the effect of different parameters
- Circles and Semi Circles

Financial Mathematics (15 ± 3 Marks)

- Simple and compound interest
- Logarithms
- Nominal and effective interest rates
- Depreciation (reducing balance and straight line)

Differential Calculus & Integration (50 ± 3 Marks)

- Average Gradient
- Determining Derivative by:
  - First principles
  - Using Differentiation Rules: “power” rule
- Gradient at a point and tangents to curves
- Cubic graphs:
  - Determining x-intercepts using factor theorem
  - Determining Stationary points, using differentiation
  - Sketching cubic graphs
  - Interpretation of graphs
- Applications (maxima and minima; rate of change)
- Integration of Polynomials
- Apply Integration to determine area.

Paper 2

Analytical Geometry (25 ± 3 Marks)

- Distance, Midpoint & gradient formula
- Parallel and Perpendicular line criteria
- Inclination and equation of a line
- Circles and tangents
  - Plotting the Elipse

Trigonometry (50 ± 3 Marks)

- Definitions, basic identities, reduction formulae; special angles
- Identities and equations (solution in interval $[0^0; 360^0]$)
- Solution of triangles and problems in 2D and 3D
- Trigonometric graphs: trigonometric functions and their transformations
- Rotating Vectors

Euclidean Geometry (40 ± 3 Marks)

- Circle geometry
- Ratio and proportion
- Similarity of triangles

Mensuration, circles, angles and angular movement (35 ± 3 Marks)

- Circles, Angles and Angular Movement
  - **Circles (with origin as centre)**
    - Radius and Equation
    - Angles and Arcs
    - Degress and Radians
    - Sectors and Segments
  - **Angular and circumferential/peripheral velocity**
- Mensuration
  - Surface Area and Volume of Right Prisms
  - Effect on Surface Area and Volume of Right Prism when multiply any dimension by a factor k
  - Midordinate Rule

Assessment

School Based Assessment consists of 5 formal assessment tasks. Your final mark will be compiled as follows:

- SBA: 25%
- Practical 25%
- Final exam: 50%

School Based Assessment and PAT

- **Term 1:** test (15 %) and PAT
- **Term 2:** assignment (15%), June exam (25 %) and PAT
- **Term 3:** test (15%) , trial exam (30 %) and PAT

Final Examination

- Two 3 hour papers which are out of 150 marks each.

Tip:

- Ensure that you are fully acquainted with your calculator it will save you time in the examination.
- Ensure you are familiar with the information sheet. Which formula are on it and where these formula are on the page.

SCAN ME!
Technical Mathematics Overview

Technical Maths
https://drive.google.com/drive/folders/1uttLA0Ud2SoUhpZH47cWd62D6-MirMR?usp=sharing

Telematics Videos
https://qrgo.page.link/mCY4k