

UNIVERSITY OF SWAZILAND
FACULTY OF EDUCATION
RE-SIT EXAMINATION PAPER 2017

TITLE OF PAPER: CURRICULUM STUDIES IN MATHEMATICS I

COURSE CODE: CTE231/CTE531

PROGRAMME: B.ED 2 & PGCE

APPENDICES: CRITERIA FOR SCORING A "C" GRADE,
SELECTED SGCSE SYLLABUS TOPIC

TIME ALLOWED: THREE (3) HOURS

TOTAL MARKS: 100

INSTRUCTIONS: ANSWER ANY **FOUR** QUESTIONS. EACH
QUESTION IS WORTH 25 MARKS.

This paper contains 6 pages including appendices
DO NOT OPEN UNTIL INTRUCTED BY THE INVIGILATOR

Question 1

- a) What are misconceptions? [2]
- b) State **five** reasons why teachers need to study misconceptions. [5]
- c) Using examples from mathematics explain the difference between primary concepts and secondary concepts. [6]
- d) State Skemp's (1986) **two** principles of concept development. [2]
- e) You asked learners to calculate the minimum and the maximum area of a rectangle whose length is 4.7 cm and width 2.6 cm.

Lwethu gave the answers as follows: Minimum area is 12.215

Maximum area 12.225

- (i) Identify the source of Lwethu's response [2]
- (ii) Write a detailed feedback you would give to him. [8]

Question 2

- a) Give **four** reasons why it is important to determine contributory concepts for a topic. [4]
- b) Identify **six** concepts that are contributory concepts to the SGCSE mathematics topic "Probability." See appendix 1 for syllabus extract. [6]
- c) "Teaching approaches informed by constructivist theory are appropriate for an examination oriented curriculum" Support or refute the statement. [15]

Question 3

- a) State **five** reasons for lesson planning [5]
- b) In appendix 2 are criteria for scoring a "C" grade in SGCSE mathematics. Give **five** implications for you as a teacher of mathematics in preparing learners to obtain at least a C grades. [5]
- c) "Our mathematics teachers at all levels have used the psychomotor domain in the teaching of mathematics" Explain the psychomotor domain then support or refute the statement. [15]

Question 4

- a) Why is it important to consider the following when preparing a scheme of work?
 - (i) Materials to use [2]
 - (ii) Time frame for each topic [2]
 - (iii) Past examination questions [2]
- b) For the topic in appendix 1 identify factual knowledge that learners need to recall or recognize i.e. what strategies would you use to facilitate remembering of these things? [15]

c) Write Furst's **four** suggestions about objectives

[4]

Question 5

Write an essay on the importance of problem solving in the teaching and learning of school mathematics.

[25]

Appendix 1

Probability

All learners should be able to:

- 24.1 Explain the terms and phrases used in probability
- 24.2 Calculate the probability of a single event as either a fraction or a decimal (NOT a ratio)
- 24.3 Understand and use probability scale from 0 to 1
- 24.4 Understand that the probability of an event occurring = $1 -$ (minus) the probability of an event not occurring
- 24.5 Understand that relative frequency approximates to probability provided the number of trials is large enough
- 24.6 Find probabilities of two combined events using possibility space diagrams (outcomes represented by points on a grid)

In addition learners writing the extended paper should be able to:

- 24.7 Find probabilities of simple combined events using tree diagrams (independent and dependent events)
- 24.8 Use the basic rules of probability for the combined events A and B and A or B
- 24.9 Use relative frequency as probability in practice (e.g. frequency and cumulative frequency tables).

Appendix 2

A Grade C candidate should be able to:

- Apply the four rules of number to positive and negative integers, and vulgar and decimal fractions.
- Use positive and negative indices in numerical work.
- Calculate percentage change.
- Perform calculations involving several operations.
- Use a calculator fluently. Give a reasonable approximation to a calculation involving the four rules.
- Use and understand the standard form of a number.
- Use area and volume units.
- Find the volume and surface area of a prism and a cylinder.
- Use a scale diagram to solve a two-dimensional problem.
- Solve ratio and proportion problems.
- Solve problems involving perimeters and areas of compound shapes bounded by line segments and/or circular arcs.
- Solve practical problems involving mass, volume and density.
- Draw distance-time graphs.
- Make quantitative and qualitative conclusion from distance-time graphs.
- Manipulate algebraic fractions with denominators containing a single term (numerical or algebraic).
- Form simple algebraic expressions.
- Factorise two-term expressions and expressions of the form $x^2 + bx + c$.
- Form and solve linear equations in practical situations.
- Manipulate and solve fractional equations and quadratic equations ($a = 1$).
- Calculate the length of the third side of a right-angled triangle.
- Find the angle in a right-angled triangle, given two sides.
- Calculate angles in geometrical figures.
- Recognise, and in simple cases formulate, rules for generating a pattern or sequence.
- Solve simple simultaneous linear equations in two unknowns.
- Form and solve simple linear inequalities
- Represent regions in the plane determined by linear inequalities.
- Identify and describe rotational symmetry in two dimensions.

- Use angle properties and symmetry properties of a circle to calculate specified angles and/or length of line segments.
- Use cosine, sine and tangent ratios in right angled triangles when solving problems in two dimensions (including bearings, angles of elevation and depression).
- Draw and or state loci of points in two dimensions.
- Draw, recognise and describe transformations of shapes (translation, rotation, reflection and enlargement).
- Make, use and interpret scale drawings.
- Find the magnitude of a vector.
- Calculate the probability of single events.
- Make and justify estimates of probability.
- Understand that relative frequency approximates to probability.
- Analyse a given situation, generate data, generalise the data and describe the situation using mathematical symbols, words or diagrams.
- Transform simple formulae.
- Substitute numbers in more difficult formulae and evaluate the remaining term.
- Use brackets and extract common factors from algebraic expressions.
- Construct a pie-chart from simple data.
- Plot and interpret graphs, including travel graphs, conversion graphs and graphs of linear and simple quadratic functions.