

NATIONAL UNIVERSITY OF LESOTHO

BSc.Ed EXAMINATIONS

SCE 3421: Curriculum Studies in Junior Secondary Mathematics

JUNE 2023

MARKS: 100

TIME: 3 HOURS

- INSTRUCTIONS:**
- Answer any **four** out of the five questions
 - Each question carries **25** marks
 - Begin each question on a fresh page
 - Number all your answers the way questions are numbered
 - You may use an electronic calculator where necessary
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DO NOT OPEN THIS SPACE UNTIL YOU HAVE BEEN TOLD TO DO SO BY THE EXAMINATIONS OFFICER

Question 1 [25 Marks]

(a) Define the concept Geometry. [1]

(b) State and describe the first three (3) Van Hiele's levels of geometrical thought.

Write: level number; naming; description. [6]

(c) Suppose you are to teach a Grade 8 learner at Level 1 of geometric thought the calculation of the Area of a trapezium.

(i) Identify and write down the Van Hiele's Phase of Learning within which you can operate to help this learner to transit from Level 1 to Level 2. [1]

(ii) Explicitly describe the teaching strategy you would use when teaching within this Phase of learning to help the learner transit from level 1 to level2. [3]

(d) In teaching calculation of perimeter of a rectangle to Grade 8 learners, a teacher first tells learners the objective of the lesson. He then instructs learners to go outside in the school yard and use four sticks and a piece of string to form their rectangular boundaries around pieces of land they choose to make their sites. During this activity the teacher instructs learners to: 1. measure and write down the length of each side of their sites; 2. put the string around all the corner-poles of their sites and measure the length of that string; 3. add the sizes of all the sides and compare the answer with the measured length of the string.

After the activity the teacher tells the learners that what they found was the perimeter of their rectangular sites, and provides the clear definition of perimeter and gives a worked example of its calculation.

(i) State two teaching methods the teacher used. [2]

(ii) Discuss the effectiveness of this teaching strategy in helping learners to grasp the concept of perimeter. [6]

(iii) Discuss three (3) possible disadvantages of using this teaching strategy. [6]

[25]

Question 2

- (a) Discuss the learner-centered teaching approach as opposed to teacher-centered approach. [5]
- (b) Distinguish between a misconception and a conceptual error as they apply to the teaching and learning of Mathematics. Write down one example for each case. [5]
- (c) In one lesson, Grade 8 learners are given an exercise to do:
- (1) 'Express the fraction $\frac{17}{50}$ as a percentage.
 - (2) Express the expression $\frac{5}{7} - \frac{2}{5}$ as a single fraction.

In carrying out the exercise, Lesilo writes:

$$(1) \frac{17}{50} = \frac{17}{50} \times 100 \\ = 35\%;$$

$$(2) \frac{5 \times 5}{7 \times 5} - \frac{2 \times 7}{5 \times 7} \\ = \frac{25 - 14}{35} \\ = \frac{19}{35}$$

- (i) State two types of errors Lesilo committed. [2]
- (ii) If Lesilo had not made any errors, how would his work look like? (write exactly the way he would be expected to have written). [4]
- (iii) Explain why Lesilo is considered to have committed the errors you listed in each case in (a) and why the way you have written in (b) above is mathematically correct. [3]
- (iv) Discuss the teaching strategy you would use in your teaching of fractions in order to avoid each of the errors Lesilo committed. [6]

Question 3 [25 marks]

- (a) By definition, a Curriculum is set to address each of the following:
- (i) *What should be taught,*
 - (ii) *To whom should it be taught,*
 - (iii) *When should it be taught,*
 - (iv) *How should it be taught,*
 - (v) *How much of it should be taught?*

Describe a curriculum by explaining how each of the above questions contributes in its definition. [10]

- (b) State and describe:
- (i) Two pedagogical practices proposed by the Grade 8 Mathematics syllabus,
 - (ii) Two learning practices stipulated by the Grade 8 Mathematics syllabus. [4]

- (c) As discussed in this course, historical change in Mathematics curriculum across the world and in Lesotho includes 6 aspects. One of these aspects is Mathematics Content.
Mention and discuss two more aspects of curriculum change discussed. [4]
- (d) According to History, in the late 50s, SPUTNIK was a major instigator of Mathematics curriculum change across the world.
(i) Describe what SPUTNIK was and explain what finally happened to it. [3]
(ii) State and describe two major curricula change projects brought about by the launching of SPUTNIK in the **late 50s. (include one challenge brought by introduction of one of these projects)** [4]

Question 4 [25 Marks]

- (a) State and elaborate on two possible reasons for poor performance in Mathematics in Lesotho's secondary education. [4]
- (b) Write down and discuss any three *capabilities* that Mathematics teaching is set to develop in a learner [6]
- (c) One of the skills that classroom Mathematics should equip learners with is '*Functional Numeracy*'.
Suggest and Describe a teaching activity, which you can use in your teaching to equip your learners with this capability. Use an appropriate example of a topic/subtopic as content to be taught. [5]
- (d) The LGCSE syllabus is classified into four main syllabus areas.
(i) State the four syllabus areas and their abbreviations. [4]
(ii) For each of the four syllabus areas you stated in (a)(i) above, write down two *Learning Objectives* stipulated by a Grade 8 Mathematics syllabus. [6]

Question 5 [25 Marks]

- (a) Distinguish between a learner who has *Conceptual understanding* and a learner who has *Procedural understanding* of a Mathematics concept. Use appropriate examples in the learning of fractions at Grade 8 level. [5]
- (b) State and briefly describe the three (3) facets of Mathematics according to Ebrahim (2010). [5]
- (c) Problem-solving is a term commonly used in the teaching/learning of Mathematics:
(i) Explain what a *Worthwhile Problem* is in the context of teaching and learning of Mathematics. [3]
(ii) Discuss each of the following approaches to the teaching of Mathematics as it applies to problem-solving. In your discussion, put emphasis on the effectiveness of Mathematics teaching.
a. Teaching for Problem-Solving,
b. Teaching through Problem-Solving. [6]
(iii) Design and write down a *worthwhile problem* you could use in the teaching of Fractions. [5]