University of Fort Hare
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UNIVERSITY OF FORT HARE

MATHEMATICS EDUCATION 3

MTH313E

JUNE

YEAR 2023

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Time	**3 hours**
Subject	**Mathematics**
Marks	**100**

This paper consists of 8 pages, including cover page

Internal Examiner

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Internal Moderator

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INSTRUCTIONS

1. **This paper is divided into SECTION A, B and C**
2. **All the questions are compulsory.**
3. **You are expected to use your OWN words and understanding.**
4. **Read the instruction carefully.**

SECTION A **[15]**

True / False

1. A prism is a polyhedron formed by connecting a polygonal base and a point called a vertex.
2. A pyramid is a polyhedron in which all cross-sections are taken perpendicular to a base and are identical to the base.
3. A prism always has an even number of edges, but a pyramid can have an even number of edges or an odd number of edges.
4. Look at a prism and a pyramid with equal bases. Count the edges of the pyramid. Count the vertices of the prism. The two numbers will always be the same.
5. A prism has one face for each vertex, but a pyramid has fewer faces than vertices.
6. A pyramid always has an even number of edges, but a prism can have an even number of edges or an odd number of edges.
7. Look at a prism and a pyramid with equal bases. Count the edges of the pyramid. Count the vertices of the prism. The two numbers will always be the same.
8. Transformation is the process of creating a two-dimensional plane using the repetition of a geometric shape with no overlaps and no gaps.
9. Geometric patterns are number patterns represented by diagrams.
10. Constant ratio in a geometric sequence is found by adding or subtraction the previous term by the same amount.

(10)

Fill in:

11. An octagonal prism has --------- edges.

A: 8

B: 10

C: 16

D: 24

12. A square based pyramid has _____ faces

A: 4

B: 5

C: 12

D: None of the above

13. The size of an interior angle in a regular polygon is_____.

A: 90 degrees

B: 135 degrees

C: 108 degrees

D: None of the above

14. In a right angled triangle, one of the angles is 90^0 and the other two angles are:

A: 45mm

B: 45^0

C: 72 mm^2

D: None of the above

15. Characteristics of a rectangle are:

A: It has 6 straight equal sides.
It has 6 equal sides.

B: It has 4 straight equal sides
It has 4 equal angles.

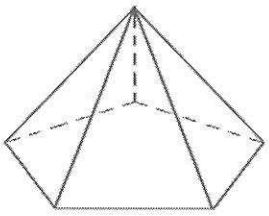
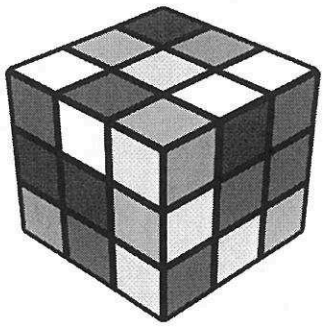
C: It has 2 long equal sides and 2 short equal sides
It has no right angles.

D. It has 8 equal straight sides.
It has 8 equal angles.

(5)

SECTION B **[48]**

1. Fill in the missing letters (a – e)

object	Faces	Vertices	Edges
Triangular prism	4	(a)	(b)
	(c)	6	(d)
	6	(e)	12

(5)

2. In the classroom, learners were given rectangles, squares, and triangles. They were asked to sort these shapes according to the number of sides. Below are how two learners organizing their shapes:

   Thabo: had three sets, one set with triangles, the second set with squares, and the third set with rectangles.

   Pat: had two sets, one set with triangles and the second set with rectangles and squares.

Drawing on the Van Hiele's levels of geometric understanding describe the level(s) on which each learner is operating. **Motivate** your answer. **(6)**

3. Amanda is a new Grade 6 teacher. She needs your help to plan her mathematics lesson for term 2. She needs help with the following components of a lesson plan for teaching and learning:

- Lesson aims **(2)**
- Introduction **(5)**
- Lesson Development with two stages **(5)**
- 2 Resources to support teaching and learning **(3)**

Content Area: Space and Shape

Topic: Properties of 2-D shapes

Concept and Skill: Describe, sort, and compare 2-D shapes in terms of the number of sides.

4. Discuss Van Hiele's first two **phases of learning**, the **inquiry phase (Information)** and **free orientation**. Provide examples to support your discussion. **(10)**

5. (a) Draw a flow diagram to show the following: Input =7, process= x2, and the output=14. **(2)**

b) Explain in your own words what is an input, output and the rule in a flow diagram and give examples in each. **(6)**

c) Explain to the grade 6 learner how you find the input when you are only given the output and show example. **(2)**

d) If the rule is **b=ax2+3** and the output is 11. Show a grade 6 learner how you are going to get the input. **(2)**

SECTION C [37]

1. As a grade 6 teacher, you need to be able to name, describe, distinguish, and compare 3D objects.

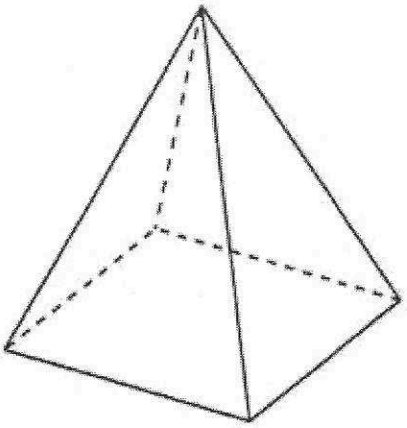


Diagram 1

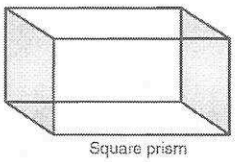


Diagram 2

a) Compare these TWO groups of 3D shapes. **[2]**

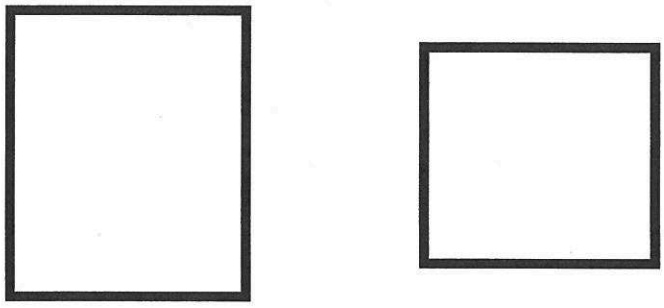
b) Describe the similarity between the two shapes in terms of dimensions. **[2]**

c) Explain to a grade 6 learner what the difference between the two diagrams is. **[6]**

d)Name the 3D shape in diagram 1. **[1]**

2. As a mathematics Intermediate phase teacher, you need to know the features of 2D shapes.

Shape A **Shape B**



a) Describe these 2D shapes according to the number of sides, length of sides and the sizes of the angles inside the shape. Draw a table like the one below: **[6]**

2D-shapes	Number of sides	Length of sides	Angles inside the shape
Shape A	[1]	[1]	[1]
Shape B	[1]	[1]	[1]

b) Thobile who is a grade 6 learner seems to be struggling to differentiate between the two diagrams. As an expect in this field, explain to him the similarities and differences between the shapes. Draw in your workbook the following table. **[6]**

2D SHAPES		
	Shape A	Shape B
Similarities **[4]**		
Differences **[2]**		

3. There are two types of polygons: Regular and irregular polygons.

a) Describe what are regular and irregular polygons **[4]**

b) Draw an example of a regular and irregular polygon **[2]**

c) Explain to a grade 6 learner the similarities and differences between a rectangle and a parallelogram. Also draw an example of a rectangle and a parallelogram. **[8]**

TOTAL = 100