

BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF SCIENCE EDUCATION

- - DEC 2018

Diploma in Science Education II

MT 007: Applied Mathematics Education II:

Duration 3 hours

**Instructions**

1. Answer all questions in Section A and any other two questions from Section B.
2. Start each question answer on a new page.
3. Present your answers neatly.

**SECTION A [40 Marks]**

**Q1.** a) Given that,  $\log_{10}(x + 2) + \log_{10}(x + 4) = 1$ , show that  $x^2 + 6x - 2 = 0$ . [3]

Solve the equation:  $x^2 + 6x - 2 = 0$ , giving your answers correct to two decimal places. [4]

Explain briefly, why only the positive value of  $x$  satisfies the equation

$\log_{10}(x + 2) + \log_{10}(x + 4) = 1$  . [1]

**Q2. Answer the whole of this question on a graph paper**

- a) Using a scale of 2cm to 2 units on each axis, draw the X and Y axis such that:  
 $0 \leq X \leq 10$  and  $-12 \leq Y \leq 8$ .  
Draw triangle PQR whose vertices are P(2, 4), Q(4, 4) and R(3, 2). [1]
- b) Draw and label triangle  $P_1Q_1R_1$ , the image of triangle PQR under a Shear with y-axis invariant and shear factor -4. [3]
- c) i) Draw the line  $y = x - 4$  and label it  $\ell$ . [1]  
ii) Draw triangle  $P_2Q_2R_2$ , the image of triangle PQR under a reflection in the line  $\ell$ . [3]
- d) Triangle  $P_3Q_3R_3$  has vertices at the points  $P_3(3, 8)$ ,  $Q_3(6, 8)$  and  $R_3(4, 4)$ .
  - i) Draw and label triangle  $P_3Q_3R_3$ . [1]
  - ii) Describe fully the **single** transformation which maps triangle PQR onto triangle  $P_3Q_3R_3$ . [3]
- e) List four concepts that you can assume before teaching transformation. [8]

**Q3. Answer the whole of this question on a sheet of graph paper.**

The marks scored by 200 students in a mathematics test are summarised in the table below:

Mark (x)	$15 < x \leq 30$	$30 < x \leq 40$	$40 < x \leq 50$	$50 < x \leq 60$	$60 < x \leq 80$	$80 < x \leq 100$
Number of candidates (f)	45	20	55	40	30	10

- a) Draw a histogram for this distribution using scale of 2cm to 10 marks on the horizontal axis and 2cm to 1 unit on the vertical axis. [6]
- b) Copy and complete this table which uses an assumed mean of 45.

Mark (x)	Number of Candidates (f)	$(x - 45)$	$F(x - 45)$
22,5	45	-22,5	-1012,5
35	20		
45	55		
55	40		
70	30		
90	10	45	450
	Total = 200		Total =

Hence, or otherwise, calculate the mean of the distribution. [6]

**SECTION B [40 Marks]**

Q4. Explain any five indicators of good mathematics teaching [20]

Q5.a) State five classroom factors affecting mathematics learning. [10]

- b) Describe a teaching method which can reduce the effect of one of the factors affecting the learning of mathematics. [10]

Q6. Evaluate the application of problem-solving in mathematics in Zimbabwe secondary schools. [20]

**END OF EXAMINATION PAPER**