EXAMINATIONS COUNCIL OF ZAMBIA
JUNIOR SECONDARY SCHOOL LEAVING EXAMINATION (GRADE 9) - 2015

Mathematics 401/2
Paper 2

(INTERNAL AND EXTERNAL CANDIDATES)

READING TIME: 10 MINUTES
WORKING TIME: 2 HOURS
MARKS: 50

CANDIDATE NAME: ____________________________________________________________
EXAMINATION NUMBER: ______________________________________________________
SCHOOL/CENTRE: ____________________________________________________________

Instructions to candidates

1. Write your name, examination number and school/centre in the spaces provided
   on the question paper.
2. There are eight (8) questions in this paper. Answer any five (5) questions.
3. Answer all questions in the spaces provided on the question paper.
4. Write your answers clearly.
5. All essential working must be shown. Candidates will be penalized for omitting
   essential working.
6. Tick (✓) the question you have attempted in the grid provided below.

<table>
<thead>
<tr>
<th>Questions</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>Total marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tick</td>
<td></td>
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<td></td>
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<td></td>
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<td></td>
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<tr>
<td>Mark</td>
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<td></td>
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</tbody>
</table>

Information for candidates

Cell phones and calculators are not allowed in the examination room.

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This question paper consists of 15 printed pages.
1  (a) Write 0.004289 in standard form correct to 2 decimal places.  [2]

(b) Solve the equation $3(2x + 1) = 17 - 2(x - 1)$.  [2]

(c) Given that $2 = \frac{m + n}{3 + mn}$ make $m$ the subject of the formula.  [3]
(d) Kawombesha earns K7 000.00 per month. His income tax deductions are calculated as follows:

<table>
<thead>
<tr>
<th>Amount</th>
<th>Income tax (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First K3 000.00</td>
<td>0</td>
</tr>
<tr>
<td>Next K1 000.00</td>
<td>25</td>
</tr>
<tr>
<td>Next K1 000.00</td>
<td>30</td>
</tr>
<tr>
<td>Balance</td>
<td>35</td>
</tr>
</tbody>
</table>

How much income tax does he pay? [3]

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2 (a) Express $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} \begin{pmatrix} -2 \\ 5 \end{pmatrix}$ as a single matrix. [2]
(b) Solve the simultaneous equations
\[ 3x - 2y = 12, \]
\[ x + 3y = -7. \]

(c) (i) Construct triangle LMN in which LM = 7cm, MN = 5cm and LN = 6cm. [1]
(ii) Bisect angle LNM and angle LMN and label the point of intersection of the angle bisectors as O. [2]
(iii) Draw a perpendicular from O to the side LM. Label the point where the perpendicular meets LM as P. [1]
(iv) With O as the centre, draw a circle which touches all the three sides of the triangle LMN. [1]
3  (a)  Given the following set of ordered pairs (22, 11), (20, 10), (18, 9), (16, 8) and (14, 7),
   (i)  find the function representing this mapping, [2]

   (ii) find the value of \( x \) when \( y = -5 \). [2]

(b)  An agent sold a television set for K2 200.00. This amount includes 10% commission for the agent. What was the price of the TV set before the commission was added? [3]
(c) The triangles below are similar.

Given that \( PQ = 18\text{ cm} \), \( QR = 20\text{ cm} \) and \( XY = 30\text{ cm} \), calculate the length of \( WY \). [3]
Given that $E = \{x : x \leq 10, x \in \mathbb{N}\}$, $P = \text{prime numbers in } E$, $Q = \text{even numbers in } E$ and $R = \text{factors of 6}$.

(i) Illustrate this information in the Venn diagram below.

(ii) List the elements of $(P \cup R)' \cap Q$.

(b) Illustrate the solution of $x + y \leq -2$ on the XOY-plane shown below, by shading the wanted region for the domain $-5 \leq x \leq 1$. [3]
(e) Given that $A = \begin{pmatrix} 1 & 2 \\ 3 & 1 \end{pmatrix}$ and $B = \begin{pmatrix} 5 & 0 \\ 0 & 6 \end{pmatrix}$, find $AB$. [3]

(a) Evaluate $111_{\text{two}} \div 11_{\text{two}}$, giving your answer in base two. [2]

(b) A bag contains 6 red marbles and 3 blue marbles. A marble is picked at random from the bag, find the probability that it is blue. [2]
(e) In the triangular prism ABCDEF below, $AC = 4\text{cm}$, $AB = 3\text{cm}$, $BC = 5\text{cm}$ and $BF = 11\text{cm}$.

Find its total surface area. [3]
(d) On the XOY - plane shown below,

(i) State the coordinates of D. [1]

(ii) draw the graph of \( y = \frac{1}{3} x \) for the domain \(-3 \leq x \leq 6\). [2]

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6 (a) Simplify \( 3x + 7 - 2(x - 3) \). [2]
(b) The angles of triangle ABC are shown in the diagram below.

![Diagram of triangle ABC with angles marked as (x + 10°), (x + 65°), and (90°).]

Calculate the value of \(x\).  [2]

(e) The diagram below shows a cylinder of radius 3.5 cm and length 22 cm.

![Diagram of a cylinder with radius 3.5 cm and length 22 cm.]

[Take \(\pi = \frac{22}{7}\).]

Calculate its volume.  [3]
(d) Kafola’s current salary is K5 000.00. He gets housing allowance at 20% of the salary. What amount will be his housing allowance after a salary increment of K750.00?

[Total: 10]

7 (a) Given the length \( l \) and breadth \( b \) of a rectangle, write a simple program to calculate and output the area, \( A \), of a rectangle.
(b) Multiply $144_{\text{five}}$ by $13_{\text{five}}$, giving your answer in base five. [3]

(c) The frequency table below shows the marks obtained by pupils in a Mathematics test.

<table>
<thead>
<tr>
<th>Mark</th>
<th>0 - 4</th>
<th>5 - 9</th>
<th>10 - 14</th>
<th>15 - 19</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of pupils</td>
<td>7</td>
<td>8</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

(i) What was the modal class? [1]

(ii) Calculate the mean mark. [3]

[Total: 10]
8  (a)  The insurance company rated the value of a house at K100 000.00. This value appreciates at the rate of 20% each year. Calculate its value after one year.  [2]

(b)  Selula bought a cell phone for K1 380.00. How much is this amount in US dollars given that the exchange rate is $1 to K6.90?  [3]

(c)  Find the sum of the interior angles of a polygon with eight sides.  [2]
The compound bar chart below shows the number of bags of maize produced by Mr Hapopwe and Mr Milisi from 2010 to 2014.

Find the difference in the total number of bags produced by the two farmers from 2010 to 2014. [3]
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