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**EXAMINATIONS COUNCIL OF ZAMBIA**  
**JUNIOR SECONDARY SCHOOL LEAVING EXAMINATION (GRADE 8) – 2022**

**Mathematics 401/2**  
**Paper 2**

(INTERNAL CANDIDATES)

Reading Time: 10 minutes

Marks: 50

Working Time: 2 hours

Examination Number: .....

School/Centre Name: .....

School/Centre Code: .....

**Instructions to candidates**

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- 1 Write your **examination number, school/centre name** and **code** in the spaces provided on the question paper.
- 2 Write your **examination number** on **every page** of this question paper.
- 3 There are **two (2)** sections in this paper, **A** and **B**.  
 Section **A**: There are **two (2)** questions in this section, answer **both**.  
 Section **B**: There are **six (6)** questions in this section. Answer any **three (3)** questions.
- 4 Write all your answers in the spaces provided on the question paper.
- 5 All essential working must be shown. Candidates will be penalised for omitting essential working.
- 6 Tick (✓) the questions you have attempted in Section **B** in the grid provided below.

| Section           | A |   | B |   |   |   |   |   | Total marks |
|-------------------|---|---|---|---|---|---|---|---|-------------|
| Questions         | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |             |
| Tick              | ✓ | ✓ |   |   |   |   |   |   |             |
| Mark              |   |   |   |   |   |   |   |   |             |
| Marker's Initials |   |   |   |   |   |   |   |   |             |

**Information for candidates**

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

0ECZ/JSSLE/2022/T1

This question paper consists of 16 printed pages.

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## SECTION A: [20 MARKS]

There are two questions in this section, answer **both**. Each question carries 10 marks.

- 1 (a) Given that  $(1 \ 3) \begin{pmatrix} 3 \\ y \end{pmatrix} = (9)$ , find the value of  $y$ . [2]

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- (b) Evaluate  $11011_{\text{two}} + 11_{\text{two}}$ , giving your answer in base two. [2]

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- (c) A man's basic rate per hour is K20.00 and his overtime rate is "double time". If he worked for 54 hours instead of 40 normal working hours in a certain week, calculate his wage for that week. [3]

- (d) Solve the simultaneous equations  
 $x - 3y = 1$ ,  
 $x + 2y = 6$ .

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[3]

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[Total: 10]

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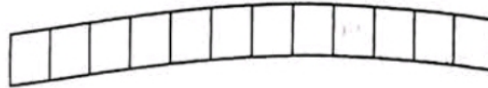
- 2 (a) Solve the equation  $\frac{x}{2} = 3x - 1$ . [2]

- (b) Evaluate  $342_{\text{five}} \times 14_{\text{five}}$ , giving your answer in base five. [3]

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- (c) (i) Use geometrical instruments to construct triangle ABC in which  $AB = 10\text{cm}$ , angle  $ABC = 55^\circ$  and angle  $BAC = 60^\circ$ . [1]
- (ii) Measure and write the length of AC. [1]
- (iii) Bisect the sides AB and BC and let the bisectors meet at O. [2]
- (iv) With centre O and radius OA, draw a circle which touches A, B and C. [1]

**SECTION B: [30 MARKS]**

There are six questions in this section, answer **any three**. Each question carries 10 marks.

- 3 (a) Simplify  $5(2 - x) + 2(3x - 7)$ .

[2]

- (b) A bag contains 3 red and 9 green balls. One ball is picked at random from the bag. Find the probability that the ball picked is green.

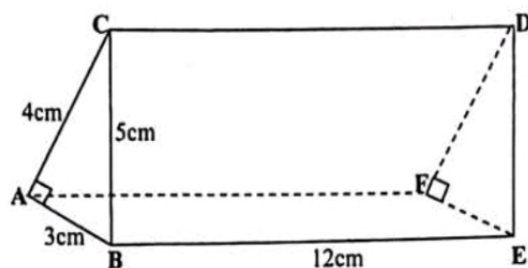
[2]

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- (c) A sales agent has a salary of K1 800.00 per month. He also receives a commission of 5% on all his sales. If the total sales for a month was K40 000.00, calculate his total income for that month.

[3]

- (d) The figure ABCDEF below is a triangular prism in which  $AB = 3\text{cm}$ ,  $BE = 12\text{cm}$ ,  $AC = 4\text{cm}$  and  $BC = 5\text{cm}$ .



Calculate the volume of the prism.

[3]

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[Total: 10]

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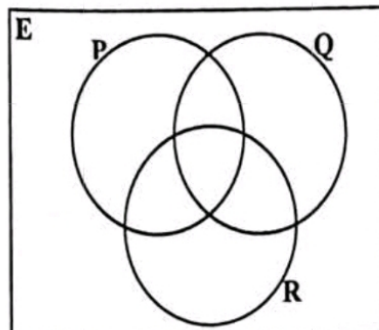
- 4 (a) Given that  $\frac{2}{y} = \frac{3x}{x-1}$ , make  $x$  the subject of the formula.. [3]

- (b) Given that  $A = \begin{pmatrix} 8 & 4 \\ 2 & -4 \end{pmatrix}$  and  $B = \begin{pmatrix} 1 & 3 \\ -1 & 6 \end{pmatrix}$ , find  $\frac{1}{2}A + B$ . [3]

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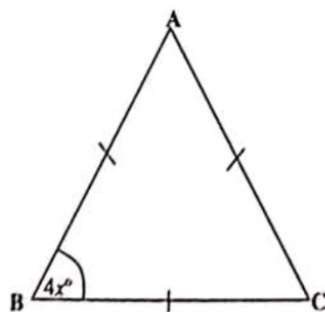
- (c) Given that  $E = \{-1, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ ,  
 $P = \{1, 2, 3, 5, 9\}$ ,  $Q = \{1, 2, 3, 4, 6, 8\}$  and  $R = \{2, 3, 4, 5, 10\}$ ,  
 (i) illustrate this information in the Venn diagram below, [2]



- (ii) list the elements of  $(P \cap Q)' \cup R$ . [2]

[Total: 10]

- 5 (a) In the triangle ABC,  $AB = AC = BC$  and angle  $ABC = 4x^\circ$ .



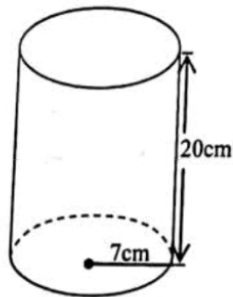
Calculate the value of  $x$ .

[2]



- (b) Calculate the number of sides of a polygon whose sum of interior angles is  $720^\circ$ . [2]

- (c) The following diagram is a cylinder of radius 7cm and height 20cm.



Calculate the total surface area of the cylinder. [Take  $\pi$  as  $\frac{22}{7}$ ] [3]

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- (d) A car is valued at K120 000.00. Calculate its book value after 2 years if it depreciates using the straight line method at 4% of the original value per year. [3]

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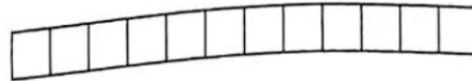
[Total: 10]

- 6 (a) Given that  $f(x) = 2x - 4$ , find
- (i) the range for the domain  $\{1, 2, 3\}$ ,

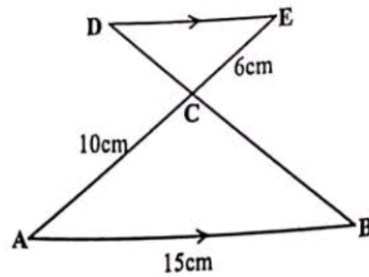
[www.eczpastpapers.com](http://www.eczpastpapers.com) [3]

- (ii)  $x$  when  $f(x) = 20$ .

[1]



- (b) In the following diagram, triangles CAB and CED are similar.  $AB = 15\text{cm}$ ,  $AC = 10\text{cm}$ ,  $CE = 6\text{cm}$ ,  $AB$  and  $DE$  are parallel.



Calculate the length of  $DE$ .

[3]

- (c) On a particular day, the exchange rate between the **Zambian Kwacha** and the British Pound was  $\text{£}1 = \text{K}26.50$ . How many pounds would be exchanged for  $\text{K}5\,300.00$ ? [3]

[Total: 10]

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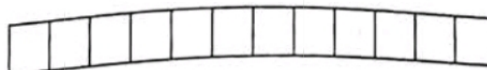
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- (a) Express 0.3475 in standard form correct to 2 significant figures. [2]

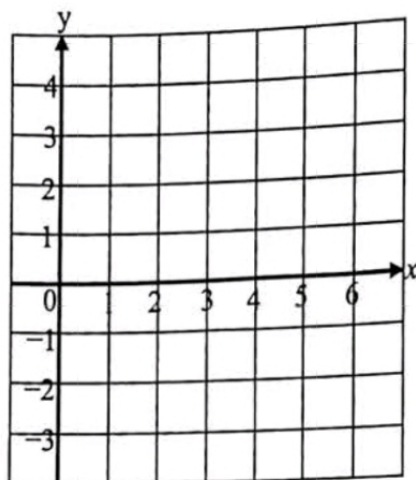
- (b) The frequency table shows the marks obtained by Grade 8 learners in Mathematics at a certain school.

|           |         |         |         |         |
|-----------|---------|---------|---------|---------|
| Marks     | 40 – 44 | 45 – 49 | 50 – 54 | 55 – 59 |
| Frequency | 3       | 10      | 3       | 4       |

Calculate the mean mark. [3]



- (c) On the XOY plane below,
- (i) plot the points  $P(1, -2)$ ,  $Q(6, -2)$ ,  $R(6, 1)$  and  $S(1, 1)$ , [3]
- (ii) join the points P, Q, R and S to form a quadrilateral PQRS, [1]
- (iii) draw the graph of  $y = 3$ . [1]



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[Total: 10]

- 8 (a) Given the height (h) of a triangle and its base (b), complete the steps below for calculating and displaying its area (A).  $[A = \frac{1}{2}bh]$  [3]

Start

Enter .....

A = .....

Display .....

Stop

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- (b) The table shows the frequency distribution of marks obtained by Grade 9 learners in a test at a particular secondary school.

| Marks   | Frequency |
|---------|-----------|
| 1 – 10  | 5         |
| 11 – 20 | 15        |
| 21 – 30 | 20        |
| 31 – 40 | 10        |
| 41 – 50 | 15        |

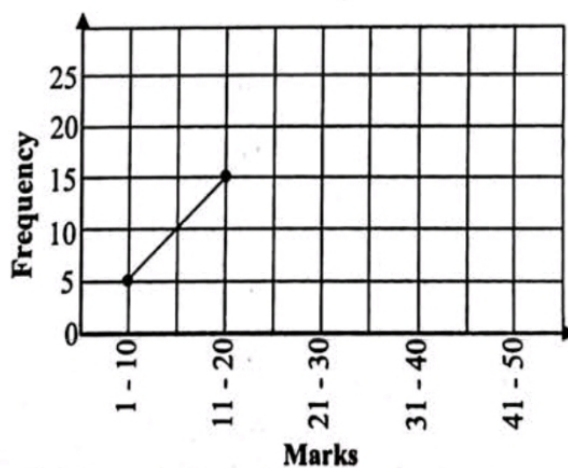
- (i) What is the modal class?

[1]

- (ii) Use the information in the table above to complete the frequency polygon below.

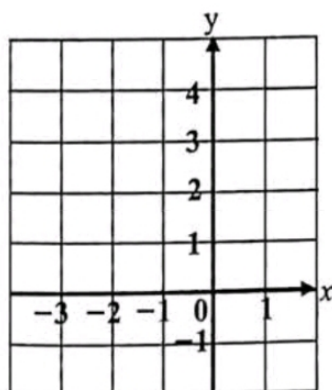
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[3]



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- (c) Illustrate the solution of  $y < x + 3$  on the XOY plane below by shading the **wanted** region for the domain  $-3 \leq x \leq 1$ . [3]



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[Total: 10]