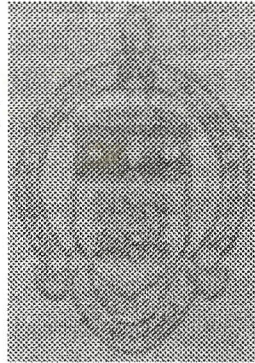# HARRISON COLLEGE

SECOND FORM MATHEMATICS

INTERNAL PROMOTION EXAMINATION 2013 - 2014

DURATION: 1 hour and 40 minutes

GENERAL INSTRUCTIONS TO CANDIDATES:

1) This question paper consists of FOUR printed pages.

2) Write your name clearly on **EACH** sheet of paper used.

3) All <u>twenty</u> questions are to be attempted.

4) Number your responses carefully and <u>identically</u> (including any associated parts) as they appear on the question paper.

Do **NOT** write ANY of your responses beside each other.

5) Calculators are NOT allowed.

6) The maximum mark for this examination is 96.

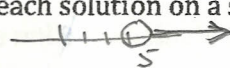**<u>DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO</u>**

SECTION A

<u>Write on your foolscap</u> the LETTER that matches your response for Questions 1 – 5.

1. The next term in the sequence ..., 3, 5, 5, 7, 7, 9, 9, 11, ... is
   A. 11   B. 13   C. 15   D. 17

2. Which of the following calculations does not have the same value of as 19
   A. $4 + 3 \times 5$ B. $5 \times 3 + 4$ C. $4 + (5 \times 3)$ D. $(4 + 5) \times 3$

3. The highest integer that satisfies the inequality $3x - 1 \leq x + 6$ is
   A. 2   B. 7   C. 14   D. 28

4. $(3 \times 10^{-2})^2$ written in standard form
   A. 3×10^{-4} B. 9×10^{-4} C. 3×10^4 D. 9×10^4

5. If $\frac{1}{a} + \frac{2}{b} = \frac{3}{c}$, then c is
   A. $\frac{2a+b}{3ab}$ B. $\frac{2a+b}{ab}$ C. $\frac{ab}{2a+b}$ D. $\frac{3ab}{2a+b}$
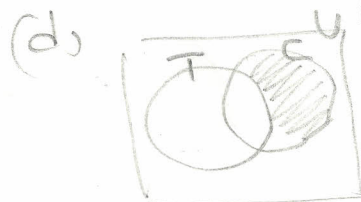
   [5 marks]

SECTION B

<u>All working MUST be shown for questions 6 – 20</u>

6. Write each of the following numbers in standard form.
   a) 2435 2.435×10^3
   b) 0.038 3.8×10^{-2}
   c) 25.67 2.567×10^1 [6 marks]

7. Calculate $2 \times 10^3 + 3.2 \times 10^{-2}$ giving your answer
   a) in standard form 2.000032×10^3
   b) to 2 decimal places 2000.03 [5 marks]

8. Solve the following inequalities, showing each solution on a separate number line.
   (i) $6 + 5x > 31$ $x > 5$
   (ii) $2(x - 1) \geq 14 + 6x$ $x \leq -4$ [5 marks]

9. A club has 160 members, some of whom play Tennis (T) or Cricket (C) or both. 97 play Tennis, 86 play cricket and 10 play neither, x play both Cricket and Tennis.
   a) Draw a Venn diagram to represent this information.
   b) How many persons play both Tennis and Cricket? Use an equation to determine your answer.
   c) How many persons play Cricket only?
   d) Shade the region $C \cap T'$ on your diagram.   [9 marks]

   (b) $x = 33$
   (c) 53

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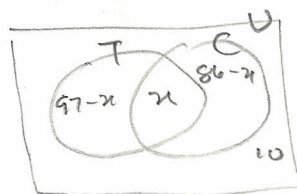
10. The interior angles of a pentagon $3x°, 2x°, 2x°, 2x°$ and $x°$. Find the size of the largest interior angle. [5 marks]

11. Guy \$1.00 = US \$0.01 and EC \$1.00 = US \$0.37.
    Calculate the value of
    (i)   Guy \$60 000 in US \$ *$600 US*
    (ii) US \$925 in EC \$ *$2500 EC*   [5 marks]

12. Simplify the following
    a) $5(x + 3y) + 6(x + 5y)$ *$11x + 45y$*
    b) $8 - 6(x - 4)$ *$32 - 6x$*
    c) $\frac{x-3}{3} - \frac{x-2}{5}$ *$\frac{2x-9}{15}$*   [10 marks]

13. Factorise completely
    a) $3x^2 + 5x$ *$x(3x + 5)$*
    b) $5a^2b + ab^2$ *$ab(5a + b)$*   [4 marks]

14. Solve the following equations
    a) $x + 4 = -10$ *$x = -14$*
    b) $\frac{x}{2} = 12 - x$ *$x = 8$*
    c) $5x - 4(x - 6) = 7x + 6$ *$x = 3$*   [9 marks]

15. Make x the subject of the following
    a) $2 = 4x - 3y$ *$x = \frac{2+3y}{4}$*   *$x = \frac{c-4y}{2}$*
    b) $4y = -2x + c$ [4 marks]
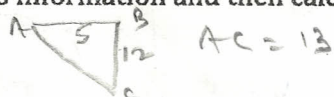
16. A scale on the map of St Kitts is 1:10 000.
    a) What is the actual distance between two places which are 1.2 cm apart on the map?   *120 m*
    b) Determine the distance on the map if the actual distance between Basseterre and Brimstone Hill is 5.4 km.   *54 cm*   [5 marks]

17. A man walks from a point A for a distance of 5 km east to a point B, then 12 km south to a point C. Draw a diagram for this information and then calculate the straight line distance of C from A.
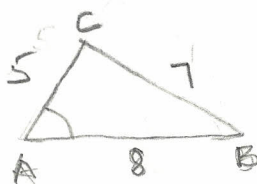   *$AC = 13$*   [4 marks]

18. (a) Using a ruler and compass only, construct accurately, the triangle ABC with $AB = 8$ cm, $BC = 7$ cm and $AC = 5$ cm. All construction lines MUST be clearly shown.
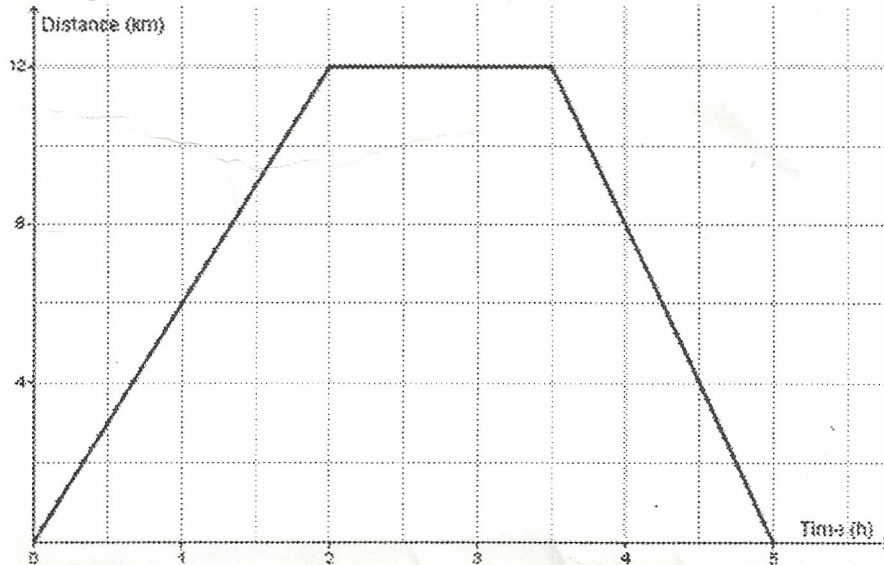   (b) Measure and state the size of $C\hat{A}B$.   [6 marks]

$C\hat{A}B = 60°$

$7^2 = 5^2 + 6^2 - 2(5)8 \cos x$
$49 = 25 + 64 - 80 \cos x$

3

19. The graph below represents the 5 – hour journey of an athlete.

(i)   What is the average speed during the first 2 hours?   6 km/hr

(ii)   What did the athlete do between 2 and 3 hours after the start of the journey?   Stopped

(iii) What was the average speed on the return journey?   8 km/hr   [5 marks]

20. In the diagram below, not drawn to scale, AEC and ADB are straight line.
$\angle ABC = \angle ADE = 90°$.
$AC = 10$ m, $AB = 8$ m and $DB = 3.2$ m.
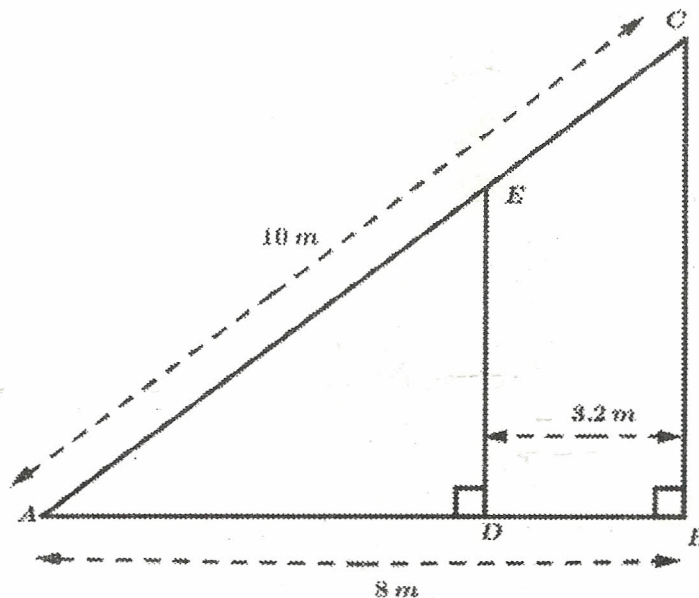
(i)   Calculate the length of BC.   6

(ii)   Explain why triangles ABC and ADE are similar.

(iii) Determine the length of DE.   3·6 m   [9 marks]

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