HARRISON COLLEGE

END OF YEAR EXAMINATION
2022
Second Year Mathematics
DURATION: 1 hour 30 minutes

INSTRUCTIONS TO CANDIDATES

1. This paper consists of two (2) sections, and **six** (6) printed pages.

2. This paper consists of 10 multiple choice questions 12 long answer questions.

3. Write your NAME and FORM clearly on the front of this paper

4. Answer **ALL** twelve (12) questions in the spaces provided.

5. The use of calculators IS ALLOWED.

6. The maximum mark for this examination is **75**

NAME: _____

FORM: _____

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

SECTION A – Multiple Choice

Instructions: Circle the **letter** of the response that best matches the correct answer

1. How much simple interest is due on a loan of $120 for two years if the annual rate of interest is $5\frac{1}{2}$ per cent?
   (A) $12   **(B)** $13.20   **(C)** $26.40   **(D)** $33.00

2. $8x - 4(x - 5)$ simplifies to

   (A) $4x + 20$ **(B)** $4x + 5$ **(C)** $4x - 20$ **(D)** $4x - 20x$

3. John is x years old and his brother is 5 years older than half his age. His brother's age is represented as
   (A) $5x + 2$ **(B)** $2(x + 5)$ **(C)** $\frac{x+5}{2}$ **(D)** $\frac{5x}{2}$

4. The next term in the sequence 2, 1, −1, −4, −8 is
   (A) −16   **(B)** −13   **(C)** −12   **(D)** −10

5. A rectangular tank is 100cm long, 30cm wide and 12 cm deep. The volume of liquid it holds is
   (A) 3.6 litres   **(B)** 36 litres   **(C)** 360 litres   **(D)** 3600 litres

6. Applying the Distributive Law, $20 \times 10 + 20 \times 7$ is the same as
   (A) 20×17 **(B)** $20 + 17$ **(C)** 30×27 **(D)** $20 + 10 \times 7$

7. In the right angle triangle ABC, AC = 15 cm, AB = 17 cm. Calculate the length of BC, x cm.
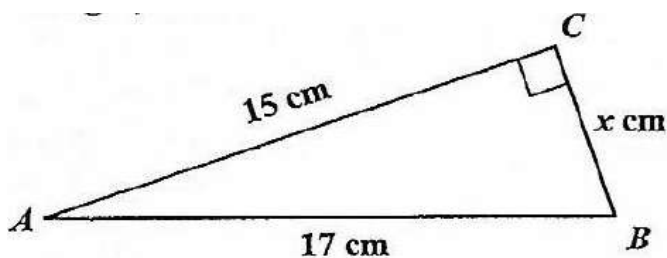
   (A) 2 cm   **(B)** 8 cm   **(C)** 16 cm   **(D)** 32 c m

8. Which of the following sets is defined by $\{x: \ -1 < x \leq 3\}$
   (A) $\{-1, 0, 1, 2, 3\}$ **(B)** $\{0, 1, 2, \}$ **(C)** $\{ 0, 1, 2, 3\}$ **(D)** $\{-1, 0, 1, 2\}$

9. The surface area of a cube with edge 10cm is
   (A) 60 cm²   **(B)** 100 cm²   **(C)** 600 cm²   **(D)** 1000 cm²

10. Mr. Archibald paid a fixed charge of $25 plus $0.55 for each kWh of electricity used. How much did he pay for using 75 kWh of electricity?
    (A) $38.75   **(B)** $66.25   **(C)** $100.55   **(D)** $155.00

SECTION B- Long Answer
Instructions: *Write the answers in the spaces provided directly* **under the question**.
1. Using a calculator or otherwise,
    (a) Calculate

$$\frac{(1.25)^2 + 1.44}{0.05}$$

[2]

    (b) The population of Barbados in 1992 was 262,900. In 2022 the population is 288,037.
        i.   Write the population in 1992 in standard form.

[2]

        ii.   Write the population in 2022 correct to 3 significant figures.

[2]

2. Mr. Greene deposited $60 000 into a fixed deposit account at a bank. The bank pays 8% per annum on fixed deposits.
        a)   What is the interest generated after 36 months?

[2]

        b)   What is the balance on the account at the end of the 36 months?

[1]

3. A clerk is paid a basic wage of $9.50 per hour for a 40-hour week.
        a)   Calculate the clerk's weekly wage.

[2]

        b)   For overtime, the clerk is paid at one-and-a-half times the basic rate. Calculate the amount earned in overtime if the clerk works an additional 6 hours overtime.

[2]

4. The table below shows Jason's electricity bill for the month of April. Calculate the missing values at (i), (ii), (iii) and (iv) and write them in the spaces provided.

Previous Reading	Present Reading	kWh Used
3011 kWh	3307 kWh	(i) _____
Fixed Charge		$40.00
Energy Charge	@ $0.45 per kWh	(ii) _____
Fuel Charge	@ $0.80 per kWh	(iii) _____
Amount Due		(iv) _____

[4]

5. Remove the brackets and simplify.

    a) $-2(3x - 5)$ **[2]**

    b) $4(x - 1) + 5(2x + 3)$ **[3]**

    c) $7x + 8x - 2(5x + 1)$

[3]

6. Factorize the following:

    a) $3pq - 7q^2$ **[2]**

    b) $3ay - 12xy$

[2]

7. Solve

    a) $7x + 3 = 3x + 31$

[2]

8. Solve the following inequalities and show your solution on a number line
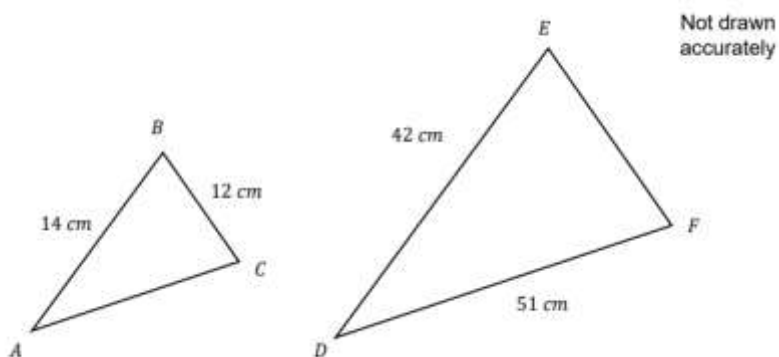
    a) $4x - 7 < 23$

[3]

    b) $2(x - 6) + 3x \geq 8$

[4]

9. Triangles DEF and ABC are similar and not drawn to scale.

Calculate:

    (a) The length of EF **[2]**

    (b) The length of AC **[1]**

10. From the Universal Set **U = {whole numbers from 20 to 30 inclusive}, P = {21, 23, 25, 27, 29}** and **Q = {25, 26, 27, 28, 29, 30}**

a) Draw a Venn diagram to represent the information above

[5]

b) From your Venn diagram in 9 a), list the members of:
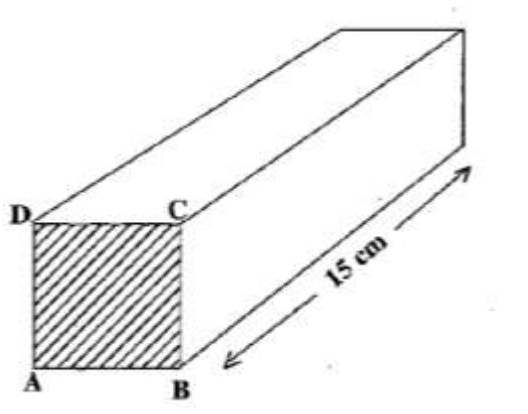
    i. $P \cap Q$

[1]

    ii. $(P \cup Q)'$

[1]

    iii. $P \cup Q'$

[1]

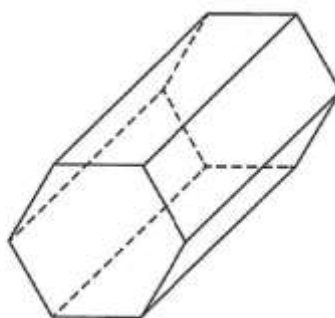11. The diagram below, not drawn to scale, shows a prism of length 15cm. the cross section ABCD is a square.

    a. If the length of edge AB is 4cm, calulate the surface area of the prism.   **[3]**

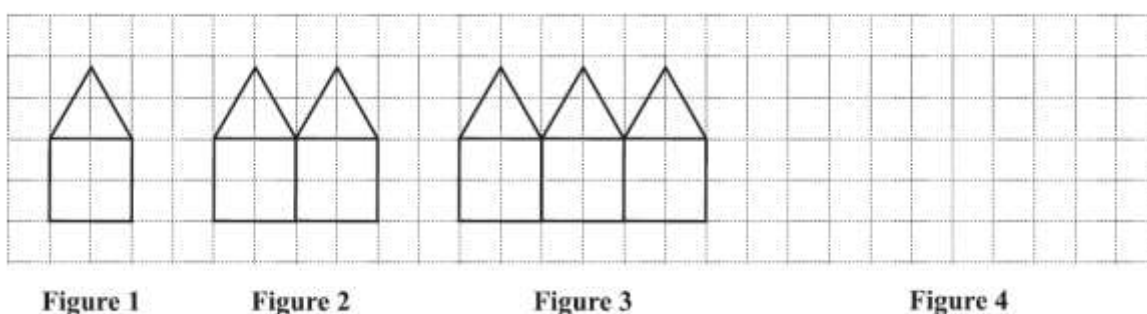   **b.** Calculate the volume of the prism   **[2]**

c. The figure below is an octagonal prism.

Complete the following statement,

The prism has _____ faces, _____ edges and _____vertices. **[3]**

12. The first 3 figures in a sequence of shapes are shown below.

| Figure 1 | Figure 2 | Figure 3 | Figure 4 |

(a) On the grid above, draw figure 4, the next figure in the sequence. **[2]**

(b) The number of lines **(L)** and the perimeter **(P)** of each figure follow a pattern. Study the pattern and complete the table below to show the number of lines and perimeter of the next two figures.

Figure	Number of Lines (L)	Perimeter (P)
1	6	5
2	11	8
3	16	11
4	_____	_____
5	_____	_____

[4]

(c) Determine the expression for the nth term of
   a. L, the number of lines

   b. P, the perimeter **[2]**

END OF EXAMINATION