THIRD FORM MATHEMATICS **P. CADOGAN**
Promotion Examination 2012 **Harrison College**

Time 1 $\frac{3}{4}$ hours **175 Copies**

INSTRUCTIONS

This question paper consists of THREE printed pages.
Write your name clearly on **EACH** sheet of paper used.
Number your answers carefully and do **NOT** do questions beside one another.

All of the questions are to be attempted.
Calculators are allowed.
Question 16 is to be done on the sheet of graph paper which is attached to the foolscap provided.

If a numerical answer cannot be given **exactly**, and the accuracy required is not specified in the question, then in the case of an angle it should be given correct to **one (1)** decimal place, in other cases it should be given correct to **three (3)** significant figures.

Write on your foolscap the **LETTER** that matches your response for Questions 1 – 5.
All working **MUST** be shown for questions 6 – 16.

1. The length of time required for \$90 to be the simple interest on \$ 500 invested at 6 % per annum

(A) 6 years **(B)** 9 years **(C)** 3 months **(D)** 3 years

2. A bag contains 14 crayons of which 5 are red, 3 are blue and the remainder are yellow. The probability a crayon drawn at random from the bag is yellow is

(A) 6 **(B)** $\frac{3}{7}$ **(C)** $\frac{5}{14}$ **(D)** $\frac{3}{14}$

3. The interquartile range of the sample 35, 36, 37, 38, 39, 40, 41 is
(A) 2 **(B)** 3 **(C)** 4 **(D)** 6

4. Twice x is added to 3 and the result is not less than 12. This information is best represented by

(A) $2x + 3 \geq 12$ **(B)** $2x + 3 \leq 12$ **(C)** $x + 3 > 12$ **(D)** $x + 3 < 12$

5. y varies directly as the square of x. If $y = 2$ when $x = 3$, then when $x = 9$, y equals

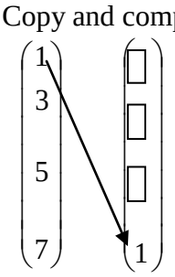
(A) 9 **(B)** 81 **(C)** 18 **(D)** $\frac{2}{9}$

[5]

6. S varies inversely as T^3, and $S = 56$ when $T = \frac{1}{2}$.

Calculate the value of S when $T = \frac{1}{3}$. [4]

7. Copy and complete the diagram below, given that the relation is $x \rightarrow 3 - 2x$



[3]

8. Simplify the following: $12x^2yz^2 \times \frac{1}{4}xz^2$ [4]

9. Given $P = \frac{RT^2}{V}$, express T in terms of P, R and V. [3]

10. Solve for x and y, the pair of simultaneous equations: $\begin{aligned} 4x - 6y &= -5 \\ 7x - 5y &= -6 \end{aligned}$ [6]

11. The line segment AB has points A (–2, –5) and B (4, –1).

(a) Determine, for this line segment
- (i) the gradient [2]
- (ii) the equation of the line AB [3]
- (iii) the midpoint M. [2]

(b) Find the equation of the perpendicular bisector of AB [3]

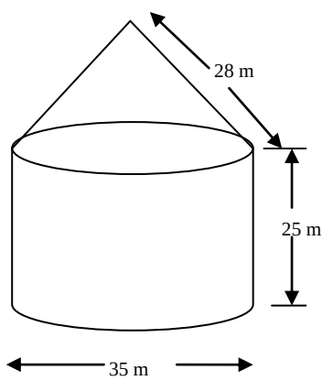
12. A married man with one child aged 15 years and a second child aged 10 years earns $15 000 per annum. He has a dependent relative whom he helps to support. Income tax is levied at the rate of 30% of taxable income.

	Allowance per Year
Single Man	$ 1 200 per annum
Married Man	$ 2 000 per annum
Child under 11 years old	$ 300
Child 11 to 16 years old	$ 500
Child over 16 years in full-time education	$ 900
Dependent relative	$ 350

Using the information in the above table, calculate

(i) his total tax- free allowances [5]
(ii) his taxable income [1]
(iii) the amount of income tax paid. [2]

13. The figure below, not drawn to scale, represents a closed fluid storage tank in the form of a cylinder surmounted by a cone.



The diameter of the cylinder is 35 m and its height is 25 m, and the slant height of the cone is 28 m. The total capacity of the tank 31 170.5 $m^{3.}$

[Use $\pi = \frac{22}{7}$. For a cone V = $\frac{1}{3}\pi r^2 h$]

Calculate
(i) the capacity of the cylindrical section [2]
(ii) the capacity of the conical section to the nearest whole number [3]
(iii) the perpendicular height of the conical section to the nearest whole number [3]
(iv) the total surface area of the tank [4]

14. A Canadian tourist exchanges CAN $ 500 into Barbados currency at a rate of CAN $1 = BDS $ 2.10, spending in Barbados, BDS $ 400. The tourist then travels to Antigua, and changes the remaining Barbados currency into East Caribbean dollars, the exchange rate being BDS $ 1 = EC $ 1.35.

(a) How much Barbadian currency was received? [3]
(b) How must East Caribbean currency was received? [3]

The visitor spends EC $ 200 and changes the remainder into Canadian currency at a rate of CAN $ 1 = EC $ 2.80.

(c) How much Canadian currency does the tourist receive? [3]

15. A number of students were weighed with the following results.

Weight (Kg)	Frequency
23 – 27	5
28 – 32	10
33 – 37	12
38 – 42	3

(i) Determine how many students were weighed. [1]
(ii) State the modal class. [1]
(iii) Calculate the mean weight of the students weighed. [5]
(iii) Find the proportion of students who weighed at most 32 Kg. [2]

16. The fisheries department has 3 buoys *A*, *B* and *C* off the coast. *B* is due east of *A*. *C* is 6 km due south of *A*. The distance between *B* and *C* is 7 km.

(i) Draw a diagram to represent ALL of this information. [5]

(ii) Calculate, correct to <u>ONE</u> decimal place
a) the distance *AB* [2]
b) the bearing of *C* from *B*. [4]

End of Examination