PC4012
WASSCE (PC2) 2024
FURTHER MATHEMATICS/
MATHEMATICS (ELECTIVE) 2
2½ hours

2

CANDIDATE'S NAME	
INDEX NUMBER	SIGNATURE
DATE:	

THE WEST AFRICAN EXAMINATIONS COUNCIL

West African Senior School Certificate Examination for Private Candidates

(PC2)

FURTHER MATHEMATICS/MATHEMATICS (ELECTIVE) 2 — 2½ hours

[100 marks]

INSTRUCTIONS TO CANDIDATES

1. *In the spaces provided above, insert your* **name, full index number,** *normal* **signature** *and the* **date of examination.**
2. *This booklet consists of* **two** *sections,* **A** *and* **B.** *Answer* **all** *the questions in Section* **A (compulsory)** *and* **four** *questions from Section* **B** with **at least one** from **each** part.
3. *In each question, all necessary details of working, including rough work,* **must** *be shown with the answer.*
4. *Give answers as accurately as data and tables allow.*
5. *Graph paper is provided for your use in the examination.*
6. *The use of non-programmable, silent and cordless calculator is allowed.*
7. *Write your* **name, index number** *and the* **number of each question you answer, at the top of each page.**
8. *Write on both sides of the paper unless otherwise instructed on the question paper.*
9. *Begin* **each** *answer to a question on a fresh page. Leave two lines between answers where there are sub-sections to the same question.*
10. *On* **no account** *should you tear off any part of the booklet. It is an examination malpractice to do so. The answer booklet will be collected at the end of the examination.*
11. *Write in the space provided below, the* **question number of the questions you have answered,** in the order in which you have answered them.

For Examiner's Use Only	
Question Number	Mark
TOTAL	

Do not write in this margin.

SECTION A

[48 marks]

Answer **all** *the questions in this section.*

All *questions carry* **equal** *marks.*

1. Find the equation of the tangent to the curve $x^2 + xy - y^2 + 4 = 0$ at $k\,(2, 4)$.

2. The sum, S_n of the **first** n terms of a linear sequence ($A.P.$) is given by $S_n = n^2 - 8n$. If the n^{th} term of the sequence is **greater** than 130, find the **least** possible value of n.

Index Number:.....**Question No.:**.....

3. Evaluate: $\int_{-2}^{3} \frac{(x-2)(6x^2-x-2)}{(2x+1)}\,dx$.

4. Resolve $\frac{4 - x}{x^2 - 5x - 24}$ into partial fractions.

5. Given that the mean of the numbers, 8, 9, x, $(x + 3)$ and 15 is 11, find the:
(a) value of x;

(b) standard deviation.

Do not write in this margin.

Index Number:.....Question No.:.....

6. If **two** fair dice are thrown together twice, find the probability of obtaining a sum of nine in the first throw and a sum of six in the second throw.

7. Given that $p = 2i - 7j$ and $q = -5i - 9j$ and $2p - 3q + r = 0$, find $|r|$.

8. A body of mass 2.5 *kg* is suspended by **two** light inextensible strings *XP* and *YP* which are inclined at 40° and 50° **respectively** to the downward vertical. Find the tension in **both** strings. [Take $g = 10\ ms^{-2}$]

Do not write in this margin.

13. The table shows the performance (in percentages) of 10 students in Chemistry and Physics examination.

Chemistry (x)	30	55	60	65	70	74	75	84	87	90
Physics (y)	55	65	75	79	83	73	69	85	90	86

(a) Plot a scatter diagram to represent this information.

(b) Calculate:

(i) $\bar{x}$ and $\bar{y}$, the means of x and y respectively;

(ii) $(\overline{x_1}, \overline{y_1})$, the means of x and y values above $\bar{x}$.

(c) Draw the line of best fit through $(\bar{x}, \bar{y})$ and $(\overline{x_1}, \overline{y_1})$.

(d) Using the graph, determine the:

(i) relationship between x and y;

(ii) value of y when $x = 77$.

PART III

VECTORS AND MECHANICS

14. The acceleration, a of a body in terms of time, t is given by $a = (3t - 4)\ ms^{-2}$. When $t = 1$ *second*, $v = 5\ ms^{-1}$ and when $t = 2$ *seconds*, $S = 30\ m$. Find the:

(a) velocity when $t = 5$ *seconds*;

(b) expression for the displacement;

(c) displacement when $t = 3$ *seconds*;

(d) velocity during the 4^{th} *second*.

15. The position vectors of two points P and Q relative to the origin are $p = -4i + j$ and $q = 3i + 7j$ respectively.

(a) Find $|7p - 3q|$.

(b) Find the scalars α and β such that $9i + 10j \equiv \alpha p + \beta q$.

(c) Find, correct to the **nearest** degree, angle between p and q.

END OF PAPER