Name..

Index Number...

THE WEST AFRICAN EXAMINATIONS COUNCIL

West African Senior School Certificate Examination
for Private Candidates

PC 2022   GENERAL MATHEMATICS/MATHEMATICS (CORE) 2   2½ hours
[100 marks]

Write your **name** *and* **index number** *in ink in the spaces provided above.*

Answer **ten** *questions in all.* **All** *the questions in Section* A *and* **five** *questions from Section* B.

In each question, all necessary details of working, including rough work, **must** *be shown with the answer.*

*Give answers as accurately as data and tables allow.*

Graph papers are provided for your use in the examination.

The use of non-programmable, silent and cordless calculator is allowed.

*Answer **all** the questions in this section. All questions carry equal marks.*

1. (*a*) The second and fourth terms of a Geometric Progression (G..P) are 54 and 6 respectively. Find the nth term (U_n) of the sequence.

    (*b*) If $log (5x - 4) = log (x + 1) + log 4$, find the value of *x*.

2. Mr Jibril is four times as old as his son. Four years ago, he was seven times as old as his son. In how many years will Mr Jibril's age be twice his son's age.

3. (*a*)
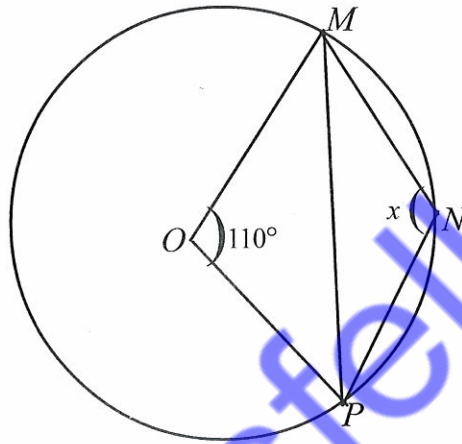
NOT DRAWN TO SCALE

In the diagram, *O* is the centre of the circle *MNP*. If $\angle MOP = 110°$, find the value of *x*.

    (*b*) There are *m* identical beads in a bag. 50 are blue, 30 are red and the rest are white. If the probability of choosing at random a white bead is $\frac{1}{3}$, find the value of *m*.

4. The height, *h* metres, of water above sea level at the entrance to a dock is given by $y = 18 - 10 \sin (5x)°$, $0 < x < 15$. Find:

    (*a*) the value of *y* when *x* =12;

    (*b*) correct to **two** significant figures, *x* when *y* =10.

5. The area of an equilateral triangle is $53 \sqrt{3}$ cm^2 . Find, correct to the **nearest** tenth, the perimeter.

SECTION B

[60 marks]

Answer **five** *questions* **only** *from this section.* **All** *questions carry* **equal** *marks.*

6. In a house of 20 people, 8 liked Ampesi, 12 liked Banku and 12 liked Fufu.
   5 liked both Ampesi and Fufu, 6 Banku and Fufu, 2 only Ampesi and 3 liked all
   three types of food.

   (a) Illustrate the information on a Venn diagram.

   (b) Find the number of people in the house who liked:
       (i)   **only** fufu;
       (ii)   **exactly** two types;
       (iii)   **only** one type of food.

7. (a) A man covers a distance of 8 km to a stadium in 1 hour. He walks part of
   the distance at 6km/h and runs the rest at 10 km/h. How many kilometres
   did he run?

   (b) A factory purchased a new machine at the cost of ₦3,000,000.00. In its operation,
   it depreciates at the rate of 15 % in the first year and 20 % yearly thereafter.
   Calculate the value of the machine at the end of the third year.

8. (a) Copy and complete the table of values for the relation $y = 2x - x^2$, $-2 \leq x \leq 4$.

x	−2	−1.5	−1	−0.5	0	0.5	1	1.5	2	2.5	3	3.5	4
y	−8		−3		0		1		0	−1.3		−5.3	

   (b) Using a scale of 2 cm to 1 unit on both axes , draw the graph for
   $y = 2x - x^2$, $-2 \leq x \leq 4$.

   (c) Using the graph, find the:
       (i)   maximum point;
       (ii)   line of symmetry,
   (iii)   range of values of x for which $y \geq 0$.

9.

Marks	1—3	4—6	7—9	10—12	13—15
Frequency	8	3	6	2	1

The table shows the distribution of marks scored by students in a test.
Calculate the:

(a) mean;

(b) mean deviation , of the distribution.

10. A boat is on the same horizontal level as the foot of a vertical tower. The angle of depression of the boat from the top of the tower is $39°$. If the boat is 30 m away from the foot of the tower, :

(a) illustrate the information in a diagram;

(b) find, correct to **three** significant figures, the height of the tower.

(c) If the boat moves further away to a new position, P and the initial angle of depresssion decreased by $5°$, calculate the distance moved by the boat from its initial position.

11. A military tent is in the form of a pyramid with square base. The vertex of the tent, V and the base $ABCD$ is of side length 8 m. The angle between a sloping face and the base is $70°$. Calculate, correct to **two** decimal places the:

(a) height of the tent;

(b) area of tapolean needed to cover the tent completely;

(c) total amount needed to buy the tapolean in (b) if 3 m² of tapolean cost $7.20.

12. (a)
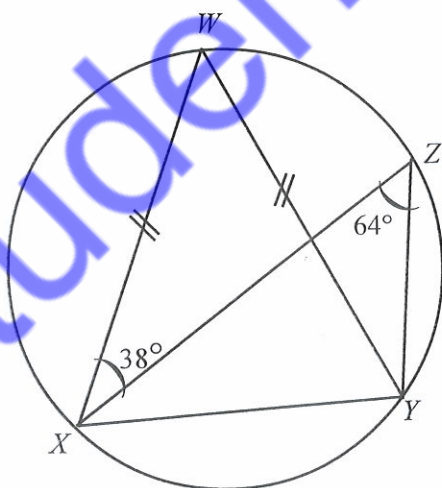
NOT DRAWN TO SCALE

In the diagram, $WXYZ$ are points on a circle. $|\overline{WX}| = |\overline{WY}|$, $\angle XZY = 64°$ and $\angle WXZ = 38°$ .Find:

(i) $\angle WYX$;

(ii) $\angle YXZ$.

(b)   The probabilities that Afi and Naa will pass an aptitude test are 60 % and 80 % respectively. Find, correct to **one** decimal place the probability that:

    (i)   **only** one of them will pass the test;

    (ii)   **none** of them will pass.

13.   (a)   The function , f is defined as $f : x \rightarrow x^2 + \dfrac{9}{2}x$

    (i)   Evaluate: $f(2)$.

    (ii)   Find the value of x for which $f(x) = 17\dfrac{1}{2}$

    (b)   A linear function, $f(x) = ax + b$, where a and b are constants. If $f(2) = 1$ and $f(4) = 3$, find $f(x)$.

END OF PAPER