

ST GODFREY (PVT) SECONDARY SCHOOL 2022 MSCE MOCK 1 EXAMINATION MATHEMATICS (100 MARKS) PAPER II

SUBJECT NUMBER : M131/II

TIME ALLOWED : $2\frac{1}{2}$ HOURS

INSTRUCTIONS

- This paper has 11 pages and 2 sections A and B Please check.
- 2. The maximum number of marks for each answer is indicated against each question.
- 3. Write your answers in the spaces provided
- 4. Calculators may be used and all working should be clearly shown.
- **5.** Please make sure that you write your examination number and class on top of all pages in this paper before you start answering questions.
- 6. In section B, choose any three questions.

Questions	Tick if	Do not		
Answered	Answered	write in this		
		column		
1				
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CLASS: ____

Section A (55 Marks) Answer all questions from this section

1.

a. Given that $(y) = 2xy - 35y^2$ and $g(x) = 2x^2 + xy$. Factories completely (y) + (x).

(4 marks)

b. Make z the subject of the formula $q = \sqrt[3]{\frac{m}{x} + \frac{n^z}{y}}$

(5 marks)

a. Given that $A = \begin{pmatrix} 0 & 1 \\ 5 & 1 \end{pmatrix}$ and $A + 2B = \begin{pmatrix} 4 & 7 \\ 3 & 9 \end{pmatrix}$. Find Matrix B

(4marks)

- b. A straight line passing through the points A and B has a slope of 3. If the x coordinate of points A and B are 3t and t respectively while the y coordinates for A and B are 7 and 5 respectively,
 - i. Find the equation of the line AB.
 - ii. Calculate the distance from A to B.

- 3.
- a. An arc of the circle subtends an angle of 54° at the center. If the arc is 9cm long, calculate the circumference of the circle

(4marks)

b. Figure below shows two similar triangles ADE and ABC in which DE is parallel to BC. The area of triangle $ADE=12cm^2$



If the heights of triangle ADE and trapezium DECB are 6cm and 4cm respectively. Calculate the length BC.

(6marks)

(6marks)

4.

a. The second term of a geometric progression is -6 and the fourth term is 54. Calculate the common ratio, given that it is negative.

(5marks)

b. Figure below shows a straight line graph y= x + 8 crossing the x and y axes at A and B respectively.



Calculate the distance between points A and B, leaving your answer correct to 2 decimal places.

(5marks)

5.

- **a.** A car accelerates uniformly from rest to reach a certain velocity in 10 minutes. It then continues at this velocity for another 10 minutes and decelerates to rest in a further 5 minutes.
 - i. Sketch the velocity time graph.

(4 marks)

ii. If the distance covered is 175 km, calculate the maximum velocity reached.

(2 Marks)

b. Find the standard deviation of the following data 2a + 1, 2a + 2 and 2a + 3

(6 marks)

a. In**figure 1**. O is the centre of the circle. TA and TB are tangents to the circle at A and B respectively. AO is produced to X.



Prove that

- **i.** OATB is a cyclic quadrilateral
- ii. Angle BOX = Angle ATB

(6 Marks)

b. . Make *r* the subject of the formula $v = \pi h^2 (r - \frac{h}{3})$

(4 Marks)

Section B (45 Marks) Answer any Three questions from this section

7.

a. Table 1 shows some values of x and y for y = (4 - x)(2 + x)

Table 1	l
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Х	-3	-2	-1	0	1	2	3	4
Y		0	5		9		5	0

- i. Complete the table
- ii. Using a scale of 2 cm to represent 1 unit on the horizontal axis and 2 cm to represent 2 units on the vertical axis, draw the graph of y = (4 x)(2 + x)
- iii. Use the graph to solve the equation $6 + x x^2 = 0$

(10 marks)

b. *x* varies directly as *y* and inversely as the square of *n*. if x = 15, y = 24 and n = 4. Calculate the value of *n* when x = 8 and y = 20.

(5marks)

8.

- a. Village B is on the bearing of 135° and a distance of 40km from village A. village C is on a bearing of 225° and a distance of 62km fron village A.
 - i. Show that A, B and C form a right angled triangle.
 - ii. Calculate the angle ABC to the nearest degrees.

(8marks)

b. Given that $\overrightarrow{PQ} = \begin{pmatrix} 12\\20 \end{pmatrix}$ and $\overrightarrow{QR} = \begin{pmatrix} 18\\30 \end{pmatrix}$, show that points P, Q and R are collinear.

(7 marks)

9.

- An aquarium shop owner specializes in two types of fish, chambo and kampango. The weekly costs amount to K150 for each chambo and K300 for each kampango and the owner has decided that the costs should not exceed K120,000 per week. Experience had shown that it is necessary to stock at least half as many chambo as kampango fish but the storage tank will only hold 600 fish.
 - i. If x is the number of chambo fish and y is the number of kampango fish, write down **three** inequalities in addition to .
 - Using a scale of 2 cm to represent 100 units on the horizontal axis and 2 cm to represent 50 units on the vertical axis , draw a graph on the graph paper provided to show the region represented by the inequalities , shading the unwanted region.
 - iii. If the profit on chambo fish is K300 and on kampango fish is K450, calculate the maximum possible profit.

(10 marks)

b. Solve the equation $(2^a)^2 - 9(2^a) + 8 = 0$

(5marks)



a. Figure 3 is a triangular prism with AB = 4 cm, BC = 3cm, AC = 5cm and CF = 12cm. ACFD, ABED and BCFE are rectangular faces.



If P is the point where diagonals of the rectangular face BCFE meet, find the angle which AP makes with the plane ABC.

(7 marks)

- b. Given that the polynomial $2y^3 + by^2 + cy 6$ is exactly divisible by (y + 2) and (y 3).
 - i. Find the values of b and c.

ii. Hence solve for x, $2y^3 + by^2 + cy - 6 = 0$.

(9marks)

END OF QUESTION PAPER