MATHEMATICS PAPER 2 - 2019 MOKASA II MOCK EXAMINATION

Instructions to Candidates

i. This paper consists of two sections: Section I and Section II.
ii. Answer ***ALL*** questions from section I and ***ANY FIVE*** from section II
iii. Show all the steps in your calculation, giving your answer at each stage
iv. Non – Programmable silent electronic calculators and KNEC mathematical tables may be used, except where stated otherwise.

SECTION I (50 MARKS)

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

1. Use logarithm tables of trigonometry and numbers to evaluate; (3 marks)
$$\sqrt{\frac{\sin 35^0 \cos 50^0}{\log 6}}$$
2. By rounding each number to the nearest tens, approximate the value of, $\frac{2454\times396}{66}$ Hence, calculate the percentage error arising from this approximation to 4 significant figures. (3 marks)
3. Determine the value of x for which the matrix below is singular. (3 marks)
$$\begin{pmatrix} x & 4 \\ 1 & x-3 \end{pmatrix}$$
4. Simplify without using tables or a calculator (3marks)
$$\frac{\sin 480^0 - \cos 765^0}{\tan 225^0 - \sin 330^0}$$
5. Find the value of x in the equation $\cos(3x-180^\circ)=\frac{\sqrt{3}}{2}$ in the range listed below.
$0^0 \le x \le 180^0$ (3marks)
6. Z is directly proportional to x^2 and inversely proportional to $\frac{1}{y^{-1}}$. If x is increased by 22.5% and y is decreased by 19.76%. Find the percentage change in Z.(3marks)
7. Triangle PQR has vertices P(-1, 2) Q(-1, 1) and R(1, -1). Find the matrix of transformation which maps triangle PQR onto triangle P^1 Q^1 R^1 whose vertices are P^1(-3, 2) Q^1(0, -1) R^1(2, -1). Describe the transformation fully. (3 marks)
8. The age distribution of 9 workers in a factory were: 32, 30, 28, 35, 33, 37, 33, 34, 32.Determine the semi-Interquartile range of the data. (3 marks)
9. The first three terms of a geometric sequence are 2x, x-8 and 2x=5. Find the possible values of x.(3 marks)
10. 125 small white cubes are arranged to form one large cube. The sides of the large cube are then painted red, the cubes are then dismantled and one of the small cubes picked at random. Find the probability that the cube picked has two of its side painted red. (3 marks)
11. The gradient function of a curve is given by theexpression 2x+1. If the curve passes through the point (-4,6).Find the equation of the normal to the curve at this point. (3marks)
12. Find the area enclosed by the curve $y=81-x^2$and the x – axis using mid-ordinate rule with 9 strips. (4marks)
13. Two parallel chords of a circle are each 16cm long. If the radius of the circle is 10cm. Find the perpendicular distance between the chords. (3marks)

MARKING SCHEME

SECTION I 50 MARKS

(Answer all the questions)

1. Use logarithm tables only to evaluate; (3 marks)

$$\sqrt{\frac{\sin 35^0 \cos 50^0}{\log 6}}$$

NO	Log
Log sin 35°	$\bar{1}\cdot 7586$
Log Cos 50°	$\bar{1}\cdot 8081$ +
	$\bar{1}\cdot 5667$
	$\bar{1}\cdot 8911$ −
	$\bar{1}\cdot 6756$
	$\frac{\bar{1}\cdot 6756}{2}$

M_1 – All logs correctly

M1 $-\frac{\text{tan}^{-1}2 + 1\cdot 6756}{2}$

A1 – ✓ $\bar{1}\cdot 8378$

$\log 6 = 0.7782$

7.782×10^{-1}

$-2+1$

6.884×10^{-1} CA.O

0.6884 ✓ A1

2. By rounding each number to the nearest tens, approximate the value of,

$\frac{2454\times 396}{66}$ Hence, calculate the percentage error arising from this approximation to 4 significant figures. (3 marks)

$\frac{2450 \times 400}{70} = 14\,000$ M1

$\frac{2454 \times 396}{66} = 14,724$

M1 % error $= \frac{14724 - 14000}{14724} \times 100$

$= 4.917$ A1

3. Determine the value of x for which the matrix below is singular. (3 marks)

$$\begin{pmatrix} x & 4 \\ 1 & x-3 \end{pmatrix}$$

$x(x-3) - 4 = 0$ M1

$x^2 - 3x - 4 = 0$ ✓M1

$(x+1)(x-4) = 0$

$x = -1$ or $x = 4$ ✓A1