Nixor College
EXAMINATIONS

MATHEMATICS
AS LEVEL
Total Marks:40
Time: 1 hour

TEST
Date: 23-JAN-2021

CANDIDATE NAME

CANDIDATE ID

2	0	2		-			

GROUP

TEACHER NAME

READ THESE INSTRUCTIONS FIRST

If you have been given an Answer Booklet, follow the instructions on the front cover of the Booklet.

Listen to the invigilator and do what you are asked to do.

Write your name, class and section on all sheets you hand in.

Write in dark blue or black pen on both sides of the paper.

You must not talk, communicate in any way with, seek assistance from or give assistance to, or disturb other candidates once the test has started.

If you cheat, try to use any unfair practice, or break rules in anyway, you may be disqualified from all your subjects.

Q1 The first term of a geometric progression is 2 and its sum to infinity is 1.5. Find the 4th term of the progression.

[3]

Q2

The coefficient of $\dfrac{1}{x}$ in the expansion of $\left(kx + \dfrac{1}{x}\right)^{5} + \left(1 - \dfrac{2}{x}\right)^{8}$ is 74.

Find the value of the positive constant k.

[5]

Q3 A circle with radius 3 units is cut into 12 sectors. The area of the 12 sectors can be arranged in an arithmetic progression with first term a and common difference d. If the area of the first, third and eleventh sectors form consecutive terms of a geometric progression, find the exact area of the smallest and largest sector respectively.

[6]

Q4

a)   Prove the identity $\dfrac{\tan x \sin x}{1 - \cos x} \equiv 1 + \dfrac{1}{\cos x}$.

[4]

b)   Sketch the graph of $y = 3\cos x - 2$ for $0 \leqslant x \leqslant 4\pi$

[3]

Q5   a   Show that the equation $2\sin^{2}x - 3\sin x \cos x + \cos^{2}x = 0$ can be written in the form $2\tan^{2}x - 3\tan x + 1 = 0$.

b   Hence solve the equation $2\sin^{2}x - 3\sin x \cos x + \cos^{2}x = 0$ giving all solutions in the interval $-180° < x < 180°$.

[4] + [4]

Q6   The coordinates of the points A and B are $(-1, -2)$ and $(7, 4)$ respectively.

(a)   Find the equation of the circle, C, for which AB is a diameter.

[4]

(b)   Find the equation of the tangent, T, to circle C at the point B.

[4]

(c)   Find the equation of the circle which is the reflection of circle C in the line T.

[3]