

**GRADE 11 MATHEMATICS
NOVEMBER EXAMINATION PAPER 2**

QUESTION 1

1.1 Calculate the following with the use of a calculator:

1.1.1 $\sin 43^\circ + \cos 47^\circ$ (1)

1.1.2 $\tan^2 50^\circ$ (1)

1.1.3 $\cot 33^\circ + \operatorname{cosec} 15^\circ$ (1)

1.2 If $A = 34,3^\circ$ and $B = 22,2^\circ$, calculate the following to two decimal places:

1.2.1 $\sin (A + B)$ (2)

1.2.2 $\sec \left(\frac{A}{2}\right)$ (2)

1.3 Calculate the following without the use of a calculator:

1.3.1 $\sin 30^\circ + \cos 60^\circ$ (1)

1.3.2 $\tan 45^\circ + \cos 45^\circ$ (1)

1.3.3 $\cos 90^\circ + \sin 90^\circ$ (1)

[12]

QUESTION 2

Without the use of a calculator, answer the following questions:

2.1 Given $\cos \theta = -\frac{1}{2}$ and $0^\circ \leq \theta \leq 180^\circ$
Use a diagram to determine the values of:

2.1.1 $\tan (180^\circ + \theta)$ (1)

2.1.2 $3\sin (\theta - 90^\circ)$ (2)

2.2 Simplify the following expression: $\frac{\sin(-230^\circ)}{\cos(240^\circ)} + \frac{\cos(190^\circ)}{\sin(260^\circ)}$ (5)

2.3 Prove that: $\tan \theta \sqrt{\frac{1}{\sin^2 \theta} - 1} = 1$ (4)

2.4 Determine the general solution for: $3\sin^2 \theta + 1 = \sin \theta$ (6)

[28]

QUESTION 3

3.1 Sketch on the same set of axes the graphs for:

$f(x) = -2\cos x$ and $g(x) = \sin 2x$, for the interval $-90^\circ \leq x \leq 180^\circ$.

Show the coordinates of the turning points and all axis intercepts. (5)

3.2 Study the following sketch and determine the value of $\cos \theta - \cos \phi$, without the use of a calculator.



(5)
[10]

QUESTION 4

In the diagram below, the angle between line AB and the x-axis is β . The angle between line CD and the x-axis is θ . A and D are the x-axis intercept points for lines AB and CD respectively. The coordinates of point B are $(\sqrt{3}, 2)$.

The intercept point E, of lines AB and CD lies on the y-axis. $\angle EDC = 63,69^\circ$

The equation of the line CD is given as: $3x + 2y = 6$



4.1 Determine the coordinates of E. (2)

4.2 Calculate the numerical value of α . (2)

4.3 Calculate the numerical value of β . (2)

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$$\text{N}_2 + \text{F}_2 \rightarrow \text{NF}_3$$

$$2\text{C}_6\text{H}_{10}\text{O}_2 + \text{CO}_2 + \text{H}_2\text{O} \rightarrow \text{HBr} + \text{KHCO}_3 + \text{H}_2\text{O} + \text{KBr} + \text{CO}_2 + \text{GaBr} + \text{NaBr} + \text{SnO}$$

$$4\text{NaSO}_3 + \text{Ga}_2\text{SO}_3 + 3\text{SO}_3 + 3\text{NF}_3 + \text{SnF}_2 + \text{N}_2\text{O}_3$$
using the equation from problem 2 above answer the following

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$$\text{N}_2 + 3\text{F}_2 \rightarrow 2\text{NF}_3$$

$$2\text{C}_6\text{H}_{10}\text{O}_2 + 17\text{O}_2 \rightarrow 12\text{CO}_2 + 10\text{H}_2\text{O}$$

$$3\text{HBr} + 1\text{KHCO}_3 + 1\text{H}_2\text{O} + 1\text{KBr} + 1\text{CO}_2 + 2\text{GaBr}_3 + 3\text{Na}_2\text{SO}_3 + 1\text{Ga}_2\text{SO}_3 + 3\text{SO}_3 + 6\text{NaBr} + 3\text{SnO} + 2\text{NF}_3 + 3\text{SnF}_2 + 1\text{N}_2\text{O}_3$$
using the following equation

$$2\text{NaOH} + \text{H}_2\text{SO}_4 \rightarrow 2\text{H}_2\text{O} + \text{Na}_2\text{SO}_4$$

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$$\text{Ce} + \text{Zn} + \text{CuCl}_2 \rightarrow \text{ZnCl}_2 + \text{Cu} + \text{Zn} + \text{CuCl}_x$$
2 ZnCl_x + 2 Cu how many moles of Ce ZnCl₂ ZnCl_x + 2 will be produced from 23.0 g of Ce Zn Zn assuming Ce CuCl₂ CuCl_x + 2 is available in excess

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$$\text{Br}_2 + \text{N}_2 + 3\text{F}_2 + 2\text{NF}_3 + 2\text{C}_6\text{H}_{10}\text{O}_2 + 17\text{O}_2 + 12\text{CO}_2 + 10\text{H}_2\text{O} + \text{Br}_2 + 3\text{HBr} + 1\text{KHCO}_3 + 1\text{H}_2\text{O} + 1\text{KBr} + 1\text{CO}_2 + 2\text{GaBr}_3 + 3\text{Na}_2\text{SO}_3 + 1\text{Ga}_2\text{SO}_3 + 3\text{SO}_3 + 6\text{NaBr} + 3\text{SnO} + 2\text{NF}_3 + 3\text{SnF}_2 + 1\text{N}_2\text{O}_3$$
using the following equation

$$\text{Br}_2 + \text{NaOH} + \text{H}_2\text{SO}_4 \rightarrow 2\text{H}_2\text{O} + \text{Na}_2\text{SO}_4 + \text{Br}_2$$

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$$\text{N}_2 + 3\text{F}_2 + 2\text{NF}_3 + 2\text{C}_6\text{H}_{10}\text{O}_2 + 17\text{O}_2 + 12\text{CO}_2 + 10\text{H}_2\text{O} + \text{HBr} + \text{KHCO}_3 + \text{H}_2\text{O} + \text{KBr} + \text{CO}_2 + \text{GaBr} + \text{Na}_2\text{SO}_3 + \text{Ga}_2\text{SO}_3 + 3\text{SO}_3 + 3\text{NaBr} + \text{SnO} + \text{NF}_3 + \text{SnF}_2$$

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