

## CHEMISTRY ONLINE

- TUITION -

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## ALGEBRA AND FUNCTION

| Level \& Board | EDEXCEL (A-LEVEL) |
| :--- | :--- |
| TOPIC: |  |
| QAPER TYPE: | QUESTION PAPER 1 |
| TOTAL QUESTIONS | 8 |
| TOTAL MARKS | 28 |

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## Questions

Q1. The equation $k x^{2}+4 k x+3=0$, where $k$ is a constant, has no real roots.
Prove that

$$
0 \leq k<\frac{3}{4}
$$

(Total for question = 4 marks)

Q2.
(a) Using algebra, find all solutions of the equation

$$
3 x^{3}-17 x^{2}-6 x=0
$$

(3)
(b) Hence find all real solutions of

$$
3(y-2)^{6}-17(y-2)^{4}-6(y-2)^{2}=0
$$

(Total for question = 6 marks)

Q3.
Find, using algebra, all real solutions to the equation
(i) $16 a^{2}=2 \sqrt{a}$
(ii) $b^{4}+7 b^{2}-18=0$

## Q4.

$$
f(x)=2 x^{2}+4 x+9 \quad x \in \mathbb{R}
$$

(a) Write $f(x)$ in the form $a(x+b)^{2}+c$, where $a, b$ and c are integers to be find.
(b) Sketch the curve with equation $y=f(x)$ showing any points of intersection with the coordinates axes and the coordinates of any turning point.
(c) (i) Describe the fully transformation that maps the curve with equation $y=f(x)$ onto the curve with equation $y=g(x)$ where

$$
g(x)=2(x-2)^{2}+4 x-3 \quad x \in \mathbb{R}
$$

(ii) Find the range of the function

$$
h(x)=\frac{21}{2 x^{2}+4 x+9} \quad x \in \mathbb{R}
$$

## Q5.

The quadratic equation $k x^{2}+(k-3) x+1=0$ has two equal real roots. Find the possible value of k .

Q6.
The equation $k x^{2}+4 x+(5-k)=0$, where k is a constant, has two different solutions for x .
(a) Show that $k$ satisfies

$$
\begin{equation*}
k^{2}-5 k+4>0 \tag{4}
\end{equation*}
$$

(b) Hence find the sets of possible values of k .

Q7.
Given that the equation

$$
k x^{2}+6 k x+5=0 \quad \text { where } \mathrm{k} \text { is non zero constant }
$$

has no real roots, find the range of possible values for k .

## Q8.

One solution of the equation $k x^{2}+(3 k+1) x-8=0$ is $x=-4$
Find
(a) The value of k ,
(b) The second possible value of x .
(3)
(Total for question = 6 marks)


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