

# CHEMISTRY ONLINE 

- TUITION -

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## PURE MATH

## ALGEBRA AND FUNCTION

PAPER TYPE:

SOLUTION 28

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## Simultaneous 2

Q. 1

$$
\begin{aligned}
& 2 x-y=14 \rightarrow(i) \\
& 3 x+2 y=70 \rightarrow(i i)
\end{aligned}
$$

From equation (i)

$$
\begin{aligned}
& 2 x-y=14 \\
\Rightarrow \quad & y=2 x-14
\end{aligned}
$$

Substituted in equation (ii), we have

$$
\begin{aligned}
& 3 x+2(2 x-14)=70 \\
& 3 x+4 x-28=70 \\
& 7 x=70+28 \\
& 7 x=98 \\
& x=14
\end{aligned}
$$

To get " $y$ ", simply use the value of " $x$ " in any of the equations.

$$
\begin{aligned}
\Rightarrow & 2 x-y=14 \\
\Rightarrow & 2(14)-y=14 \\
\Rightarrow & 28-14=y \\
& y=14 \\
& \text { s.s }=\{14,14\}
\end{aligned}
$$

## Q. 2

As,

$$
\begin{aligned}
& 3 a+2 b=3 \rightarrow(i) \\
& 2 a+b=1 \rightarrow(i i)
\end{aligned}
$$

Multiply (ii) by 2 ,

$$
4 a+2 b=3 \rightarrow(i i i)
$$

Subtract (iii) from (i)

$$
\text { (-) } \begin{aligned}
& 3 a+2 b=3 \\
& 4 a+2 b=2 \\
& -a=1 \\
& \\
& a=-1 \rightarrow(i v)
\end{aligned}
$$

Subtract (iv) in to (i)

$$
\begin{aligned}
& 3 a+2 b=3 \\
& 3(-1)+2 b=3 \\
& \quad 2 b=6 \\
& \quad \Rightarrow \quad b=3
\end{aligned}
$$

Thus,

$$
\begin{aligned}
& a=-1 \\
& b=3
\end{aligned}
$$

Q. 3

Given equations

$$
\begin{aligned}
&-5 x+6 y=13 \\
& \rightarrow(i) \\
& 5 x+2 y=11 \rightarrow(i i)
\end{aligned}
$$

Adding (i) and (ii)

$$
\begin{aligned}
& -5 x+6 y=13 \\
& 5 x+2 y=11 \\
& 8 y=24 \\
& \Rightarrow \quad y=3 \text { put in (ii) } \\
& 5 x+2(3)=11 \\
& 5 x+6=11 \\
& 5 x=5 \\
& \Rightarrow \quad x=1 \\
& \text { Hence s.s = \{1,3\} }
\end{aligned}
$$

## Q. 4

Given,

$$
\begin{aligned}
& x=y-5 \rightarrow(i) \\
& x+y=5 \rightarrow(i i)
\end{aligned}
$$

Equation (i) put in (ii)

$$
\begin{aligned}
& y-5+y=5 \\
& 2 y=10 \\
& y=5 \quad \text { put in (i) } \\
& x=5-5 \\
& x=0 \\
& \text { Hence, } s . s=\{0,5\}
\end{aligned}
$$

## Q. 5

Given equation

$$
\begin{aligned}
& 2 x+3 y=8 \rightarrow(i) \\
& 2 x+5 y=12 \rightarrow(i i)
\end{aligned}
$$

Subtract (i) and (ii)

$$
\begin{aligned}
& 2 x+3 y=8 \\
& 2 x+5 y=12 \\
& -2 y=-4
\end{aligned}
$$

$$
y=2
$$

The value of $y$ put in (i)

$$
\begin{aligned}
& 2 x+3(2)=8 \\
& 2 x+6=8 \\
& 2 x=2 \\
& x=1
\end{aligned}
$$

Thus,

$$
\text { s. } s=\{1,2\}
$$

## Q. 6

As

$$
\begin{aligned}
& y=10+x \rightarrow(i) \\
& 2 x-y=5 \rightarrow(i i)
\end{aligned}
$$

Equation (i) put in (ii)

$$
\begin{aligned}
& 2 x-(10+x)=5 \\
& 2 x-10-x=5 \\
& x=15 \quad \text { put in (i) } \\
& y=10+15 \\
& y=25
\end{aligned}
$$

Thus,

$$
\text { s. } s=\{15.25\}
$$

## Q. 7

As

$$
\begin{aligned}
& 4 y+8 x=12 \rightarrow(i) \\
& 3 y-5 x=20 \rightarrow(i i)
\end{aligned}
$$

Using equation (i)

$$
\begin{aligned}
& 4 y+8 x=12 \\
& 4 y=12-8 x \\
& y=\frac{12-8 x}{4} \\
\Rightarrow \quad & y=3-2 x \rightarrow(i i i)
\end{aligned}
$$

Equation (iii) put in equation (ii)

$$
3(3-2 x)-5 x=20
$$

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$$
9-6 x-5 x=20
$$

$$
-11 x=11
$$

$$
x=-1 \quad \text { Put in (iii) }
$$

$$
y=3-2(-1)
$$

$$
y=3+2
$$

$$
y=5
$$

Hence,

$$
s . S=\{-1,5\}
$$

Q. 8

As

$$
\begin{aligned}
& 2 x-3 y=1 \rightarrow(i) \\
& 3 x+2 y=8 \rightarrow(i i)
\end{aligned}
$$

Multiply 2(i) and 3(ii) we get

$$
\begin{aligned}
& 4 x-6 y=2 \\
& 9 x+6 y=24 \\
& 13 x=26 \quad \Rightarrow x=2
\end{aligned}
$$

The value of $x$ put $\ln$ (ii)

$$
\begin{aligned}
& 3(2)+2 y=8 \\
& 2 y=2 \\
& y=1
\end{aligned}
$$

Thus,

$$
\text { s. } s=\{2,1\}
$$



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