

Question 5

		Answer	Marks																																			
a)	(i)	$C_{132}H_{120}N_2 + 164O_2 \rightarrow 132CO_2 + 60H_2O + 2NO_2$ or $C_{132}H_{120}N_2 + 162O_2 \rightarrow 132CO_2 + 60H_2O + N_2$	1																																			
	(ii)	$M_r = (132 \times 12.01) + (120 \times 1.008) + (2 \times 14.01) = 1734.30$ % of C = $((132 \times 12.01) / 1734.30) \times 100\% = 91.41\%$ % of H = $((120 \times 1.008) / 1734.30) \times 100\% = 6.97\%$ % of N = $((2 \times 14.01) / 1734.30) \times 100\% = 1.62\%$	1																																			
b)		<p>If top right box on every car is correctly assigned – 2 marks If top right box on every car is incorrectly assigned – 1 mark (for consistent error) Mark the bottom left and bottom right boxes in the same way</p>	6																																			
c)		“B and F” is awarded 2 marks “B and F; A and C” is awarded one mark Any other answer is awarded no marks	2																																			
d)		A, C and E. Any other answer is awarded no mark	1																																			
e)		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;">A</th> <th style="text-align: center;">B</th> <th style="text-align: center;">C</th> <th style="text-align: center;">D</th> <th style="text-align: center;">E</th> <th style="text-align: center;">F</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">(i) Spin clockwise</td> <td></td> <td style="text-align: center;">✓</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">(ii) Spin anti-clockwise</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td style="text-align: center;">✓</td> </tr> <tr> <td style="text-align: center;">(iii) Remain stationary</td> <td style="text-align: center;">✓</td> <td></td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">(iv) Move forwards</td> <td></td> <td></td> <td></td> <td></td> <td style="text-align: center;">✓</td> <td></td> </tr> </tbody> </table> <p>One mark for each car/letter/column Note that if B is marked as ‘anti-clockwise’ and F is marked as ‘clockwise’, this combination scores 1 mark for consistent error.</p>		A	B	C	D	E	F	(i) Spin clockwise		✓					(ii) Spin anti-clockwise						✓	(iii) Remain stationary	✓		✓	✓			(iv) Move forwards					✓		6
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