1	**Litres per amount of money and then conversion**			
	$\frac{8.6\times10^5}{770\,000}(=1.1168)$ *l*/$			M1 Number of litres per $ for D
	$\frac{4.2\times10^5}{2500\,000}(=0.168)$ *l*/k			M1 Number of litres per Krone for A
	A: *l*/$ to *l*/k '1.1168' ÷ 6.57 (= 0.1699..)or D: *l*/k to *l*/$ '0.168' × 6.57 (= 1.103..)			M1 *l*/$ to *l*/k for A or *l*/k to *l*/$ for D
		Arctic Oil and relevant figures		A1 for Arctic Oil with 1.1168… and 1.10376… **or** 0.168 and 0.1699..
	Conversion then litres per amount of money			
	$\frac{2500000}{6.57}$(=380517.5..) or 770 000 × 6.57(= 505 8900)			M1 Changing Krone to $ or $ to Krone
	$\frac{4.2\times10^5}{2500000}(=0.168)$ or $\frac{4.2\times10^5}{'380517.5'}(=1.103..)$			M1 Litres per Krone or litres per $ for D
	$\frac{8.6\times10^5}{770000}(=1.1168)$ or $\frac{8.6\times10^5}{'5058900'}(=0.1699..)$			M1 Litres per Krone or litres per $ for A
		Arctic Oil and relevant figures		A1 for Arctic Oil with 1.1168… and 1.10376… **or** 0.168 and 0.1699..
	Cost per litre then conversion			
	$\frac{2500000}{4.2\times10^5}(=5.952..)$			M1 Price per litre in Krone for D
	$\frac{770000}{8.6\times10^5}(0.895..)$			M1 Price per litre in $ for A
	'5.952' ÷ 6.57(=0.9059..) or '0.895' × 6.57(= 5.882..)			M1 Conversion of Krone to $ or $ to Krone
		Arctic Oil and relevant figures		A1 For Arctic Oil with 5.952 and 5.882 **or** 0.895 and 0.9059
	Conversion then cost per litre			
	$\frac{2500000}{6.57}$(=380517.5..) or 770 000 × 6.57(= 505 8900)			M1 Changing Krone to $ or $ to Krone
	$\frac{2500000}{4.2\times10^5}(=5.952)$ or $\frac{'380517.5..'}{4.2\times10^5}(=0.9059..)$			M1 Cost per litre in Krone or cost per litre in $ for D
	$\frac{770000}{8.6\times10^5}(=0.895)$ or $\frac{'5058900'}{8.6\times10^5}(=5.882..)$			M1 Cost per litre in $ or cost per litre in Krone for A
		Arctic Oil and relevant figures		A1 For Arctic Oil with 5.952 and 5.882 **or** 0.895 and 0.9059
	Comparing equal amounts			
	$\frac{8.6\times10^5}{4.2\times10^5}(=\frac{43}{21}=2.047..)$	$\frac{4.2\times10^5}{8.6\times10^5}(=\frac{21}{43}=0.488..)$		M1 Multiplier for same amount of D as A or same amount of A as D
	'2.047..'×2500 000 K (=5119047.619..)K	'0.488..' × 770 000 $ (=376046.511..)$		M1 Cost of equal amount of D as A or A as D
	'5119047.619'÷6.57 = 779154.88…$ or 770 000×6.57=5058900 K	'376046.511..'× 6.57 =2470625.58..K or 2500 000÷6.57 = 380517..$		M1 Converts so can compare costs – either K to $ or original A to K or $ to K or original D to $
			Arctic Oil and relevant figures	A1 Arctic Oil and 779154.. or with 2470625..(figures may be rounded) Or Arctic Oil with 5119047… and 5058900 or with 376046.. and 380517
Students may compare other equal amounts – please use the scheme that best fits their method and award marks appropriately.				
				Total 4 marks

2	$M = kh^3$ oe or $4 = k\times0.5^3$ oe		4	M1 $k \neq 1$ and where k could be any letter	M2 for $\frac{500}{4}=\frac{h^3}{0.5^3}$ oe or 125×0.5^3 (= 15.625) oe
	$k=\frac{4}{0.5^3}$ or $k=\frac{4}{0.125}$ or $k=32$			M1 Allow this for M2 if $M = kh^3$ is not written	
	$h=\sqrt[3]{\frac{500}{"32"}}$ or $\sqrt[3]{\frac{500\times0.5^3}{4}}$ or $\sqrt[3]{15.625}$ or $h = 5 \times 0.5$			M1 for a correct expression for h using correct values or a value of k from a completely correct method	
		2.5		A1 oe	
				Total 4 marks	

3	$y=\frac{k}{\sqrt{x}}$ or $ky=\frac{1}{\sqrt{x}}$ or $x=pT^3$ or $y=\frac{k}{\sqrt{pT^3}}$ or $y=\frac{c}{\sqrt{T^3}}$ oe	**Alternative** $y^2T^3=n$ oe		4	M1 Constant of proportionality must be a symbol such as k or p or c or n $k\neq 1$, $p\neq 1$ and $c\neq 1$ and $n\neq 1$
	$c=8\times\sqrt{25^3}\ (=1000)$ oe	$n=8^2\times 25^3\ (=1000000)$ oe			M1 dep M1 for rearranging for c or n with ($y=$) 8 and ($T=$) 25 substituted correctly into their equation
	$27=\frac{'1000'}{\sqrt{T^3}}$ and $T^3=\left(\frac{'1000'}{27}\right)^2$ oe $27=\frac{'1000'}{\sqrt{T^3}}$ and $T^{\frac{1}{2}}=\left(\frac{'1000'}{27}\right)^{\frac{1}{3}}$ oe	$T^3=\frac{'1000000'}{27^2}$ oe			M1 for substitution of y **and** a correct rearrangement for T^3 or $T^{\frac{1}{2}}$ or T.
			$\frac{100}{9}$		A1 oe eg $11\frac{1}{9}$ or $11.1\dot{}$ or $11.111(\ldots)$
					Total 4 marks

4	eg $40=\frac{k}{1.5^2}$ **or** $k=90$ **or** $\frac{C^2}{1.5^2}=\frac{40}{1000}(=0.04)$ **or** $(C^2=)1.5^2\times\frac{40}{1000}(=0.09)$ **or** $\frac{1.5^2}{C^2}=\frac{1000}{40}(=25)$ **or** $(C^2=)1.5^2\div\frac{1000}{40}(=0.09)$		3	M1	
	eg $(C=)\sqrt{\frac{"90"}{1000}}$ oe **or** $(C=)\sqrt{1.5^2\times "0.04"}$ **or** $(C=)\sqrt{1.5^2\div "25"}$ **or** $(C=)\sqrt{"0.09"}$			M1	
		0.3		A1	oe, allow ± 0.3 oe or -0.3 oe
					Total 3 marks

5 (a)	$F=\frac{k}{r^2}$ or $kF=\frac{1}{r^2}$		3	M1	(NB. Not for $F=\frac{1}{r^2}$) Constant of proportionality must be a symbol such as k	M2 for $36=\frac{k}{4^2}$ oe
	$36=\frac{k}{4^2}$ oe **or** $k=36\times 4^2$ **or** $k=576$			M1	for substitution of F and r into a correct formula	
	Correct answer scores full marks (unless from obvious incorrect working)	$F=\frac{576}{r^2}$		A1	oe e.g $F=576(\times)\frac{1}{r^2}$ Award 3 marks if answer is $F=\frac{k}{r^2}$ on the answer line and $k=576$ clearly given in the body of working of the script	

6 (a)	$Q=k\sqrt{t}$		3	M1	for linking Q and t correctly (must have constant eg k) (allow $Q\propto k\sqrt{t}$)
	eg $6=k\sqrt{4}$ or $3=k\sqrt{1}$ or $k=3$			M1	for substituting a suitable pair of values **or** finding $k=3$ (allow $\propto$ sign)
	Correct answer scores full marks (unless from obvious incorrect working)	$Q=3\sqrt{t}$		A1	oe allow q for Q (must have =) allow 2.95 – 3.05 for k if method clearly shown and readings correct ± 0.5 small square allow an answer of $Q=k\sqrt{t}$ with $k=3$ clearly stated