MEASUREMENT MARKING SCHEME

1.	2.4m – 1.8m = 0.6m 3.2 x 0.6m x 2 =3.84m^2 2.8m x 0.6m x 2 = 3.36m^2 3.8m x 0.6m x 2 x = 3.3m^2 3.84m^2 + 3.36m^2 = 7.20m^2 **1989Q9**	2M
2.	V = $\pi r^2 h + {}^2/_3 \pi r^3$ $= \left(\frac{22}{7} \times 7^2 \times 15\right)$ $+\left(\frac{2}{3} \times \frac{22}{7} \times 7^3\right)$ =2310 + 718.67cm^3 = 3,028.67cm^3 **1989Q16**	4M
3.	A = $\frac{\theta}{360}\pi r^2$ $30.8 = \frac{72^0}{360} \times \frac{22}{7} \times r^2$ $r^2 = \frac{30.8 \times 360 \times 0\ 7}{72 \times 22}$ $r^2 = \frac{77616}{1584}$ $r^2 = 49$ $r^2 = 7$ AB = $\frac{72}{360} \times \frac{22}{7} \times 7$ = 8.8cm **1990Q9**	3M
4.	20cm- 8cm = 12cm $20^2 - 122 = 400 - 144$ = 256 $\sqrt{256}$ = 16cm 16 x 2 = 32cm **1990Q11**	3M
5.	$\frac{a}{\sin A} = \frac{B}{\sin B}$ $\frac{6}{\sin 30} = \frac{X}{\sin 120^0}$ $x = \frac{6}{\sin 30^0} \times \sin 120^0$ = 10.392cm **1990Q14**	2M
6.	V =πr^2 $\frac{22}{7}$ x $(2.5)^2$ x 14 = 275cm^3 $\left(\frac{22}{7} \times 4 \times 0.3\right) - \left(\frac{22}{7} \times \left(\frac{3}{4}\right)^2 \times 0.3\right)$ $\frac{26.4}{7} - \frac{3.7125}{7} = \frac{22.6875}{7}$ $x = \frac{275 \times 7}{22.6875}$ = 84.8 = 84 **1990Q13**	4M
7.	A = πrl $\left(\frac{22}{7} \times 20 \times 5.2\right) - \left(\frac{22}{7} \times 10 \times 26\right)$ $\frac{22880}{7} - \frac{5720}{7}$ $\frac{17160}{7}$ 2451.42cm^2 or 2450.76cm^2 **1991Q12**	3M
8.	V = $\frac{2}{3}\pi r^3$ $\frac{2}{3}$ x $\frac{22}{7}$ x7 $\frac{2156}{3}$cm^3 $\frac{40 \times 1000}{17.5}$ = 2285.7142cm^3 $2285.7142 - \frac{2156}{3} = 1567$ $1567 = \frac{22}{7} \times 7^2 \times h$ $h = \frac{1567 \times 7}{49 \times 22}$ h = 10. 18cm **1991Q17**	8M
9.	A = 2ab sinθ = 2 x20 x 28.8 x sin 62^0 = 154.3cm^2 **1992Q4**	3M

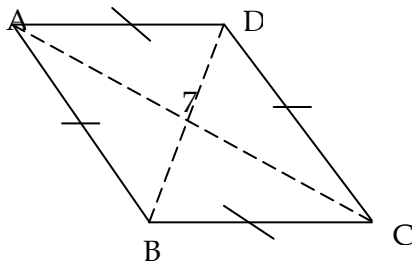
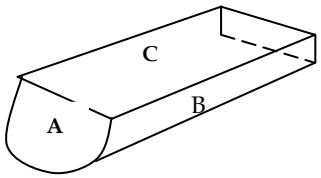
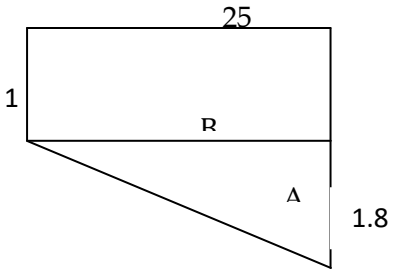
10.	$A = \left(\frac{90}{360} \times 14 \times 4^2\right) - \left(\frac{1}{2} \times 4 \times 4\right)$ $12.56 - 8 = 4.56$ 4.56×2 $= 9.12cm^2$ **1992Q15**	4M
11.	(a) vol $= \{(7.5 \times 3.3) - (7.2 \times 5)\} 3.3$ $= \{39.75 - 36.0\}3.3$ $= 3.75 \times 3.3$ $= 12.375m^3$ Vol required $= 12.375 - 5$ $= 7.375m^3$ (b) Vol of blocks $= 7.375 - 0.225$ $= 7.15m^3$ No of blocks $= \frac{7.15}{0.0135} = 529.6$ $= 530$ blocks **1992Q17**	8M
12.	(i) $\frac{0.4}{14.4} = \frac{4}{10} \times \frac{10}{144} = \frac{4}{144}$ $l.s.f = \sqrt{\frac{4}{144}}$ $\frac{2}{122} \times 2.1 = 0.35m$ (ii) V.S.F $= \left(\frac{2}{12}\right)^3 = \frac{8}{1728}$ $\frac{1728}{8} \times 23.15$ $= 5000$litres **1992Q22**	4M
13.	(a) $V = (L \times W \times H) + (\frac{1}{2} b \times h \times l)$ $= (30 \times 14 \times 1) + (\frac{1}{2} \times 3 \times 30 \times 14)$ $= (420 + 630)$ $= 1050cm^3$ (b) vol drained per second $= 3.14 \times 72 \times 500$ $= 76930cm^3$ $\frac{1050 \times 100000}{76930} = 13648.77$seconds $\frac{13648.77}{60} = 227$minutes **1992Q20**	4M
14.	$V = (l \times w \times h) + \pi r^2 h$ $(21 \times 30 \times 40) + \left[\frac{22}{7} \times (10.5)2 \times 40\right]$ $25200 + 13860$ $= 39060mm^3$ $\frac{39060}{1000} = 39.06cm^3$ Mass $= 39.06 \times 8.8$ $= 343.7g$ **1993Q7**	4M
15.	V.S.F $= \left(\frac{1}{3}\right)^3 = \frac{1}{27}$ $\frac{27}{27} - \frac{1}{27}$ $= \frac{26}{27}$ **1993Q15**	3M
16.	$V = \pi r^2 H + \frac{2}{3}\pi r^3$ $(\frac{22}{7} \times 1.752 \times 5) + (\frac{2}{3} \times \frac{22}{7} \times 4.2^3)$ $\frac{336.875}{7} + \frac{1086.624}{7} = \frac{1423.499}{7}$ $= 203.357$ $= 203.4cm^3$ **1993Q3**	3M
17.	$V = A \times h$ $A = \sqrt{s\,(s-a)(s-b)\,(s-b)}$ $= \sqrt{4.5 \times 1.5 \times 1.5 \times 1.5}$ $= \sqrt{15.1875} = 3.8971143$ $v = 3.8971143$ $= 97.43cm^3$ **1995Q4**	
19.	$\pi r^2 h = \frac{4}{3}\pi r^3$ $\pi \times 11^2 \times 50 = \frac{4}{3}\pi r^3$ $R^3 = \frac{6050\pi \times 3}{4\pi}$ $r = 4537.5$ $r = 16.5cm$ $r = 16.56cm$ **1995Q14**	2M
20.	$1 + x^2 = (2x -)^2 - 1$ $3x^2 - 4x - 1 = 0$ $x = \frac{4 \pm \sqrt{28}}{6}$ $= 1.549$ **1996Q7**	M1 M1 M1 A 1

21.	Volume of the cone $= {}^{1}/_{3} \times {}^{22}/_{7} \times 7 \times 7 \times 18$ $= 924cm^3$ Let change in height be h Volume of water displaced $= {}^{22}/_{7} \times 14 \times 14 \times h$ $=616cm^2$ $\pi \times 14x \times 14x\ h = {}^{1}/_{3}\ \pi \times 7x\ 7 \times 18$ $H = \frac{49 \times 6}{14 \times 14} = 1.5$ **1997Q6**	M1 M1 M1 A1 4 M
22.	i). Area of equid. $\Delta = ½ \times 6x \sin 60^0$ $= ½ \times 6 \times 0.8669$ $= 15.588\ (15.59)$ x = section area $= ½ \times 6 \times 6 \times 0.8660 \times 6$ $= 15.59 \times 6$ $= 93.54\ (93.528)$ ii). Vol. of prism $= 93.54 \times 30$ $= 2806.2 (2805.9)$ **1997Q16**	M1 M1 A1 M1 A1
23.	Volume $= \pi\ r2h = \pi\ 15 \times 1.2$ 270Л (b) ${}^{1}/_{3}\ \pi \times r \times 9 = 270\ \pi$ $r^2 = \frac{270\ x\ 3}{9} = 90$ $r^2 = \sqrt{90} = 10.947$ **1998Q11**	M1 A1 M1 A1 3M
24.	(a) area of the circular based ${}^{22}/_{7} \times 2 \times 3.5 \times 3.5 = 38.5$ (b) area of the curved S.A ${}^{22}/_{7} \times 2\ x3.5\ x20 = 440cm^2$ (c) ${}^{4}/_{3}\ \pi\ r^2 = {}^{2}/_{3} \times {}^{22}/_{7} \times 3.5^2$ 44 x0.5 x3.5 22x3.5 = 77cm² (d)38.5 + 440 + 77cm² **1998Q21**	A1 M1 A1 M1 A1 M1 M1 A1 8M
25.	Initial volume $= \frac{4}{3\pi r^3} \times 2^3 = \frac{3211}{3}$ New vol $= 32\ \pi \times 337.5$ $= 36\ \pi$ **1998Q11**	M1 M1 2M
26.	Area $= 3.142 \times 5 \times 13$ $= 204.23cm^2$ If base area included M1 AO **1999Q4**	M1 A1 2 M
27	a). $y^2 - 2x^2\ cm^2$ b). $2x^2 = 142$ $x = 7\sqrt{2}$ c). area of octagon $y = 14 + 2x = 14 + 2 \times 9.9 = 33.8$ $A = y^2 - 2x^2 = 33.82 - 2 \times 98$ $= 1142.44 - 196$ $= 946.44cm^2$ **1999Q8**	B1 B1 M1 M1 A1
28.	Length of the pipe $\frac{63}{7000} = (0.15 \times 0.12 \times 01)$ $= 0.009 \div 0.006$ $=1.5m$ **1999Q13**	M1 M1 M1 A1 4 M
29.	a) volume of hemisphere $½ \times {}^{4}/_{3} \times {}^{22}/_{7} \times 5.2^3$ 10.4 : 10.4 : 11: h – H – 3h Big cone $V1 = {}^{1}/_{3} \times {}^{22}/_{7} \times 5.2^2 \times h$ Small cone $V_2 = {}^{1}/_{3} \times {}^{22}/_{7} \times (\frac{5.2}{3}) \times h$ $V1 - V_2 = \frac{1}{2} \times \frac{22}{7} \times 5.2^2 \times (3 - \frac{1}{9}) h$ $= \frac{1}{2} \times \frac{22}{7} \times 5.2^2 \times (\frac{26}{9}) h$ $\frac{26}{9} h = 10.4$ $H = \frac{10.4 \times 9}{26} = 3.6$ Therefore height of the frustum $= 2h = 7.2cm$	M1 M1 M1 A1

	b) $L = 3.62 + \frac{5.2^2}{3} = 3.995$ $L = \sqrt{10.8^2 + 5.2^2} = 11.98$ Area $= \pi r^2 + \pi RL - \pi rl$ $\frac{22}{7} \times 3 \times \frac{22}{7} \times 5.2^2 \times \frac{11}{7}.98$ $-\frac{22}{7} \times \frac{5.2}{3} \times 3.995$ $= 9.429 + 195.8 - 21.76$ $= 183.469$ $= 183.5cm^2$ **1999Q23**	M1 M1 A1 8 M
30	Area of rectangle $= 19.5 \times 16.5cm$ $= 321.75cm^2$ Area of 4 triangles $= \frac{1}{2} \times 6 \times 4.5 \times 4$ $= 54cm^2$ Area of octagon $= 321.75 - 54$ $= 267.75cm^2$ **2000Q9**	
31	a) i) $A = \frac{22}{7} \times 4.2 \times 4.2 = 5.44cm^2$ ii) Let standing length cone be L $L - 8 - \frac{3.5}{L} \quad \frac{4.2}{}$ or equivalent $L = 48cm$ Curved area of frustum $22 (4.2 \times 48 - 3.5 \times 40)$ $193.6cm^2$ iii) hemispherical surface area $= \frac{1}{2} \times \frac{4}{7} \times \frac{22}{7} \times 3.5 \times 3.5$ $= 77cm^2$ b) Ratio of areas $= 81.51 : 326.04 = 1:4$ Ratio of lengths $= 1:2$ Radius of base $= \frac{4.2}{2}$ $= 2.1cm$ **200Q20**	B1 M1 A1 M1 A1 M1 A1 8 M
32.	$A = \frac{1}{2} \times 5 \times 5 \sin 120^0$ $= \frac{1}{2} \times 5 \times 5 \times 0.866$ $= 10.825$ **2000Q3**	M1 M1 A1

33.	$x = \frac{p - \pi r}{2}$ Area of triangle $= \frac{1}{2} \left(\frac{p - \pi r}{2}\right)^2$ $= \frac{1}{2} (p - \pi r)^2$ Area of semicircle $= \frac{1}{2} \pi r^2$ Total area $= \frac{1}{2} \pi r^2 + \frac{1}{8}(p - \pi r)^2$ **2000Q4**	B1 B1 B1 3 M
34	$BO - OD = \sqrt{15^2 - 12^2} = \sqrt{81}$ $= 9$ AREA $= 1 \times 9 \times 12 \times 2 + 1 \times \frac{1}{2} 9 \times 18 \times 2$ $= 108 + 162$ $= 270cm^2$ **2001Q2**	M1 M1 A1 3M
35.	$\frac{1}{3} \times \frac{22}{7} \times 6 \times 6 \times 9 + \frac{1}{2} \times \frac{4}{3} \times \frac{22}{7} \times 6 \times 6 \times 6$ $= 339.4 + 452.6$ $= 792$ **2001 Q4**	M1 M1 A1 3 M
36.	Area of pentagons $= \frac{1}{2} \times 4.25 \times 4.25 \sin 72^0 \times 5 \times 2$ $= \frac{1}{2} \times 4.25 \times 4.25 \times 0.9511 \times 5 \times 2$ $= 18.06 \times 0.9511 \times 5 \times 2$ $= 85.88$ or (85.9) Area of rectangle faces $= 5 \times 12 \times 5 = 300$ Total area $= 300 + 85.88$ $= 385.88$ **2001Q12**	M1 A1 M1 A1 4 M
37.	a). i). volume cylindrical part $= \frac{22}{7} \times 0.7 \times 0.7 \times 1$ $= 1.54m^3$ ii). x- section $= \frac{1}{2} \times 0.42 \times \sin 600 \times 6$ $= \frac{1}{2} \times 0.4 \times 0.866 \times 6$ $= 0.41568(0.4157)$ Volume hexagonal part $= 0.41568 \times 4$ $= 1.6628 (1.663)$ b). volume of pillar $(1.54+1.6628) - 0.25 \times 5$ $= 3.2028 - 1.25 = 1.9528(1.953)$ $=$Mass $= 1.953 \times 2400$ $= 4687.2kg(4687kg)$ **2001Q23**	M1 A1 M1 M1 A1 M1 M1 A1 8 M

38	H = 12 sin 60 = 10.39 AD = (12 cos 60) X 2 + 4 = 16 Area = ($^1/_2$ x (4 + 16) 10.39 = 103.9 x 2 =207.8 cm^2 **2002Q6**	M1 A1 3M
39	x section area = $^{22}/_7$ ($4^2 - 3^2$)cm volume = $^{22}/_7$ x 7 x 0.2cm^2 4.4 = cm^2 **2002Q11**	M1 A1 2M
40	½ x 14 x 8sin θ = 28 sin θ = $\frac{28}{56} = \frac{1}{2}$ θ = 30^0 or 150^0 **2003Q10**	M1 A1 2
41	Area Δ face = ½ x 6 x 6 x sin60^0 = 18 x 0.866 = 15.59 Total surface are = (2 x 15.59) + 3 x 6 x 10) = 31.18 + 180 = 211.18cm^2 **2003Q10**	M1 M1 M1 A1 2M
42	4x + 2 $\left(\frac{3x}{2}\right)$= 21 7x = 21 X = 3 width is 3cm **2003Q11**	
43	a). Ext d = 11cm or r_1 = 5.5cm Int. d = 9cm or r_2 = 4.5cm Volume = π ($r^2 - r^2$) x 600cm = 3.142 (5^2 – 5- 2-4.5^2) x 600cm = 18852. **2003Q13**	M1 M1 A1 3 M
44	a). Volume of milk ¾ (1.7mx1.4mx2.2m) =3.927m^2 b). i).Volume of each $^1/_3$ x ½ x 16x16 sin 600 x 13.6 = $^1/_3$x ½ x 256 x 0.866x13.6 = 502.5cm^2 in 2sf=500cm^3 ii). Number of full packets	M1 A1 M1 M1 A1 B1
	$\frac{3.927}{502.5}$ x 10^6 x 25 = 7814 x 25 1. 7814 x 25 = 195350 – 3.927x106 / 502.5 2. 195350= 7814x25-3.926 log used 3. 195272=7811x15 – altitude correctly or heroes formula (13.86) 4. 195400=7816x25-when 502.4 is used 5. 195225-using 13.86 or heroes formula 3.926 (7809 x25) 6. 195300= $\frac{3.926}{502.5}$ x10^6 = 7812 x 25 **2003Q17**	M1 A1 8 M
45.	S.A = ½ ($4\pi^2$)+ π r^2 75 π $r^2 = \frac{75\pi}{3\pi} = 25$ r =5 v = ½ ($\frac{4}{3}\pi$ x 5^3) = $88\frac{1}{3}\pi$ **2003Q9**	M1 A1 M1 A1 4 M
46	a) Let <QSE = θ $4^2 = 5^2 + 8^2 - 2$ x 5 x 8 cos θ	M1

	$\text{Cos}\theta = \frac{89-16}{80} = \frac{73}{80} = 0.9125$ $\theta = 24^0\ 9$ $24^0\ 8$ $24^0.14$ 16.38cm^2 a) Area of PQS $= ½ \times 8 \times 10\sin 24^09$ $= 40 \times 0.4091$ $= 10.825\text{cm}^2$ $= 16.36\text{cm}^2$ **2004Q12**	A1
47.	a) Area of hemispherical part $= ½ \times 48r^2$ $= 2 \times {}^{22}/_{7} \times 35 \times 35$ $= 7700\text{cm}^2$ b) Slant height for original / zone $L = 35$ $L - 60 = 14$ $L = 200\text{cm}$ C)Surface area of frustum $\pi RL = \pi rl$ $Ni = {}^{22}/_{7} \times 35 \times 100 - {}^{22}/_{7} \times 14 \times 40$ $= 11000 - 1760$ $= 9240\text{cm}^2$ Total surface area $= 7700 + 9240 + {}^{22}/_{7} \times 14^2$ $= 7700 + 9240 + 616$ $= 17556\text{cm}^2$ **2004Q19**	M1 A1 M1 A1 M1 M1 M1 A1 M1 A1 M1 M1 A1
48.	 $AD = \sqrt{7.5^2 + 4^2}$	M1 M1
	$= 72.25$ $= 8.5$ Perimeter $= 8.5 \times 4$ $= 34\text{cm}$ **2005Q19**	A1
49.	 Area A $= \pi r^2$ ${}^{22}/_{7} \times 4.2 \times 4.4$ $= 55.44\text{cm}^2$ Area B $= 2\pi rh \times ½$ $= {}^{22}/_{7} \times 4.2 \times 150$ $= 1980\text{cm}^2$ Area C $= 2 \times 4.2 \times 150$ $= 1260\text{cm}^2$ Total area $= 55.44 + 1980 + 1260$ $= 3295.\text{cm}^2$ **2005Q3**	B1 M1 M1 A1
50.	Cross sectional area $= ½\ bh + 1x\ b$ $= ½ \times 25 \times 1.8 + 25 \times 1 = 47.5\text{m}^2$ Volume $= 47.5 \times 10 \quad = 475\text{m}^2$ b). i). volume A $½ \times 25 \times 1.8 \times 10$ $= 225$ Volume B $= 10 \times 1 \times 25 \quad = 250$ Total volume $= 250 + 225 = 475\text{m}^3$  ii). 225m3 = 9 hours Therefore 250m3 = $\underline{250 \times 9}$	B1 M1 A1 B1 M1 A1

	225 = 10 hours **2005Q19**	B2 A1`
51.	a). Height $= \sqrt{3^2 - 1.8^2} = 2.4$ x – sectional area = 9.12cm^3 x – sectional area × height $= \frac{1}{2} \times 2.4 \times (2+5.6) \times 8$ Volume = 9.12 x 8 = 72.96cm^3 b). Mass mg = 72.96 x 5.75 = 419. 52g c). (i) 246.24= cross section Area × 8 Cross section Area = $\frac{246.24}{30} \times 30.85$ cm^2 (ii) $\frac{419.52g}{246.24\ cm^2} \times \frac{2}{5} = 4.259$ g/cm^3 Area of solution =9.12 × 2.25 =20.52cm^2 **2006Q19**	M1 M1 A1 M1 A1 M1 A1 10 M
52.	a). Slant height L =$\sqrt{4^2 + 3^2}$ =5cm $A_c = \pi rl$ = 3.142 × 3 × 5 = 47.13cm^2 $A_{cs} = \pi Dh$ = 3.142 × 6 × 8 = 150.82cm^2 As $= \frac{1}{2} 4\pi r^2 = 2\pi r^2$ = 2× 3.142× 9 = 56.56 cm^2 b). 15cm: 600cm 1:40 a.s.f = $\frac{1}{1600}$ Area of container	 B1 M1 M1 A1 B1 B1 M1

	1600 x 254.5cm^2 $\frac{1600 \times 254.5}{1000}$ = 40.72m^2 Paint needed $\frac{40.72}{20}$ x 0.75 = 1.527 litres Toal = 24.13 + 9.05 +2.54ml = 40.73m^2 Paint needed $^{40.73}/_{20}$ x 0.75ml = 1.527litres **2006Q23**	M1 M1 A1 10 m
53.	Volume of plate = $\frac{1.05}{8.4}$ x 100 = 125cm^3 $L^2 = \frac{125\ cm}{0.2} = 625$ **2007Q7** L = $\sqrt{625}$ = 25cm	M1 M1 A1 3 M
54.	Cos θ = $\frac{2.5}{5}$ = 05 θ = 60^0 x 2 surface under water = $\frac{2 \times 60}{360}$ x π x 10 x 12 = 125.7 **2007Q9**	A1 M1 M1 A1 4 M
55.	a). I.S.F = $\sqrt{\frac{20}{45}} = \sqrt{\frac{4}{9}} = \frac{2}{3}$ Therefore I.S.F = $^8/_{27}$ Capacity of smaller container $\frac{8}{27}$ x 0.945 0.281 or 280ml (280cm^3) b). let depth be h 45(13-h) =20h 585 =65h H = 9 c). amount in smaller container	M1 M1 A1 A1 A1 M1 A1 M1 A1

	$^1/_5$ x 9 x 45 + 20x9 =261 Height in smaller container $^{261}/_{20}$ = 13.05cm Difference 13.05 – $^4/_5$ x 9 =13.05 – 7.2 = 5.85 **2007Q22**	M1 A1 2 M
56.	23.50 + (7 h 15 minutes + 45 minutes + 5h 40 minutes) = 1330h = 1.30pm on Monday **2008Q4**	B1 B1 2 M
57.	Volume of liquid = $\frac{384}{0.6}$ Height of liquid = 640 x 3.22 = 19.89 **2008Q7**	M1 M1 A1 3 M
58.	Volume of sphere = $^4/_3\pi$ x 4.23 Side of cube = 3 $^4/_3\pi$ x 4.23 = 6.77 **2008Q9**	M1 M1 A1 3 M
59.	Area of rectangular part = 2x 5.2 x π x 18 = 187.2 π Area of circular parts = 2 x 5.22 x π = 54.08 π π (187.2+54.08) = 241.28 π **2008Q13**	M1 M1 A1 3 M
60.	a). $^1/_3$ x $^{22}/_7$ x 21 x 21 x 30 = 13860 b). i). $^r/_{21}$ = $^{36}/_{30}$ r = $\frac{36 \times 21}{30}$ = 25.2 ii). $^1/_3$ x $^{22}/_7$ x 25.2 x 25.2 x 36	M1 A1 M1 A1
	= 23950.08 = 23950.08 – 13860 = 10090.08cm^3 iii). $\frac{4}{3}$ x $\frac{22}{7}$ x r^3 = 10090.8 r^3 = $\frac{10090.08 \times 21}{4 \times 22}$ R = $3\sqrt{2407.86}$ = 13.40cm **2008Q22**	M1 M1 A1 M1 M1 A1 10 M
61.	AC = $\sqrt{85^2 - 75^2}$= 1600 = 40 Area of quad ABCD = ½ x 40 x 75 + $\sqrt{75(75-60)(75-50)(75-40)}$ = 1500 + $\sqrt{984375}$ =1500 + 992 =2492m^2 =0.25ha **2009Q6**	M1 M1 A1 B1 4 M
62.	Time between Monday 0545h and Friday 1945h = 4x 24 + 14 = 110h Time lost = 0.5 x 110 = 55 minutes Time shown in 12 hours system 1945-55 = 1850h = 6.50 p.m **2009Q7**	M1 M1 A1 3 M
63.	$2\pi r^2 + 2\pi rh = 154$ r = h $2\pi r^3 + 2\pi r^2 = 154$ $4\pi r^2 = 154$ r = $\sqrt{\frac{154}{4 \times 3.142}}$ = 3.500 diameter = 2r= 3.500 x 2	 M1 M1 A1

	= 7.00 (s dp) **2010Q14**	3
64.	Accept $^2/_3$ = 0.666 re-use of decimals Apply Pa- if not 4 sig figs Let OC = r .: CD = $\frac{2}{3}r$ and EF = $\frac{2}{3}r + 5$ $\frac{2}{3}r + \frac{2}{3}(r + 5)$ + 5+5 = 24 $\frac{4}{3}r = 10\frac{2}{3}$ r=8 **2010Q15**	M1 M1
65	(a) (i)internal volume of box = 150x80x40cm^3 =480,00cm^3 external volume of bos = 152 x 82x42cm^3 = 523488cm^3 Volume of wood = (523488 – 480,000)cm^3 = 43488cm^3 (ii) mass of box = $\frac{43488 \times 0.6}{1000}$ = 26092 = 26.1kg (b) (i0 no of tins = $\frac{150}{10} \times \frac{80}{10} \times \frac{40}{10}$ = 240 (ii) total mass = 26.1 + $\left(\frac{240 \times 120}{1000}\right)$ = 54.9kg **2010Q18**	
66.	$\sqrt{11.252^2 - 6.75^2}$ -9 Perimeter = 2(9+6.75) = 31.5 **2011Q2**	B1 B1 2
67	Internal dimensions:	B1
	40,20 and 15 Volume unoccupied = 40 x 20 x 15 – 8000 = 4000 Height unoccupied $\frac{4000}{40x20}$ =5cm **2011Q7**	 M1 M1 A1 4
68.	(a) (i) surface area of the solid = $\pi \times 6 \times 10 + \frac{4}{2} \times \pi$ x 6^2 = 414.69 (ii) height of the cone: =$\sqrt{100 - 36}$ = 8 Therefore: volume of the solid = $^1/_3$ x π x 6^2 x 8 + ½ x $^4/_3$ x π x 6^3 = 753.98cm^3 (b) mass of the solid in kg = $\frac{1.3 \times 753.98}{100}$ = 0.9802 to 4significant to s.f **2011Q17**	 M1 M1 A1 B1 M1 M1 A1 M1 M1 A1

69.	$\frac{24}{2} = \frac{1}{2} \times 8 \times x\ sin30°$ $x = \frac{12}{4sin30} = 6cm$ Perimeter = 2(6+8) = 28 **2012 Q4**	M1 M1 A1 3
70.	Volume of solid = $\frac{1}{3}$ x $\frac{22}{7}$ x10.5^2 x 15 – $\frac{22}{7}$ x 3.5^2 x 8 = 1732.5 – 308 = 1424.5cm^3 **2012 Q15**	M1 M1 A1 3
71. (a)	$\|AB\| = \sqrt{169 - 25} = 12$	B1
(b)	2 x 5 x 12 + 2 x 5 x 15 + 2 x 12 x 15 = 630cm^2	M1 M1 A1
(c)	Volume = 5 x 12 x 15cm^3 Mass = 7.6 x 5 12 x 15 = 6840gm = $\frac{6840}{1000}$ = 6.84kg	M1 M1 M1 A1
(d)	$\frac{150 \times 120 \times 100\ cm^3}{15 \times 12 \times 5\ cm^3}$ = 2000 **2012Q18**	M1 A1 10