VOLUME PAST PAPER QUESTIONS - ANSWERS

1.

$V = \pi r^2 h$

$V = \pi \times 3 \cdot 25^2 \times 15$

$V = 497 \cdot 7 \text{ cm}^3$

$V = \pi r^2 h$

$497 \cdot 7 = \pi \times r^2 \times 12$

$\frac{497 \cdot 7}{\pi \times 12} = r^2$

$r^2 = 13 \cdot 2$

$r = 3 \cdot 6336$

$d = 7 \cdot 26722 = 7 \cdot 3 \text{ cm}$

2. a)

$V = \pi r^2 h$

$V = \pi \times 5^2 \times 14$

$V = 1100 \text{ cm}^3$

b)

$V = \pi r^2 h$

$600 = \pi \times 5^2 \times d$

$\frac{600}{\pi \times 25} = d$

$d = 7 \cdot 6 \text{ cm}$

3. a)

$V = A h$

$V = 28 \times 18$

$V = 504 \text{ cm}^3$

b)

$V = \pi r^2 h$

$504 = \pi \times 0 \cdot 7^2 \times l$

$\frac{504}{\pi \times 0 \cdot 49} = l$

$l = 327.4 \text{ cm}$

4.

$V = \frac{1}{3} \pi r^2 h$

$V = \frac{1}{3} \pi \times 4^2 \times 15$

$V = 251 \cdot 3 \text{ cm}^3$

$V = \frac{4}{3} \pi r^3$

$V = \frac{4}{3} \pi 3 \cdot 7^3$

$V = 212 \cdot 2 \text{ cm}^3$

$V \text{ of glass} = 251 \cdot 3 - \frac{1}{2} of\ 212 \cdot 2 = 145 \cdot 2 \text{ cm}^3$

5. a)

$V = \frac{4}{3} \pi r^3$

$V = \frac{4}{3} \pi 6400^3$

$V = 1 \cdot 1 \times 10^{12} \text{ cm}^3$

b)

$(1 \cdot 1 \times 10^{12}) \div (2 \cdot 2 \times 10^{10}) = 50$

The earths volume is 50 times greater than the moons.

6.

$A = lb$

$A = 20 \times 28$

$A = 560 \text{ cm}^2$

$A = \frac{1}{2} bh$

$A = \frac{1}{2} \times 20 \times 4 \cdot 5$

$A = 45 \text{ cm}^2$

Total Area = 560 + 45 = 605 cm^2

$V = A h$

$V = 605 \times 9$

$V = 5445 \text{ cm}^3$

$V = 5445 \text{ ml}$

$V = 5 \text{ litres}$

7. a)

$A = \frac{1}{2}(a + b)h$

$A = \frac{1}{2} \times (32 + 22) \times 20$

$A = \frac{1}{2} \times 54 \times 20$

$A = 540 \text{ cm}^2$

b)

$V = A h$

$V = 540 \times 60$

$V = 30\,000 \text{ cm}^3$

8. a) $A = \frac{1}{2}(a+b)h$

$A = \frac{1}{2} \times (32+68) \times 24$

$A = \frac{1}{2} \times 100 \times 24$

$A = 1200 \text{ cm}^2$

b) $V = A\,h$

$156\,000 = 1200 \times l$

$l = \frac{156000}{1200}$

$l = 130 \text{ cm}$

9. a) $c^2 = a^2 + b^2$

$1^2 = x^2 + 0 \cdot 5^2$

$1 = x^2 + 0 \cdot 25$

$x^2 = 0 \cdot 75$

$x = 0 \cdot 87$

b) $A = lb$

$A = 1 \cdot 13 \times 0 \cdot 5$

$A = 0 \cdot 57 \text{ m}^2$

$A = \frac{1}{2}bh$

$A = \frac{1}{2} \times 0 \cdot 87 \times 0 \cdot 5$

$A = 0 \cdot 22 \text{ m}^2$

Total area = 0·79 m^2

$V = Ah$

$V = 0 \cdot 79 \times 2$

$V = 1 \cdot 58 \text{ m}^3$

10. $V = \pi r^2 h$

$V = \pi \times 3^2 \times 8$

$V = 226 \cdot 2 \text{ cm}^3$

2000 ÷ 226·2 = 8·84

8 full glasses

11. a) $V = \pi r^2 h$

$V = \pi \times 3^2 \times 4$

$V = 113 \cdot 1 \text{ cm}^3$

b) $V = \frac{1}{2} of \frac{4}{3} \pi r^3$

$113 \cdot 1 = \frac{1}{2} of \frac{4}{3} \pi r^3$

$226 \cdot 2 = \frac{4}{3} \pi r^3$

$54 = r^3$

$r = 3 \cdot 8 \text{ cm}$

12. 23 – 15 = 8 mm

radius = 8 ÷ 2 = 4 mm

$V = \pi r^2 h$

$V = \pi \times 4^2 \times 15$

$V = 754 \cdot 3 \text{ mm}^3$

$V = \frac{4}{3} \pi r^3$

$V = \frac{4}{3} \pi 4^3$

$V = 268 \cdot 1 \text{ m}$

Total Volume = 1022·4mm^3

13. a) $V = \pi r^2 h$

$V = \pi \times 1 \cdot 5^2 \times 15$

$V = 106 \text{ m}^3$

b) $V = \frac{1}{3} \pi r^2 h$

$5 \cdot 7 = \frac{1}{3} \pi 1 \cdot 5^2 h$

$17 \cdot 1 = \pi 1 \cdot 5^2 h$

$h = 2 \cdot 4 \text{ m}$

Total height = 15 + 2·4 = 17·4 m

14. $V = \pi r^2 h$

$3260 = \pi \times 6 \cdot 4^2 \times h$

$h = \frac{3260}{\pi \times 6 \cdot 4^2}$

$h = 25 \cdot 3 \, cm$

15. $V = \pi r^2 h$

$V = \pi \times 41^2 \times 900$

$V = 4752916 \text{ mm}^3$

$V = \pi r^2 h$

$V = \pi \times 37^2 \times 900$

$V = 3870756 \text{ mm}^3$

Volume of tube = 4 752 916 – 3 870 756 = 882 160 = 882 000 mm^3

16. a) $A = lb$ $A = \pi r^2$ $V = Ah$ b) $V = l\ b\ h$

$A = 30 \times 24$ $A = \pi \times 12^2$ $V = 1172 \cdot 4 \times 50$ $29300 = 35 \times 28 \times h$

$A = 720\ \text{cm}^2$ $A = 452 \cdot 4\ \text{cm}^2$ $V = 58620$ $h = \frac{29300}{35 \times 28}$

Total area = 1172·4 cm^2 $V = 58600\ \text{cm}^3$ $h = 29 \cdot 9\ \text{cm}$

17. $V = \frac{1}{3}\ \pi\ r^2\ h$ $V = \frac{1}{3}\ \pi\ r^2\ h$

$V = \frac{1}{3} \times \pi\ \times 15^2 \times\ 24$ $V = \frac{1}{3} \times \pi\ \times 5^2 \times\ 8$

$V = \ 5654 \cdot 9\ \text{cm}^3$ $V = \ 209 \cdot 4\ \text{cm}^3$

Volume of water = 5654·9 – 209·4 = 5445·5 cm^3

18. $V = \frac{1}{3}\ \pi\ r^2\ h$ $V = \frac{1}{2}\ of\ \frac{4}{3}\ \pi\ r^3$

$V = \frac{1}{3} \times \pi\ \times 5^2 \times\ 11$ $V = \frac{1}{2}\ of\ \frac{4}{3}\ \pi\ 5^3$

$V = \ 288\ \text{cm}^3$ $V = \ 262\ \text{cm}^3$

Total volume = 288 + 262 = 550 cm^3

19. a) $V = \frac{4}{3}\ \pi\ r^3$ b) $V = \ \pi\ r^2\ h$

$V = \frac{4}{3} \times\ \pi \times\ 0 \cdot 5^3$ $0 \cdot 52 = \ \pi\ \times 0 \cdot 7^2\ \times h$

$V = \ 0 \cdot 5235987756$ $\frac{0 \cdot 52}{\pi \times 0 \cdot 49} = h$

$V = \ 0 \cdot 52\ \text{cm}^3$ $h = 0 \cdot 34\ \text{cm}$

20. $V = \frac{1}{3}\ \pi\ r^2\ h$ $V = \ \pi\ r^2\ h$

$V = \frac{1}{3} \times \pi\ \times 5 \cdot 2^2 \times\ 20$ $V = \ \pi \times\ 5 \cdot 5^2 \times\ 5 \cdot 8$

$V = \ 566\ \text{cm}^3$ $V = \ 551\ \text{cm}^3$

The cone is better value for money as it contains more ice cream.

21. a) $A = lb$ $A = \pi r^2$ $V = Ah$ b) $V = \frac{1}{4}\ \pi\ r^2\ h$

$A = 46 \times 30$ $A = \pi \times 15^2$ $V = 2086 \cdot 9 \times 25$ $30000 = \frac{1}{4} \times r^2 \times 20$

$A = 1380\ \text{cm}^2$ $A = 706 \cdot 9\ \text{cm}^2$ $V = 52172 \cdot 5$ $120000 = r^2 \times 20$

Total area = 2086·9 cm^2 $V = 52000\ \text{cm}^3$ $6000 = r^2$

$r = 77 \cdot 5\ \text{cm}$

22. $V = \frac{1}{3}\ \pi\ r^2\ h$ $V = \frac{1}{3}\ \pi\ r^2\ h$

$V = \frac{1}{3} \times \pi\ \times 8^2 \times\ 32$ $V = \frac{1}{3} \times \pi\ \times 5^2 \times\ 20$

$V = \ 2144 \cdot 7\ \text{cm}^3$ $V = \ 523 \cdot 6\ \text{cm}^3$

Volume of water = 2144·7 – 523·6 = 1621·1 = 2000 cm^3

NON-CALCULATOR QUESTIONS

23. $V = \frac{4}{3}\pi r^3$

$V = \frac{4}{3} \times 3 \cdot 14 \times 3^3$

$V = 4 \times 3 \cdot 14 \times 3^2$

$V = 12 \cdot 56 \times 9$

$V = 113 \cdot 04 \text{ cm}^3$

24. $V = \pi r^2 h$

$V = 3 \cdot 14 \times 5^2 \times 4$

$V = 3 \cdot 14 \times 25 \times 4$

$V = 3 \cdot 14 \times 100$

$V = 314 \text{ cm}^3$

25. $V = \frac{1}{3}\pi r^2 h$

$V = \frac{1}{3} \times 3 \cdot 14 \times 10^2 \times 12$

$V = \frac{1}{3} \times 3 \cdot 14 \times 100 \times 12$

$V = 3 \cdot 14 \times 100 \times 4$

$V = 314 \times 4$

$V = 1256 \text{ cm}^3$