Mark scheme   UNIT 17

This test is divided into non-calculator (20 minutes) and calculator (30 minutes) sections which can be delivered separately.

The following marks are awarded for each question.

B	Unconditional accuracy mark
M	Method mark – the correct method must be shown but there may be an arithmetic error; the sight of the value given in brackets implies the award of the method mark
A	Accuracy mark – unless the question specifies that working **must** be shown then the sight of the correct answer implies the award of full marks (unless the answer clearly comes from incorrect working)
C	Communication mark
P	Process mark to show correct process for problem solving. Any other process of a similar standard to achieve an accurate result is acceptable to achieve this mark
FT	Incorrect values may be **followed through** from one step to the next **provided** that the correct method is seen in each step and the only errors are arithmetic. This is shown in mark schemes by putting a number in inverted commas
OE	Or equivalent answer mark

Q	Answer	Mark	Comment
1	299.5 (cm^2)	B1	
3	Gives maximum height of bottle and minimum height of shelf in the same units eg the height of the bottle could be 255 mm but the minimum height of the shelf is 249.5 mm	C2	C1 for either maximum height of bottle or minimum height of shelf

5a	9 (cm^2)	P1	process to find the area of the square, e.g. 6^2 (= 36)
		P1	process to estimate the area of the circle (must use the radius of 3 cm), e.g. 3×3^2 (= 27)
		A1	9
5b	Overestimate as the area of the circle is an underestimate from using an smaller value for π	C1	overestimate with valid reason
7a	Any diameter drawn on the circle	B1	
7b	Chord	B1	
9	47.7 (cm)	M1	$150 \div \pi$
		A1	Accept 47.7 to 47.8
11	22 cm	M1	$\pi \times 7$
		A1	21.99 − 22
		B1	Units consistent with answer

13	60.7	P1	for process to find the area of one shape, e.g. 25^2 (= 625) or $\pi \times 12.5^2$ (= 490.873...) or $\pi \times 12.5^2 \div 2$ (= 245.43...)
		P1	for process to find the shaded area eg "25^2" − "$\pi \times 12.5^2$" $\div 2$ (= 379.563...)
		P1	for a complete process to find the required percentage, e.g. $\dfrac{"379.563"}{625} \times 100$
		A1	answer in the range of 60 to 61
15	9.4 (cm^2)	M1	for method to find the area of the sector, e.g. $\dfrac{30}{360} \times \pi \times 6^2$
		A1	answer in the range of 9.4 to 9.5

| 17 | 980.2 (cm^3) | M1 | for method to find the volume of the hemisphere, e.g. $\dfrac{4}{3}\pi \times 6^3 \div 2$ (= 452.389...) |

	M1	for method to find the volume of the cone, e.g. $\frac{1}{3}\pi \times 6^2 \times 14$ $(= 527.787...)$
	A1	answer in the range of 979 to 981

Non-Calculator

Question	Topic	Step	Mark
1	Identify the upper and lower bounds of a measurement	8th	1
3	Identify the upper and lower bounds of a measurement	9th	2
5a	Use the formulae for the area of a circle, given the radius or diameter	7th	3
5b	When using approximations, identify whether the estimate will be an under estimate or an over estimate	7th	1
7	Identify, illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius	6th	2

⊞ **Calculator**

9	Use the formulae for the area of a circle, given the radius or diameter	7th	2
11	Problem solving involving area of a circle	7th	3
13	Find the perimeters and areas of semicircles and quarter circles	8th	4
15	Use the formulae to find the length of an arc and the area of a sector	9th	2
17	Find the surface area and volumes of compound solids constructed from cubes, cuboids, cones, pyramids, spheres, hemispheres, cylinders	10th	3