

Volume of Prisms Past Paper Questions (MS)



Q1.

| PAPER: 1MA0 1F | | | | |
|----------------|---------|--------|------|-------------------------------------|
| Question | Working | Answer | Mark | Notes |
| (a)(i) | | 6 | 3 | B1 cao |
| (ii) | | 12 | | B1 cao |
| (iii) | | 8 | | B1 cao |
| (b) | | 120 | 2 | M1 $10 \times 3 \times 4$ A1 cao |

Q2.

| Question | Working | Answer | Mark | Notes |
|----------|--|--------|------|--|
| | $\frac{1}{2} \times 5 \times 12 \times 10 =$ | 300 | 2 | M1 for $\frac{1}{2} \times 5 \times 12 (\times 10)$ oe A1 cao |

Q3.

| 5MB3H 01 November 2015 | | | | |
|------------------------|---------|--------|------|---|
| Question | Working | Answer | Mark | Notes |
| | | 180 | 3 | M1 for area of cross section, eg $3 \times 2 + 3 \times 4 + 3 \times 6$ (=36) or $9 \times 6 - 3 \times 3 \times 2$ (=36) M1 for "36" $\times 5$ A1 cao OR M1 for area of one cuboid eg $3 \times 2 \times 5$ (=30) M1 for $6 \times$ "30" A1 cao OR M1 for 4.5×8 (=36) M1 for "36" $\times 5$ A1 cao |

Q4.

| Question | Working | Answer | Mark | Notes |
|----------|---------|--------|------|--|
| | | 618 | 4 | M1 for a method to find an area which is part of the cross section M1 (dep) for a complete method to find the total area of the cross section M1 (dep M1) for their cross sectional area $\times 12$ A1 cao OR M1 for a method to find the volume of cuboid, $8 \times 8 \times 12$ (= 768) M1 for a method to find the volume of the triangular prism, $\frac{1}{2} \times 5 \times 5 \times 12$ (= 150) M1 (dep M2) for a complete method for the volume of the prism A1 cao |

Q5.



| 5MB2F November 2016 | | | | | |
|---------------------|--|--------|------|---|------|
| Question | Working | Answer | Mark | Notes | Type |
| | $4 \times 3 = 12$ $2 \times 10 = 20$ $(12 + 20 + 20) \times 1.5$ $8 \times 10 \times 1.5 = 120$ $\frac{1}{2} \times 4 \times 7 \times 1.5 = 21$ $120 - 21 - 21$ | 78 | 4 | M1 for method to find area of parallelogram or 2 triangles M1 for method to find whole cross sectional area M1 for complete method to find volume A1 cao OR M1 for method to find volume of enclosing cuboid or volume of a single cuboid. M1 for method to find volume of triangular prism(s) of method to find parallelogram prism M1 for complete method to find volume of prism. A1 cao | E |

Q6.

| Working | Answer | Mark | Notes |
|---------|--------|------|---|
| | 1180 | 3 | M1 for a correct method to find the area of the cross section M1 (dep) for a complete correct method for the volume of the prism A1 cao OR M1 for a correct method to find the volume of one cuboid M1 (dep) for a complete correct method for the volume of the prism A1 cao |

Q7.

| Question | Working | Answer | Mark | Notes |
|----------|--|--------|------|---|
| | Area of cross section $4 \times 7 + 5 \times 2$ or $9 \times 2 + 5 \times 4$ OR $9 \times 7 - 5 \times 5 (= 38)$ | 380 | 3 | M1 for $4 \times 7 + 5 \times 2 (=38)$ or $9 \times 2 + 5 \times 4 (=38)$ or $7 \times 9 - 5 \times 5 (=38)$ or $4 \times 7 \times 10$ or $5 \times 2 \times 10 (=100)$ or $9 \times 2 \times 10 (=180)$ or $5 \times 4 \times 10 (=200)$ or $9 \times 7 \times 10 (=630)$ or $5 \times 5 \times 10 (=250)$ M1 (dep) for '38' $\times 10$ or 380 or $4 \times 7 \times 10 + 5 \times 2 \times 10$ or $9 \times 2 \times 10 + 5 \times 4 \times 10$ or $(7 \times 9 - 5 \times 5) \times 10$ A1 cao |



Q8.

| 5MB2H 01 November 2015 | | | | |
|------------------------|---------|------------------------|------|--|
| Question | Working | Answer | Mark | Notes |
| | | 105 cm ³ | 4 | M1 for writing factor pairs of 35, 21 or 15 M1 for "3" × "5" × "7" using their lengths dep on one at least one correct factor pair A1 ft for 105 (dep on one correct factor pair) B1 for cm ³ |

Q9.

| Question | Answer | Mark | Mark scheme | Additional guidance |
|----------|-------------------|------|---|---|
| | No (supported) | P1 | for finding the area of 3 or more faces of the cuboid and adding eg $(6 \times 8) + (8 \times 18) + (6 \times 18) \dots$ or "48" + "144" + "108" ... (= 300) | Could be an addition of <i>any</i> three faces eg $48 + 48 + 144$ etc. |
| | | P1 | complete process to find surface area of cuboid, eg $6 \times 8 \times 2 + 6 \times 18 \times 2 + 8 \times 18 \times 2$ (= 600) | |
| | | P1 | for process to find side length of cube, eg [surface area] $\div 6$ and square rooting (= 10) | for a process to find the volume of the cuboid $6 \times 8 \times 18$ (= 864) and cube rooting (= 9.52...) to find a side length |
| | | P1 | (dep on previous P1) for processes to find volume of cube and volume of cuboid, eg [side length] ³ (= 1000) and $6 \times 8 \times 18$ (= 864) | [surface area] must come from the addition of at least three attempts at area, but not from volume. |
| | | A1 | No with 1000 and 864 OR No with 600 and 544(.28...) | |

Q10.

| Question | Working | Answer | Mark | Notes |
|----------|--|-------------------|------|--|
| | $\frac{1}{2} \times 2x \times x \times (x + 10)$ | $V = x^3 + 10x^2$ | 3 | M1 for $\frac{1}{2} \times 2x \times x \times (x + 10)$ A1 for $x^3 + 10x^2$ or $x^2(x + 10)$ B1 for $V =$ cubic expression in x |



Q11.

| Question | Working | Answer | Mark | Notes |
|----------|---|--------------------|------|---|
| | <p>Unknown length = $x + 3 - x - x = 3 - x$</p> <p>Cross-sectional area $= (x + 3)(x - 1) + (x + 3)(x - 1) + (3 - x)(2x)$ $= x^2 + 2x - 3 + x^2 + 2x - 3 + 6x - 2x^2$ $= 4x - 6 + 6x$ $= 10x - 6$</p> <p>Volume $= (10x - 6)(x + 3)$ $= 10x^2 + 24x - 18$</p> <p>OR Unknown length = $x + 3 - x - x = 3 - x$</p> <p>Volume $= (x + 3)(x + 3)(x - 1) + (x + 3)(x + 3)(x - 1) + (2x)(3 - x)(x + 3)$ $= (10x - 6)(x + 3)$ $= 10x^2 + 24x - 18$</p> <p>OR Unknown length = $(2x - 2) + 2x = 4x - 2$</p> <p>Surrounding area $= (4x - 2)(x + 3) = 4x^2 + 10x - 6$ So $A = 4x^2 + 10x - 6 - 4x^2 = 10x - 6$</p> <p>So $V = (10x - 6)(x + 3) = 10x^2 + 24x - 18$</p> <p>OR Unknown length = $(2x - 2) + 2x = 4x - 2$</p> <p>Surrounding volume $= (4x - 2)(x + 3)(x + 3)$ $V = (4x - 2)(x + 3)(x + 3) - 2x(2x)(x + 3)$</p> | $10x^2 + 24x - 18$ | 4 | <p>B1 for $x + 3 - x - x$ oe or $3 - x$ seen or $x - 1 + 2x + x - 1$ oe or $4x - 2$ seen</p> <p>M1 for correct expression for 1 area from cross-section or for 1 volume of cuboid(s) (brackets not needed)</p> <p>M1 for correct method for total cross-sectional area OR at least 2 volumes added OR volume of surrounding cuboid – at least 1 vol (brackets needed)</p> <p>A1 for $10x^2 + 24x - 18$ oe</p> |

Q12.

| PAPER: IMA0/1H | | | | |
|----------------|---------|-----------------|------|--|
| Question | Working | Answer | Mark | Notes |
| | | $9x^2 + 7x - 2$ | 4 | <p>M1 for finding an expression for a missing length eg $4x - 1 - x - x (=2x - 1)$ or $x + 2 - 2x (=2 - x)$</p> <p>M1 for a correct expression for one area from the cross-section, eg. $x \times 2x$ or $(4x - 1)(x + 2 - 2x)$ or for one volume of cuboid(s), eg. $x \times 2x \times (x + 1)$</p> <p>M1 for a complete method to find the volume A1 for $9x^2 + 7x - 2$ or $(9x - 2)(x + 1)$ oe</p> |