

SPEED AND DENSITY

OCR GSCE – Monday 9 November 2020 – Paper 6 (Calculator) Higher Tier

1.

6				6	<p>385 with correct working</p>	<p>“Correct working” requires evidence of at least M2 AND B1 i.e. correct and consistent units used</p> <p>soi by 38.8 to 38.9 [kg] soi by 38 800 to 38 900 [g]</p> <p>soi by 0.0518 to 0.0519 [m³] soi by 51 800 to 51 900 [cm³] Assume <i>their</i> mass unit from M2, but do not assume from M1 only</p> <p>Accept any figure but not 2.4, 1.2, 1.8 and 750 for <i>their</i> mass For M1 accept one or more trial(s) of <i>their</i> mass × an integer in attempt to = <i>their</i> figs 15</p>
				<p>M2 for [mass of one panel =] 2.4 × 1.2 × 0.018 × 750 or 240 × 120 × 1.8 × 0.750 or</p> <p>M1 for figs 24 × figs 12 × figs 18 × figs 750 or 2.4 × 1.2 × 0.018 or 240 × 120 × 1.8</p> <p>AND</p> <p>B1 for 15 000 [kg] or 15 000 000 g seen or <i>their</i> mass correctly converted to tonnes</p> <p>M1 for $\frac{\text{figs 15}}{\text{their mass}}$</p> <p>A1 for 385.[...] to 387</p> <p>If 0 or B1 scored, instead award SC2 for answer 385 with no working or insufficient working</p> <p>If 0 scored SC1 for answer 385.[...] to 387 with no working</p>		

OCR GSCE – Monday 11 November 2019 – Paper 6 (Calculator) Higher Tier

2.

12	a	37 minutes 52 seconds to 37 minutes 53 seconds	4	B1 for 5000 or 0.0022 seen and M1 for figs 5 + figs 22 oe soi by figs 2272 to 2273 and M1 for figs (2272 to 2273) ÷ 60 soi by figs 37[...]	
	b	19.09 20.19	6	B5 for 19.09 to 19.1 and 20.18 to 20.2 as final answers OR B2 for 53.5, 52.5, 2.65 and 2.75 all seen or B1 for two of 53.5, 52.5, 2.65 or 2.75 seen and M2 for both 53.5 ÷ 2.65 and 52.5 ÷ 2.75 or M1 for (52.5 to 53.5) ÷ (2.65 to 2.75) and A1dep for 19.09 to 19.1 and 20.18 to 20.2 If 0 scored, allow SC3 for one answer either 19.09 to 19.1 or 20.18 to 20.2	Allow 2.749[9...] for 2.75 or 53.49[9...] for 53.5 For M2 ignore other unnecessary divisions e.g. 53.5 ÷ 2.75 and 52.5 ÷ 2.65 Dep on M2

OCR GCSE – Thursday 8 November 2018 – Paper 5 (Non-Calculator) Higher Tier

3.

4		4 g/cm ³ or g cm ⁻³	2 1	M1 for figs 5 + figs 125	If change of units then allow consistent units with conversion e.g. for 3 marks 0.004 kg/ cm ³
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OCR GCSE – Tuesday 13 June 2017 – Paper 6 (Calculator) Higher Tier

4.

8		2.7 nfw	5 2 AO1.3b 1 AO3.1d 1 AO3.2 1 AO3.3	Allow 2.70 to 2.71 M2 for $4 \times 4 \times 8 \times 0.67$ or M1 for $4 \times 4 \times 8$ AND M1 for $\frac{1}{3} \times 4 \times 4 \times (13 - 8)$ AND M1 for <i>their</i> 85.76 + <i>their</i> 26.7x = 158 oe	Condone for full marks minor inaccuracies from rounding if final answer given as 2.7 = 85.76 (mass of cuboid) = 128 (vol of cuboid) = 26.6 to 26.7 (vol of pyramid) eg (x =) $\frac{158 - \text{their}85.76}{\text{their}26.7}$
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OCR GSCE – Sample Papers – Paper 5 (Non - Calculator) Higher Tier

5.

9		Volume of cuboid = 100000 cm ³ Mass of cuboid = 270 kg Yes, because 270 < 300 kg	4 1 AO1.3b 2 AO3.1d 1 AO3.3	B3 for 270 kg or M1 for 100 000 cm ³ OR 0.1 m ³ OR 100 cm × 50 cm × 20 cm OR 1 m × 0.5 m × 0.2 m M1 for 2.7 × <i>their</i> '100000' OR 2 700 000 × <i>their</i> '0.1'	
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OCR GSCE – Sample Papers – Paper 6 (Calculator) Higher Tier

6.

1	(a)	20	2 1 AO1.1 1 AO2.3a	M1 for $D = \frac{M}{V}$ soi	Can be implied by an answer of 2
	(b)	$8\frac{1}{7}$ or 8.14[...]	4 2 AO1.3b 2 AO3.1d	M1 for 15 or 105 ÷ 7 And M2 for $\frac{180+105}{\text{their}(20+15)}$ or $\frac{18+10.5}{\text{their}'(2+1.5)'}$ Or M1 for some attempt to find $\frac{\text{total mass}}{\text{total volume}}$	

AQA GSCE – Thursday 4 June 2020 – Paper 2 (Calculator) Higher Tier

7.

11	2625 ÷ 250 or 2.625 ÷ 250 or 2625 ÷ 0.000 25 or answer with digits 105	M1	oe eg $\frac{2.625 \times 1000}{250}$
	10.5	A1	oe
	Additional Guidance		
	Digits 105 may have additional zeros before 1 or after 5 eg1 0.000 105 eg2 10 500 eg3 10.05		M1A0 M1A0 M0A0

AQA GCSE – Thursday 6 June 2019 – Paper 2 (Calculator) Higher Tier

8.

6	Alternative method 1		
	18 + 36 or 0.5 or 30	M1	oe implied by 3.5 or 3 h 30 min or 3.3(0) or 210 seen
	$\frac{200-18}{4-}$ their 0.5 or $\frac{182}{3.5}$ or $\frac{200-18}{4 \times 60-}$ their 30 or $\frac{182}{210}$ or 0.86(6...) or 0.87	M1dep	oe method for miles per hour or miles per minute implied by $\frac{182}{3 \text{ h } 30 \text{ min}}$ or $\frac{182}{3.3(0)}$
	52	A1	
	Alternative method 2		
	18 + 36 or 0.5 or 30	M1	implied by 7
	$\frac{200}{4} + \frac{50-36}{7}$ or 50 + 2	M1dep	oe
	52	A1	
	Additional Guidance		
	Allow the first mark even if not subsequently used		
	Ignore units for the M marks		
	Answer 0.86(6...) or 0.87		M1M1A0
	Answer 0.86(6...) or 0.87 with mph crossed out and replaced by miles per min oe		M1M1A1
Working for 52 then (52 + 36) + 2		M1M1A0	
NB 50 + 2 = 52 from 200 + 4 = 50 and 36 + 18 = 2		Zero	

AQA GCSE – Tuesday 11 June 2019 – Paper 3 (Calculator) Higher Tier

9.

7	6 as density for J or K	B1	
	13 as volume for K or 78 ÷ their 6 as volume for K	B1ft	ft their 6
	g/cm ³ as units for densities of J and K and cm ³ as unit for volume of K	B1	allow g cm ⁻³
	Additional Guidance		
	Mark table first		
	Full marks are only awarded for a fully correct table with no errors or omissions		
	13 cm ³ as a volume for K, 0.006 kg/cm ³ for both densities		B1B1B1
	Condone g per cm ³ , gpcm ³ or g per cubic centimetre as units for density		

AQA GCSE – Thursday 7 June 2018 – Paper 2 (Calculator) Higher Tier

10.

16(a)	2400×3.8 or $\frac{m}{3.8} = 2400$ or $\frac{m}{2400} = 3.8$	M1	oe equation allow mass for m allow any letter apart from v or d
	9120	A1	
	Additional Guidance		

16(b)	$\pi r^2 h = 3.8$ or $\pi \times 0.5^2 \times h$ or $0.25\pi h$ or $[0.78, 0.79]h$ or $3.8 \div (\pi \times 0.5^2)$ or $3.8 \div 0.25\pi$ or $3.8 \div [0.78, 0.79]$	M1	oe eg $\pi r^2 = \frac{3.8}{h}$
	[4.8, 4.841]	A1	
	Additional Guidance		
	$\pi 0.5^2 h$		M1

AQA GCSE – Thursday 7 June 2018 – Paper 2 (Calculator) Higher Tier

11.

21(a)	Alternative method 1		
	$80^2 + 60^2 - 2 \times 80 \times 60 \times \cos 75$ or $6400 + 3600 - 9600 \cos 75$ or 7515.(...)	M1	oe
	$\sqrt{\text{their } 7515.(...)}$ or [86.6, 86.7] or 87	M1dep	
	[86.6, 86.7] and Liz or 87 and Liz	A1	accept 86 and Liz or 90 and Liz with full method seen
	Alternative method 2		
	$80^2 + 60^2 - 2 \times 80 \times 60 \times \cos 75$ or $6400 + 3600 - 9600 \cos 75$ or 7515.(...)	M1	oe
	$(80^2 =) 6400$ and 7515.(...) and Liz	A2	
	Additional Guidance		
	$80^2 + 60^2 - 2 \times 80 \times 60 \times \cos 75$ seen followed by processing error can score up to M2 eg $80^2 + 60^2 - 2 \times 80 \times 60 \times \cos 75$ $= 6400 + 3600 - 9600 \cos 75$ $= 400 \cos 75 = 103.5$ $\sqrt{103.5}$	M1	M1depA0
	You may need to check on your calculator whether to award M1dep after first M1 with a processing error seen eg $80^2 + 60^2 - 2 \times 80 \times 60 \times \cos 75 = 3654$ (processing error) 60.4 (square root of 3654 is implied)	M1	M1depA0
	Ignore any reasons given		
	Alt 2 not possible to score M1A1		
	Answer [86.6, 86.7] and Liz (possibly from scale drawing)		M1M1A1
[86.6, 86.7] (possibly from scale drawing)		M1M1	

21(b)	Alternative method 1 (answer Liz in (a))		
	No change	B1	oe eg Liz will still arrive first or Liz will be there even earlier (than Tia)
	Alternative method 2 (answer Tia in (a))		
	Not possible to tell	B1ft	oe eg Liz might arrive before Tia or it depends on how much faster Liz walks or it could be either of them
	Alternative method 3 (answer they arrive at same time in (a))		
	Liz will arrive first	B1ft	oe eg Liz wins
	Alternative method 4 (neither Liz or Tia in (a))		
	If Liz had arrived first there would be no change and if Tia had arrived first it would not be possible to tell	B1ft	oe
	Additional Guidance		
	If correct decision is made, ignore non-contradictory further work		
	Alt 1 Liz will arrive earlier		B1
	Alt 1 No		B0
Alt 2 Yes		B0	

AQA GSCE – Wednesday 25 May 2017 – Paper 1 (Non - Calculator) Higher Tier

12.

9(a)	2 or two	B1	Allow words which imply two times eg double, twice
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9(b)	+ 4	B1	
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AQA GSCE – Tuesday 13 June 2017 – Paper 3 (Calculator) Higher Tier

13.

17	Alternative method 1		
	1 mile per minute or 60 miles per hour or 0.15 (hours) or 1.6 (hours) or $1\frac{36}{60}$ (hours)	B1	
	$9 \div 50$ or 0.18	M1	oe
	$70 \times 1\frac{36}{60}$ or 70×1.6 or 112	M1	oe
	their $112 \div 40$ or 2.8	M1dep	dep on 2nd M1
	2.98 or 2.8 and $(3 - 0.18 =) 2.82$ or 0.18 and $(3 - 2.8 =) 0.2$	A1	Ignore fw
	Alternative method 2		
	1 mile per minute or 60 miles per hour or 0.15 (hours) or 1.6 (hours) or $1\frac{36}{60}$ (hours)	B1	
	$9 \div 50$ or 0.18	M1	oe
	$70 \times 1\frac{36}{60}$ or 112 or 70×1.6 or 112	M1	
	$40 \times (3 - \text{their } 0.18)$ or 112.8	M1dep	dep on 1st M1
112.8 and 112	A1	Ignore fw	

Alternative method 3 and additional guidance is on the next page

17 cont	Alternative method 3		
	1 mile per minute or 60 miles per hour or 0.15 (hours) or 1.6 (hours) or $1\frac{36}{60}$ (hours)	B1	
	$9 \div 50$ or 0.18	M1	oe
	$70 \div 40$ or 1.75	M1	
	$70 \div 40 \times 1.6$ or 2.8 or their 1.75×1.6	M1dep	oe eg $1.75 + 0.875 + 0.175$ dep on 2nd M1
	2.98 or 2.8 and $(3 - 0.18 =) 2.82$ or 0.18 and $(3 - 2.8 =) 0.2$	A1	Ignore fw
	Additional Guidance		
	Key facts are :		
	First stage: Distance travelled 9 miles (given) Time taken 9 minutes (given) or 0.15 hours Average speed 60 mph Miles per gallon 50 mpg (given), Amount of petrol $9 \div 50 = 0.18$ gallons Second stage: Distance travelled $70 \times 1.6 = 112$ miles Time taken 1 hour 36 minutes (given) or 1.6 hours Average speed 70 mph (given) Miles per gallon 40 mpg (given), Amount of petrol $112 \div 40 = 2.8$ gallons		
	An incorrect conversion of 1 hour 36 minutes to 1.36 can score: eg $70 \times 1.36 = 95.2$, $95.2 \div 40 = 2.38$ $70 \times 1.36 = 95.2$, $95.2 \div 40 = 2.38$, $0.18 + 2.38 = 2.56$		B0M0M1M1A0 B1M1M1M1A0
2.98 = 3 (further work)		B1M1M1M1A1	
$9 \div 50$		B1M1	

AQA GCSE – Sample Paper 2 (Calculator) Higher Tier

14.

17(a)	Alternative method 1		
	93 000 000 × 2π or 186 000 000π or [584 000 000 , 584 412 000]	M1	oe Allow working in millions
	365 × 24 or 8760	M1	
	their 186 000 000 π ÷ their 8760	M1	oe Allow working in millions Only allow if first M1 gained or if their circumference is 93 000 000 × π
	[6.6 × 10 ⁴ , 6.7 × 10 ⁴]	A1	oe
	Alternative method 2		
	93 000 000 × 2π or 186 000 000π or [584 000 000, 584 412 000]	M1	oe Allow working in millions
	their 186 000 000π ÷ 365 or [1 598 904, 1 600 033]	M1	oe Allow working in millions Only allow if M1 gained or if their circumference is 93 000 000 × π their 365.25 can be 365.25 × 24 or 365.25 × 60
	their [1.6 × 10 ⁶ , 1.602 × 10 ⁶] ÷ 24	M1	
	[6.6 × 10 ⁴ , 6.7 × 10 ⁴]	A1	oe
17(b)	The average speed would be (slightly) lower	B1	oe