1. Work out the value of $5^2 \times 10^2$.

(b) _____ [2]

2(a). Calculate.

$\sqrt{3136}$

(a) _____ [1]

(b). $\sqrt[4]{625}$

(b) _____ [1]

(c). 5^{-2}

(c) _____ [1]

3(a). Work out.

$\sqrt{900}$

_____

[1]

(b). 14^2

_____

[2]

(c). 2^3

_____

[1]

4. Write $6 \times 6 \times 6 \times 6 \times 6$ as a power of 6.

_____

[1]

5(a). Work out the value of $2^2 \times 1^2$.

_____ [2]

(b). Complete the sentence below using one of these phrases.

square positive square root negative square root cube cube root

10 is the _____ of 100

[1]

(c). * Liam says that 4 cubed divided by 4 squared is 1.5.

Is Liam correct?
Show clearly how you decide.

[3]

6. Calculate.

$$\sqrt{\frac{63.4^3}{0.083}}$$

Give your answer correct to the nearest 1000.

_____

[2]

7. Work out.

(i) $28^2 - 25 \times 30$

(i) _____ [1]

(ii) $1 - \sqrt{25}$

(ii) _____ [1]

8. Write the two missing values in this table.

Statement		Value
5^3	=	125
11^2	=	
$\sqrt{64}$	=	

[2]

9(a). Calculate each of the following.

$2.6^3 - 0.42$

Give your answer correct to one decimal place.

_____ [2]

(b). $\dfrac{70}{\sqrt{18.5}}$

Give your answer correct to the nearest whole number.

_____ [2]

10(a) Write down the square root of 36.

.

_____ [1]

(b). Work out $10^3 - 10^2$.

_____ [2]

11(a) What is the square of 8?

.

_____ [1]

(b). Work out.

(i) $\sqrt{20.25}$

(i) _____ [1]

(ii) the cube of 6

(ii) _____ [1]

(iii) 4^5

(iii) _____ [1]

(iv) $5^2 - 3^3$

(iv) _____ [2]

12. Work out.

$5^2 - 3^2$

_____ [2]

13. Calculate.

(i) $5.6^2 + 6.9 - 8.2$

(i) _____ [1]

(ii) $\sqrt{65.61}$

(ii) _____ [1]

14. Work out 6^2.

_____ [1]

15(a)

. Evaluate.

(i) $\sqrt{121}$

_____ [1]

(ii) 4^{-2}

_____ [1]

(b). Fill in the power.

$5\square = 125$

[1]

16.

Find the value of y.

$5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5 = 5^y$

$y =$ _____ [1]

17.

Evaluate.

(i) 2^5

(i) _____ [1]

(ii) $\sqrt{400}$

(ii) _____ [1]

18.

Fill in each missing number.

(i) [1]

24 – _____ = 36

(ii) [1]

$\sqrt{} = 16$

19. Write $7 \div 7 \div 7 \div 7$ as a power of 7.

---------- [1]

END OF QUESTION PAPER

Question			Answer/Indicative content	Marks	Part marks and guidance	
1			2500 **oe**	2	**M1** for 25 or 100	
			Total	**2**		
2	a		56	1		
	b		5	1		
	c		$\frac{1}{25}$ or 0.04	1		
			Total	**3**		
3	a		30	1		Allow ± 30 but not –30 alone Examiner's Comments Only a minority of candidates found the square root of the large number.
	b		196	2	**M1** for 14 × 14 oe	Examiner's Comments This more successfully attempted with many knowing to do 14 × 14. Some found difficulty in the various methods of multiplication tried. Grid methods had errors and some just multiplied 10 × 10 and 4 × 4 giving an answer of 116. Many attaining no marks usually did 14 + 14.
	c		8	1		Examiner's Comments Candidates performed well at finding a cube number and 2×2×2 was often seen in the working, although 6 was a common error.
			Total	**4**		

Question			Answer/Indicative content	Marks	Part marks and guidance	
4			6^5	1		Examiner's Comments This part caused few problems although there were those that worked out 6^5 as 7776 giving just this as their answer.
			Total	1		

Question			Answer/Indicative content	Marks	Part marks and guidance	
5	a		4 nfww	2	M1 for 2^2 oe = 4 or 1^2 oe = 1 or 4 × [ ] or [ ] × 1 Examiner's Comments This was usually well answered, although a disappointing number of candidates gave 1^2 as 2. Wrong answers included 4 × 1 = 5, 3^2, 2^4 and 4 × 2 = 6. Many gained a mark for 2^2 = 4.	
	b		positive square root indicated	1	Accept any clear indication	
	c		*Fully correct solution with working shown and including **all** of • 4^3 or 4 × 4 × 4 = 64 • 4^2 or 4 × 4 = 16 • 64 ÷ 16 = 4 • Liam is incorrect oe	3	May be in one calculation $\frac{4\times4\times4}{4\times4}=4$ with cancelling shown May be 4 × 4 = 16 × 4 = 64 oe 64 ÷ 4 [=16] ÷ 4 = 4 counts as second and third bullet points $4^3 \div 4^2 = 4^{(3-2)} = 4^{[1]}$ counts as first three bullet points Condone 16 ÷ 64 = 4 only	

Question			Answer/Indicative content	Marks	Part marks and guidance	
			4 and Liam is incorrect oe but no working OR • $\frac{4\times4\times4}{4\times4}=4$ without cancelling shown or • $4^3 \div 4^2$ or $64 \div 16 = 4$ and Liam is incorrect oe OR **Three** from • 4^3 or $4 \times 4 \times 4 = 64$ • 4^2 or $4 \times 4 = 16$ • *Their* 64 ÷ *their* 16 attempted • Liam is incorrect oe	2-1	**One** from • 4^3 or $4 \times 4 \times 4 = 64$ • 4^2 or $4 \times 4 = 16$ • *Their* 64 ÷ *their* 16 attempted • $4^3 \div 4^2 = 4$ Examiner's Comments This was also quite well received and much working was seen. Most candidates gained 1 or 2 marks. Common errors were to give 4 cubed as $4 \times 4 \times 4 \times 4$ (that a few worked out to be 256) and to divide their 4^3 by 4 and not 4^2. Very few used index laws to gain an answer. A small number worked out the correct value of $4^3 \div 4^2$ but drew no conclusion.	
			Total	6		

Question			Answer/Indicative content	Marks	Part marks and guidance	
6			2000 nfww	2	**B1** for 1752. ... rot to 3 or more sf or for 2000.0 or more decimal zeros nfww Examiner's Comments This question was reasonably well answered. Common errors included leaving the answer as 1752…, 6082… from $\sqrt{(63.4^3)}$ then dividing by 0.083, and 6000 from not square rooting the denominator.	Common 0 for just 1800
			Total	2		
7		i	34	1		
		ii	–4	1	**0** for 6 but allow **1** for '–4 or 6' Examiner's Comments This was answered well but answers to part (ii) suggest that many candidates are not totally familiar with the correct order of operations.	
			Total	2		
8			121 8	1 1	Examiner's Comments The common errors included 122, and 22 for 11^2 and 32 for $\sqrt{64}$.	
			Total	2		

Question			Answer/Indicative content	Marks	Part marks and guidance	
9	a		17.2	2	B1 for 17.15 to 17.16 or $\frac{4289}{250}$ Examiner's Comments The calculation was generally well done.	
	b		16	2	B1 for 16.2 to 16.3 or $\frac{70\sqrt{74}}{37}$ Examiner's Comments The calculation was generally well done.	
			Total	4		

Question			Answer/Indicative content	Marks	Part marks and guidance	
10	a		6 or –6	1	Examiner's Comments Responses for the square root were equally successful with the few incorrect answers including 18, 6 × 6, 6^2 and $\sqrt{6}$.	
	b		900	2	**B1** for 1000 or 1001 Examiner's Comments Surprisingly, this part was not well answered and a completely correct answer of 900 was quite rare although B1 for 100 was a regular occurrence. The two most common errors both involved misconceptions about the nature of the problem. The first gave 30 – 20 = 10 and the second incorrectly applied the "rules" of indices to arrive at $10^3 – 10^2 = 10^1$.	
			Total	3		

Question			Answer/Indicative content	Marks	Part marks and guidance	
11	a		64	1	**Examiner's Comments** This question was generally answered well. A common error was to give the square root rather than the square.	
	b	i	4.5	1		
		ii	216	1		
		iii	1024	1		
		iv	$^{-}2$	2	**M1** for 25 or 27 **Examiner's Comments** In part (iii), 20 was frequently seen from candidates multiplying 4 by 5 and similarly in part (iv), multiplying 3 by 3 rather than cubing it.	
			Total	**6**		
12			16 **nfww**	2	**M1** for 5×5 or 3×3 or 25 or 9 or 4^2 **seen** **Examiner's Comments** Many candidates understood the notation for squaring a number and hence calculated the correct response.	
			Total	**2**		
13		i	30.06	1		Do not accept 1503/50
		ii	8.1	1	**Examiner's Comments** Very well done with very few errors.	Do not accept 81/10
			Total	**2**		

Question			Answer/Indicative content	Marks	Part marks and guidance	
14			36	1	Examiner's Comments Nearly all candidates gave a correct response in part (a), with just a few incorrect answers of 12.	
			Total	1		

Question			Answer/Indicative content	Marks	Part marks and guidance	
15	a	i	11	1	Accept –11, ±11 **Examiner's Comments** Most candidates understood the square root sign in (a)(i) with just a small number of responses involving 11 × 11, 11^2 or 12 seen. Only very rarely was 121 halved, giving 60.5. Although almost all candidates attempted (a)(ii) it was hardly ever answered correctly. The most common answer was –16, with –8, –4 and 2 sometimes seen. Very rarely was $\frac{1}{4^2}$ given, though often not then evaluated to $\frac{1}{16}$. Although there were several correct answers in (b) of 9, more gave the answer of 144 from working through the calculation left to right. Many candidates wrote the word BIDMAS on their paper, however, very few applied BIDMAS correctly. Often candidates changed the order of the numbers and put $(6 – 9)^2 = (-3)^2$, then gave an answer of -9. Some were unable to square correctly and it was not uncommon to see $3^2 = 6$ or $12^2 = 24$. A few attempted to square all the numbers inside the bracket (i.e. 81 – 9 × 4) and proceed from there. The correct answer of 3 was often seen in (c), with the incorrect answers of 25 (from 5 × 25 = 125) and 5 (from 125 ÷ 5) seen almost as frequently.	

Question			Answer/Indicative content	Marks	Part marks and guidance	
		ii	$\frac{1}{16}$	1	Accept 0.0625	
	b		$5^3 = 125$	1		
			Total	3		
16			7	1	Not 5^7 Examiner's Comment In this part, the correct answer was frequently seen, but common errors were to evaluate 5^7 or give 5^7 as the answer.	
			Total	1		
17		i	32	1		
		ii	20	1	Accept ± 20	
			Total	2		
18		i	–12	1		
		ii	256	1		
			Total	2		
19			7^4	1	Condone $7^4 = 2401$ on answer line	
			Total	1		