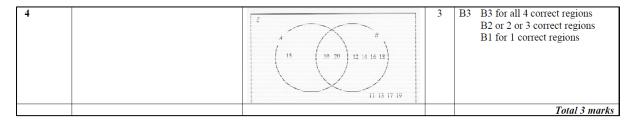
1 &		3	В3	for all entries correct
4	6 3 B		(B2	for 3 sections of the Venn diagram correct)
15	7 11 13		(B1	for 2 sections of the Venn diagram correct)
, i				Total 3 marks

2 (a)	2, 4, 6, 12	1	B1	
(b)	5, 7, 8, 9, 10, 11, 13, 14	1	B1	
(c)		2	M1	for $\frac{a}{14}$ with $a < 14$ or $\frac{3}{b}$ with $b > 3$ or
				for 3 and 14 used with incorrect notation e.g. 3:14
	3 14		A1	for $\frac{3}{14}$ oe or 0.214()
				Total 4 marks

3 ai	b, l, u, e, g, r, y	1	B1	No incorrect or repeats
aii	w, h, i, t	1	B1	No incorrect or repeats
b	No with reason	1	B1	eg 'e is in all three sets' OR 'all three sets
				share a member' OR $B \cap G \cap W = (\{\})e(\})$
				Total 3 marks



6	(a)(i)	other seen orders of letters: a, b, d, e, i, l, n, r, z b, r, I, a, e, z, l, n, d	b, r, a, z, i, l, e, n, d	1	B1	no repeats, letters can be in any order. Condone capital letters rather than lower case letters. (no need for commas)
	(ii)		b, z	1	B1	No repeats, letters can be in any order. Condone capital letters. (no need for commas)
	(b)		correct explanation that shows they know the meaning of intersection and empty set	1	B1	eg letter 'a' is in both sets $B \cap K = \{a\}$ Set B and set K have an element (or letter) in common. There is a letter that is in set B and in set K There is an intersection so it isn't the null set There is a letter in common (do not allow 'letters' or 'elements' (plural) in common) (If students mention the letter that is in common, it must be the correct one (ie a))
1						Total 3 marks

S	7 a		\$ A 2	B	Fully com Venn diag		3		lly correct Venn diagram r 2 or 3 sections correct
MI ft from (a)			8 (12)					B1 for	r 1 section correct)
S (a) (i) 24, 30 1 B1 No repeats			1 5 7 11						
Total 5 m.	b							M1 ft : '4	from (a) $\frac{1}{a}$ where $a \ge 4$ or $\frac{b}{12}$ where $b \le 12$
S					_		2	Al oe	,
(ii) 21, 23, 25, 27, 29 1 B1 No repeats (A ∪ B)' or 1 B1 or (B ∪ A)' or B' ∩ A' Total 3 m: 9									Total 5 marks
10 (a)(i) 21, 27 1 B1		(ii)			21, 23, 25,	27, 29		l B1	No repeats
10 (a)(i) 21, 23, 24, 25, 27, 29 1 B1 Total 2 minus 10 (a)(i) 9, 15 1 B1 no repeats		,					+		Total 3 marks
10 (a)(i)	9 (i)				21.22	7		l R1	2000.0
10 (a)(i) 9, 15 1 B1 no repeats (a)(ii) 9, 11, 12, 13, 15, 17, 18, 19 1 B1 no repeats or omissions (b) No must be ticked along with a reason for the award of this mark No with a correct reason 1 B1 No with eg 24/it is not in the universal set, 24/it not between 9 and 20 (need some sort of reference that the numbers it the sets do not go beyond 20) (c) 10, 18 and two from 9, 11, 13, 15, 17, 19 2 B2 for 10, 18 and two from 9, 11, 13, 15, 17, 19 (B1 a set of 4 numbers of which 3 are correct or a set of 3 or more numbers from {10, 18, 9, 13, 15, 17, 19}} Total 5 m 11 12 3 B3 For all 4 regions of Venn diagra correct (B2 for 2 or 3 regions correct, B1 for 1 region correct) mumbers must not be repeated in region Total 3 m Total 3 m							_		T (10 1
(a)(ii) (b) No must be ticked along with a reason for the award of this mark No with a correct reason (c) 10, 18 and two from 9, 11, 13, 15, 17, 19 1 B1 no repeats or omissions 1 B1 No with eg 24/it is not in the universal set, 24/in not between 9 and 20 (need some sort of reference that the numbers it the sets do not go beyond 20) (c) 10, 18 and two from 9, 11, 13, 15, 17, 19 2 B2 for 10, 18 and two from 9, 11, 13, 15, 17, 19 (B1 a set of 4 numbers of which 3 are correct or a set of 5 numbers including 10, 18, and no mo than one incorrect number or a set of 3 or more numbers from {10, 18, 9, 13, 15, 17, 19}) Total 5 m 11 3 B3 For all 4 regions of Venn diagra correct (B2 for 2 or 3 regions correct, B1 for 1 region correct) numbers must not be repeated in region Total 3 m 12									1 otal 2 marks
(b) No must be ticked along with a reason for the award of this mark No with a correct reason 1 B1 No with eg 24/it is not in the universal set, 24/it is not between 9 and 20 (need some sort of reference that the numbers is the sets do not go beyond 20) (c) 10, 18 and two from 9, 11, 13, 15, 17, 19 2 B2 for 10, 18 and two from 9, 11, 13, 15, 17, 19 (B1 a set of 4 numbers of which 3 are correct or a set of 5 numbers including 10, 18, and no mo than one incorrect number or a set of 3 or more numbers from {10, 18, 9, 13, 15, 17, 19}} Total 5 m 11 12 3 B3 For all 4 regions of Venn diagracorrect (B2 for 2 or 3 regions correct, B1 for 1 region correct) numbers must not be repeated in region Total 3 m Total 3 m [B2 for 3 correct values)									
with a reason for the award of this mark 10, 18 and two from 9, 11, 13, 15, 17, 19 2 B2 for 10, 18 and two from 9, 11, 13, 15, 17, 19								_	
(B1 a set of 4 numbers of which 3 are correct or a set of 5 numbers including 10, 18, and no mo than one incorrect number or a set of 3 or more numbers from {10, 18, 9, 13, 15, 17, 19}) Total 5 m 3 B3 For all 4 regions of Venn diagra correct (B2 for 2 or 3 regions correct, B1 for 1 region correct) numbers must not be repeated in region Total 3 m Total 3 m Total 5 m	(b)	with a	a reason for the	No with a correc	et reason			not between 9 and 20 (need some sort of reference that the number	
a set of 5 numbers including 10, 18, and no mo than one incorrect number or a set of 3 or more numbers from {10, 18, 9, 13, 15, 17, 19}) Total 5 m B3 For all 4 regions of Venn diagra correct (B2 for 2 or 3 regions correct, B1 for 1 region correct) numbers must not be repeated in region Total 3 m Total 3 m 12 3 B3 for a fully correct Venn diagra (B2 for 3 correct values) (B1 for 1 or 2 correct values)	(c)			10, 18 and two from 9, 11	, 13, 15, 17, 19	2	B2	for 10, 18 and	d two from 9, 11, 13, 15, 17, 19
3 B3 For all 4 regions of Venn diagra correct (B2 for 2 or 3 regions correct, B1 for 1 region correct) numbers must not be repeated in region Total 3 m 12 3 B3 For all 4 regions of Venn diagra correct (B2 for 2 or 3 regions correct) numbers must not be repeated in region Total 3 m [B2 for 3 correct Venn diagra (B2 for 3 correct values) (B1 for 1 or 2 correct values)								a set of 5 num than one inco or a set of 3 o	nbers including 10, 18, and no more orrect number or more numbers from {10, 18, 9, 11,
correct (B2 for 2 or 3 regions correct, B1 for 1 region correct) numbers must not be repeated in region Total 3 m B3 for a fully correct Venn diagr (B2 for 3 correct values) (B1 for 1 or 2 correct values)									Total 5 marks
Total 3 m 12 3 B3 for a fully correct Venn diagr (B2 for 3 correct values) (B1 for 1 or 2 correct values)	11		4 3 2 7 8 5					3 B3	correct, B1 for 1 region correct) numbers must not be repeated in a
(B2 for 3 correct values) (B1 for 1 or 2 correct values)									Total 3 marks
Total 3 m	12				13 18 9	10		(B2	

13	E		3	В3	all 4 parts of diagram correct
	A 5 1			(B2	for 2 or 3 parts correct)
	$\begin{pmatrix} 9 & 11 & \begin{pmatrix} 10 & 4 \\ 12 & \begin{pmatrix} 15 \end{pmatrix} & 6 \end{pmatrix}$			(B1	for 1 part correct)
	13				SCB1 if no marks scored, award
	7 8 14				B1 if 4,6 in the section $A \cap B'$ and 9, 11, 12, 13 in the section
					$A' \cap B$
	·	<u>- </u>			Total 3 marks

14 (a)	Correct Venn diagram	3	В3	for all sections completed correctly If not B3 then award B2 for 3 correct sections B1 for 1 or 2 correct sections
(b)(i)	$\frac{13}{30}$	1	В1	oe, ft their Venn diagram
(ii)	$\frac{6}{30}$	1	В1	oe, ft their Venn diagram
·				Total 5 marks

15	8 12 11 13 13 15 17 19	3	B3 Fully correct (B2 for 2 or 3 'regions' correct, B1 for one 'region' correct)
			Total 3 marks

16	(a)(i)	7, 11, 13, 5	5, 7, 11, 13	1	B1	
	(ii)	5, 15, 10, 6, 8, 12, 14	5, 6, 8, 10, 12, 14, 15	1	B1	
	(b)		Correct reason	1	B1	eg 9 is not a member of <i>C</i> or 9 is not in <i>C</i> or <i>C</i> only contains 6, 8, 10, 12, 14 or 9 is outside of <i>C</i> there must be no contradictory or incorrect statements
						Total 3 marks

17	8	Numbers placed correctly in	3	B3	for a completely correct Venn diagram
	A 7 9 5 10 B 15 17 19 6 8 12 14 16 18	Venn diagram		B2 B1	for 2 or 3 correct regions for 1 correct region
					Total 3 marks