Probability – Paper 2 – Mark Scheme

Question 1

17	(a)					3	**B1** two or three correct

			Boys	Girls	Total
		Asia	62	28	**90**
		Europe	35	45	**80**
		Africa	**68**	17	**85**
		Total	**165**	**90**	255

B1 two or three correct
or **B2** four or five correct

(b) $\dfrac{3}{17}$ or 0.176(47…)   1   Allow $\dfrac{45}{255}, \dfrac{15}{85}, \dfrac{9}{51}$

Question 2

10	0.38 or $\dfrac{19}{50}$	4	**B1** 0.8, 0.6 or 0.55 then **M1** 0.45 × their 0.6 **M1** 0.2 × their 0.55 **or M2** $1 - (0.45 \times 0.4 + 0.55 \times \text{their } 0.8)$

Question 3

21	(a)	$\dfrac{1}{12}$	2	**M1** $\dfrac{3}{3+2+4} \times \dfrac{2}{(their\ 9)-1}$
	(b)	$\dfrac{5}{18}$	3	**M2** $their(a) + \dfrac{4 \times 3}{their\ 72} + \dfrac{2(\times 1)}{their\ 72}$ **or M1** $\dfrac{4 \times 3}{their\ 72}$ or $\dfrac{2(\times 1)}{their\ 72}$
	(c)	$\dfrac{5}{9}$	3	**M2** $2 \times \dfrac{4}{3+2+4} \times \dfrac{5}{(their\ 9)-1}$ **or M1** $\dfrac{4}{3+2+4} \times \dfrac{5}{(their\ 9)-1}$

Question 4

2	$\dfrac{30}{300}$ oe www	2	**M1** for 30 seen or $\dfrac{k}{300}$ seen

Question 5

12	(a)	$\dfrac{5}{25}$ oe	2	**B1** for answer $\dfrac{5}{k}$ or $\dfrac{k}{25}$
	(b)	$\dfrac{4}{25}$ oe	2	**B1** for answer $\dfrac{4}{k}$ or $\dfrac{k}{25}$

Question 6

6	(a) $\dfrac{2}{6}$ oe	1	
	(b) 200	1FT	FT 600 × *their* (a) providing *their* (a) is a probability

Question 7

18	(a)	0.6 0.2 0.8 in correct places	2	**B1** for 0.6 in correct place **B1** for 0.2 and 0.8 in correct places
	(b)	0.52 oe nfww	3	**M2FT** for 1 – (*their* 0.6 × *their* 0.8) oe or **M1FT** for a correct product from *their* tree in **(a)**

Question 8

5	Sammy and correct reason with 25.7% oe shown	2	**B1** for 25.7% or 0.257... seen or conversion of 26% to fraction and common denominator

Question 9

5	0.2 oe	2	**M1** for 1 – (0.15 + 0.3 + 0.35)

Question 10

20	(a)	0.16 oe	2	**M1** for 0.4×0.4 If zero scored **SC1** for fully correct evaluated method involving a without replacement method
	(b)	0.58 oe	4	**M3** for $1 - (0.4^2 + 0.5^2 + 0.1^2)$ oe or **M2** for $0.4^2 + 0.5^2 + 0.1^2$ ALT method **M3** for $0.4 \times (0.5 + 0.1) + 0.5 \times (0.4 + 0.1) + 0.1 \times (0.4 + 0.5)$ oe or **M2** for addition of any **three** of: $0.4 \times 0.5, 0.4 \times 0.1, 0.5 \times 0.4, 0.5 \times 0.1, 0.1 \times 0.4$ and 0.1×0.5 or **M1** for addition of any **two** of: $0.4 \times 0.5, 0.4 \times 0.1, 0.5 \times 0.4, 0.5 \times 0.1, 0.1 \times 0.4$ and 0.1×0.5 If zero scored **SC2** for fully correct evaluated method involving a without replacement method

Question 11

23	(a)		$\frac{8}{14}$ and $\frac{5}{13}$	1	
			$\frac{6}{13}$ and $\frac{7}{13}$	1	
	(b)	(i)	$\frac{30}{182}$ oe	2	**M1FT** for $\frac{6}{14} \times$ *their* $\frac{5}{13}$
		(ii)	$\frac{126}{182}$ oe	3	**M2FT** for $1 - \frac{8}{14} \times \frac{7}{13}$ or $\frac{6}{14} \times \frac{5}{13} + \frac{6}{14} \times \frac{8}{13} + \frac{8}{14} \times \frac{6}{13}$ or $\frac{6}{14} + \frac{8}{14} \times \frac{6}{13}$ oe or **M1FT** for sum of any two of $\frac{6}{14} \times \frac{5}{13}$ or $\frac{6}{14} \times \frac{8}{13}$ or $\frac{8}{14} \times \frac{6}{13}$

Question 12

4	6	1	

Question 13

18	0.96 oe	3	**M2** for $1 - 0.2 \times 0.2$ or $0.8 + 0.2 \times 0.8$ or $0.8 \times 0.8 + 0.8 \times 0.2 + 0.2 \times 0.8$ or **B1** for one of 0.2×0.2, 0.8×0.8, 0.8×0.2, 0.2×0.8 seen

Question 14

21	(a)		$\frac{2}{3}$ oe	1	
	(b)		*their* $\frac{2}{3}$, $\frac{7}{8}$, $\frac{5}{8}$ oe	2	**B1** for either $\frac{7}{8}$ or $\frac{5}{8}$
	(c)	(i)	$\frac{1}{24}$ oe	2	**M1** for $\frac{1}{3} \times \frac{1}{8}$ seen
		(ii)	$\frac{17}{24}$ oe	3	**M2FT** for $\frac{1}{3} \times \frac{7}{8} + \frac{2}{3} \times \frac{5}{8}$ or **M1FT** for $\frac{1}{3} \times \frac{7}{8}$ or $\frac{2}{3} \times \frac{5}{8}$

Question 15

19	$\frac{5}{6}$ oe	3	**M2** for $1 - \frac{2}{3} \times \frac{1}{4}$ or $\frac{1}{3} + \frac{2}{3} \times \frac{3}{4}$ or $\frac{1}{3} \times \frac{3}{4} + \frac{1}{3} \times \frac{1}{4} + \frac{2}{3} \times \frac{3}{4}$ or **M1** for $\frac{2}{3} \times \frac{1}{4}$ or $\frac{1}{3} \times \frac{1}{4} + \frac{2}{3} \times \frac{3}{4}$

Question 16

11	(a)	0.6 oe		1	
	(b)	20 0.3 oe 0.3 oe		2	**B1** for 20 **B1** for 0.3 oe and 0.3 oe

Question 17

8	rt $(1-t)\,r$ $(1-r)t$ oe $(1-r)(1-t)$ oe	3	**B1** for each

Question 23

20(a)	5 7 7 8 10 7 9 9 10 12	1	
20(b)	7	1	
20(c)(i)	$\dfrac{7}{25}$ or 0.28 or 28%	2FT	**FT** $\dfrac{their\,7}{25}$ **B1** for $\dfrac{k}{25}$ If zero scored, then **SC1** for $\dfrac{2}{5}$ or $\dfrac{6}{15}$ if no values in the bottom two rows of the table.
20(c)(ii)	0	1FT	**FT** $\dfrac{their\,0}{25}$

Question 24

5	68.6 or 68.62 to 68.64	2	**M1** for $\dfrac{1}{2}\times\dfrac{4}{3}\pi\times 3.2^{3}$ If zero scored, **SC1** for final answer 137 or 137.2 to 137.3

Question 25

20(a)	$\dfrac{8}{15}$ oe	1	
20(b)	$\dfrac{168}{210}$ oe	3	**M2** for $1-\dfrac{7}{15}\times\dfrac{6}{14}$ oe or $3(\dfrac{7\times 8}{15\times 14})$ oe or **M1** for $\dfrac{7}{15}\times\dfrac{6}{14}$ or $\dfrac{7}{15}\times\dfrac{8}{14}$ or $\dfrac{8}{15}\times\dfrac{7}{14}$ oe

Question 26

24(a)	$\dfrac{4}{5}$ oe	2	**M1** for $\dfrac{2}{3} \times p = \dfrac{8}{15}$ or better
24(b)	$\dfrac{1}{15}$ oe	3	**3FT** $(1 - their \ \dfrac{4}{5}) \times \dfrac{1}{3}$ correctly evaluated **M2** for $(1 - their \ \dfrac{4}{5}) \times (1 - \dfrac{2}{3})$ oe or **M1** for $1 - their \ \dfrac{4}{5}$ or $1 - \dfrac{2}{3}$