Revision F4 (Topics 11-12) [36] MARKSCHEME

1.

$\frac{2}{3}\times\frac{2}{3}$ or $\frac{3}{4}\times\frac{3}{4}$ or $\frac{2}{3}\times\frac{3}{4}$ M1

anywhere or $\frac{2}{3}\times\frac{1}{4}$ or $\frac{1}{3}\times\frac{3}{4}$

any where other pair M1dep

$\frac{2}{3}\times\frac{2}{3}\times\frac{3}{4}\times\frac{1}{4}$ or $\frac{2}{3}\times\frac{2}{3}\times\frac{1}{4}\times\frac{3}{4}$ or $\frac{2}{3}\times\frac{1}{3}\times\frac{3}{4}\times\frac{3}{4}$ or $\frac{1}{3}\times\frac{2}{3}\times\frac{3}{4}\times\frac{3}{4}$

any one M1

Addition products of 4 correct quad Ml dep

dependent on all 3 Mis

$\frac{5}{12}$ **A1**

Use of decimals 0.66 or 0.67 or better

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2.

Recognising 000, 003, 006, ... 999 are multiples of 3 B1

or $\frac{1}{3}$ *of 999 or 1000*

or $\frac{1}{3}$ *are multiples of 3*

or recognising multiples of 12

Obtaining 333 or 334 possibilities B1

Obtaining 83 or 84 possible multiples of 3 and 4 M1

$\frac{84}{334}$ or 0.251… or $\frac{83}{333}$ or 0.249 … A1

oe $\frac{42}{167}$

Look for $\frac{249}{999}=\frac{83}{333}$

Incorrect method *M0*

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3.

(a)		1400	**3** 1 AO1.3a 1 AO2.3a 1 AO3.1c	**M2** for $\frac{24}{60}\times 3500$ **oe** Or **B1** for $\frac{24}{60}$ **oe** or $\frac{36}{60}$ **oe** If **0** scored, **SC1** for 2100 as final answer
(b)		Different age groups may not have the same opinion	**1** 1 AO3.5	

4.

(a) $\frac{2}{5}$ seen in part (a) — B1

One pair of branches labelled somehow correctly and with correct probabilities — B1

Accept penalty, no penalty for score, no score
(but not penalty 1, penalty 2)

Fully correct — B1

Condone '1st penalty' and '2nd penalty' headings missing
No labels but otherwise fully correct → SC2

(b) $\frac{3}{5}\times\frac{2}{5}$ or $\frac{2}{5}\times\frac{3}{5}$ — M1

One correct product seen or $\frac{6}{25}$

ft from correct structure if unambiguous (ie labelled) and all are probabilities

$\frac{3}{5}\times\frac{2}{5}+\frac{2}{5}\times\frac{3}{5}$ — M1

Addition of 2 correct products (or × 2)

ft from correct structure if unambiguous (ie labelled) and all are probabilities

$= \frac{12}{25}$ — A1

oe 0.48
If answer given in (b) is wrong and there is no working in (b), credit can be given if clear evidence seen in (a) leads to the answer given in (b)

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5.

$\frac{9}{34}$	**4** 1 AO1.3b 3 AO3.1d	**B3** for 9 or **M2** for (12 + 25 + 6) – 34 or correct diagram with 3 out of 4 correct elements or **M1** for $\frac{n}{34}$ where $n < 34$	e.g. S n $25-n$ S' $12-n$ 6

6.

(a)	25×24	600	P1 A1	for process to find number of ways cao
(b)	$12 \times 10 \times 11$ $10 \times 12 \times 9$ $1320 + 1080$	2400	P1 P1 A1	for process to find number of lists with boy then girl then boy or the number of lists with girl then boy then girl for complete process to find the total number of lists cao

7.

$T + 89 = 68n$ M1

$T + 57 = 64n$ A1

M1 for either, Al for both

$\frac{T+89}{A^n+1} = 68, \frac{T+57}{n+1} = 64,$ *etc. Ml,*

$32 = 4n$ M1

32 = 4n + 4, (n = 7)

$n = 8$ A1

Allow trail and improvement if correct answer obtained

[4]

8.

$\frac{1}{10} \times \frac{1}{9}$ M1

P(R_4 and R_5) or P(R_5 and R_4)

P(B and B) = $\frac{4}{10} \times \frac{3}{9}$ M1

Or 12 ×$(\frac{1}{10} \times \frac{1}{9})$

$(\frac{1}{10} \times \frac{1}{9}) + [(\frac{1}{10} \times \frac{1}{9})$ or $(\frac{4}{10} \times \frac{3}{9})]$ M1 dep

Adding any two correct probabilities

eg 2 × 5 $(\frac{1}{10} \times \frac{1}{9})$ *⇒first M1 dep#*

$(\frac{1}{10} \times \frac{1}{19}) + (\frac{1}{10} \times \frac{1}{9}) + (\frac{4}{10} \times \frac{3}{9})$ M1 dep

Adding all 3 (or 14) correct probabilities

$= \frac{14}{90} (= 0.155...$ recurring) A1

Accept 0.16 from correct working seen

Alternative method:

2 × 1 = 2	*M1*	*red pairs*
4 × 3 = 12	*M1*	*blue pairs*
2 + 12 = 14	*M1 dep*	*addition*
10 × 9 = 90	*M1 dep*	

$\frac{14}{90}$ *A1*

Accept a sample space diagram with diagonal crossed out using scheme above

[5]