MARKING GUIDELINE

MARKS	DURATION	QUESTIONS
31	50 minutes	3

Name: _____ Class: _____

Date: _____

MARK ____ / 31

INSTRUCTIONS AND INFORMATION

1. Answer **ALL** the questions in this question paper.
2. Answer QUESTION 1 by **circling** the letter (A–D) in the answer grid at the end of that section.
3. Show **ALL** calculations clearly.
4. Show all units where applicable.
5. Number the answers correctly according to the numbering system used in this question paper.
6. A non-programmable calculator may be used, unless stated otherwise.
7. Write neatly and legibly.

QUESTION 1 [10 MARKS]

Four options are given as possible answers to the following questions. Choose the correct answer and circle the letter (A–D) in the grid at the end of this section. If you want to change your choice, put a cross through the wrong letter and circle your new choice.

1.1 A fair die is rolled once. P(rolling a 4) is ... (1)

A) $\frac{4}{6}$ **B)** $\frac{1}{2}$

C) $\frac{1}{6}$ ✓ **D)** $\frac{1}{4}$

Answer: C — One favourable outcome out of six equally likely ones.

- **A** — that would be P(rolling 4 or less)
- **B** — that is P(an even number)
- **D** — the 4 on the die is not the number of outcomes

1.2 A fair die is rolled once. P(an EVEN number) is ... (1)

A) $\frac{2}{3}$ **B)** $\frac{1}{3}$

C) $\frac{1}{2}$ ✓ **D)** $\frac{1}{6}$

Answer: C — Three of the six outcomes (2, 4, 6) are even.

- **A** — that is P(not a multiple of 3)
- **B** — that is P(a multiple of 3)
- **D** — that is the chance of ONE particular number

1.3 The probability of an event that is CERTAIN is ... (1)

A) 1 ✓ **B)** $0{,}5$

C) 100 **D)** 0

> **Answer: A** — Probabilities run from 0 (impossible) to 1 (certain).
> - **B** — that is an even chance
> - **C** — that would be 100 PER CENT, not a probability
> - **D** — that is IMPOSSIBLE

1.4 If P(A) = $0{,}3$, then P(NOT A) is ... (1)

A) $1{,}3$ **B)** $-0{,}3$

C) $0{,}3$ **D)** $0{,}7$ ✓

> **Answer: D** — Complementary events add up to 1.
> - **A** — a probability cannot exceed 1
> - **B** — a probability cannot be negative
> - **C** — that is P(A) itself

1.5 A bag has 4 red and 6 blue balls. P(red) is ... (1)

A) $\frac{6}{10}$ **B)** $\frac{4}{6}$

C) $\frac{2}{5}$ ✓ **D)** $\frac{1}{4}$

> **Answer: C** — 4 out of 10, which simplifies to $\frac{2}{5}$.
> - **A** — that is P(blue)
> - **B** — compared red with blue instead of with the total
> - **D** — used the number of red as the denominator

1.6 Two coins are tossed. The number of possible outcomes is ... (1)

A) 4 ✓ **B)** 3

C) 8 **D)** 2

> **Answer: A** — HH, HT, TH, TT.
> - **B** — HT and TH are different outcomes
> - **C** — that is for three coins
> - **D** — that is the outcomes for ONE coin

1.7 Two coins are tossed. P(two heads) is ... (1)

A) $\frac{1}{4}$ ✓ **B)** $\frac{1}{2}$

C) $\frac{3}{4}$ **D)** $\frac{1}{3}$

> **Answer: A** — One favourable outcome (HH) out of four.
> - **B** — that is P(one particular coin showing heads)
> - **C** — that is P(at least one head): HH, HT and TH
> - **D** — there are four outcomes, not three

1.8 Relative frequency differs from theoretical probability because it is based on ... (1)

A) guesswork
B) what ACTUALLY happened in trials ✓
C) the number of outcomes only
D) what SHOULD happen

> **Answer: B** — It is the observed count divided by the number of trials.
> - **A** — it is measured, not guessed
> - **C** — the trials are what matter
> - **D** — that is theoretical probability

1.9 A coin is tossed 100 times and lands on heads 46 times. The relative frequency of heads is ... (1)

A) 46
B) 0,46 ✓
C) 0,5
D) 54

> **Answer: B** — $46 \div 100$.
> - **A** — that is the count, not a probability
> - **C** — that is the THEORETICAL probability
> - **D** — that is the number of tails

1.10 A coin is tossed and a fair die is rolled. The number of possible outcomes is ... (1)

A) 8
B) 12 ✓
C) 6
D) 2

> **Answer: B** — 2 outcomes for the coin $\times$ 6 for the die $= 12$ — a two-way table with 2 rows and 6 columns has 12 cells.
> - **A** — ADDED the 2 and the 6 instead of multiplying
> - **C** — that is the die on its own
> - **D** — that is the coin on its own

ANSWER GRID — MARKING GUIDELINE

1.1	A	B	**C**	D
1.2	A	B	**C**	D
1.3	**A**	B	C	D
1.4	A	B	C	**D**
1.5	A	B	**C**	D
1.6	**A**	B	C	D
1.7	**A**	B	C	D
1.8	A	**B**	C	D
1.9	A	**B**	C	D
1.10	A	**B**	C	D

QUESTION 2 [10 MARKS]

A bag contains 5 red marbles, 7 blue marbles and 8 green marbles. One marble is drawn at random.

2.1 Write down P(red) as a fraction in its simplest form AND as a percentage. (3)

> Total $= 5 + 7 + 8 = 20$ *(1)*
> P(red) $= \frac{5}{20} = \frac{\mathbf{1}}{\mathbf{4}}$ *(1)*
> $= \mathbf{25\%}$ *(1)*

2.2 Determine P(not green). Show your working. **(3)**

> Not green $= 5 + 7 = 12$ *(1)*
> P(not green) $= \frac{12}{20}$ *(1)*
> $= \mathbf{\frac{3}{5}}$ *(1)*

2.3 One green marble is drawn and NOT replaced. Determine the probability that the next marble drawn is also green. **(4)**

> Green left $= 8 - 1 = 7$ *(1)*
> Marbles left $= 20 - 1 = 19$ *(1)*
> P(green) $= \mathbf{\frac{7}{19}}$ *(2)*

QUESTION 3 [11 MARKS]

Answer the following.

3.1 Two coins are tossed at the same time. Write down the sample space, and hence determine the probability of getting exactly ONE head. **(4)**

> S = {HH ; HT ; TH ; TT} *(2)*
> Exactly one head: HT and TH *(1)*
> P $= \frac{2}{4} = \mathbf{\frac{1}{2}}$ *(1)*

3.2 An ordinary die is rolled once. Determine the probability of rolling a prime number. **(3)**

> The primes on a die are 2 ; 3 ; 5 *(2)*
> P(prime) $= \frac{3}{6} = \mathbf{\frac{1}{2}}$ *(1)*

3.3 A coin is tossed 200 times and lands on heads 118 times. Calculate the relative frequency of heads, and explain why it is not exactly equal to the theoretical probability. **(4)**

> Relative frequency $= \frac{118}{200} = \mathbf{0{,}59}$ *(2)*
> The theoretical probability is 0,5 *(1)*
> Chance causes variation in a real experiment; the more tosses, the closer the two usually become *(1)*

TOTAL: 31 marks

This question paper consists of 3 questions.

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