MARKING GUIDELINE

MARKS	DURATION	QUESTIONS
28	45 minutes	3

Name: ..... Class: .....

Date: .....

MARK ____ / 28

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 Simplify: $\frac{12a^5b^2}{4a^3b}$ (1)

A) $8a^2b$ **B)** $3a^8b^3$

C) $3a^2b^2$ **D)** $\mathbf{3a^2b}$ ✓

Answer: D — $12 \div 4 = 3$, $a^{5-3} = a^2$ and $b^{2-1} = b$.

- **A** — SUBTRACTED the coefficients instead of dividing
- **B** — ADDED the exponents instead of subtracting
- **C** — forgot to subtract the exponent of b

1.2 Simplify: $\frac{x^2 - 9}{x + 3}$ (1)

A) $x + 3$ **B)** $x^2 - 3$

C) $\mathbf{x - 3}$ ✓ **D)** $x - 9$

Answer: C — Factorise the top: $(x + 3)(x - 3)$, then cancel $(x + 3)$; $x \neq -3$.

- **A** — cancelled the wrong bracket
- **B** — cancelled only part of the numerator
- **D** — cancelled the 3 on its own — only FACTORS cancel

1.3 $\frac{2}{x} + \frac{3}{x} = \ldots$ (1)

A) $\frac{5}{x^2}$ **B)** $\frac{5}{x}$ ✓

C) $\frac{5}{2x}$ **D)** $\frac{6}{x}$

Answer: B — The denominators are already the same, so add the numerators only.

- **A** — multiplied the denominators
- **C** — added the denominators too
- **D** — multiplied the numerators

1.4 $\frac{1}{2}x + \frac{1}{3}x = \ldots$ (1)

A) $\frac{5}{6}x$ ✓ **B)** $\frac{2}{6}x$

C) $\frac{2}{5}x$ **D)** $\frac{1}{6}x$

Answer: A — $\frac{3}{6} + \frac{2}{6} = \frac{5}{6}$.

- **B** — used a common denominator but added wrongly
- **C** — added the tops and the bottoms
- **D** — MULTIPLIED the two fractions

1.5 Simplify: $\frac{6x}{3}$ (1)

A) $2x$ ✓ **B)** $3x$

C) $18x$ **D)** 2

Answer: A — $6 \div 3 = 2$, and the x is untouched.

- **B** — SUBTRACTED 3 from 6
- **C** — multiplied instead of dividing
- **D** — cancelled the x away as well

1.6 $\frac{a}{b} \times \frac{c}{d} = \ldots$ (1)

A) $\frac{ad}{bc}$ **B)** $\frac{ac}{bd}$ ✓

C) $\frac{ab}{cd}$ **D)** $\frac{a+c}{b+d}$

Answer: B — Multiply the tops and multiply the bottoms.

- **A** — that is $\frac{a}{b} \div \frac{c}{d}$
- **C** — paired the letters wrongly
- **D** — multiplication is not addition

1.7 $\frac{a}{b} \div \frac{c}{d} = \ldots$ (1)

A) $\frac{ac}{bd}$ **B)** $\frac{bc}{ad}$

C) $\frac{a+d}{b+c}$ **D)** $\frac{ad}{bc}$ ✓

Answer: D — Multiply by the RECIPROCAL of the second fraction.

- **A** — that is $\frac{a}{b} \times \frac{c}{d}$
- **B** — inverted the wrong fraction
- **C** — division is not addition

1.8 For what value of x is $\frac{5}{x-2}$ undefined? (1)

A) 5 **B)** -2

C) 2 ✓ **D)** 0

Answer: C — The denominator is 0 when $x = 2$, and division by 0 is undefined.

- **A** — that is the numerator
- **B** — $x = -2$ gives $\frac{5}{-4}$, which is fine
- **D** — $x = 0$ gives $\frac{5}{-2}$, which is fine

1.9 Simplify: $\frac{4x+8}{4}$ (1)

A) x **B)** $x + 8$

C) $4x + 2$ **D)** $x + 2$ ✓

Answer: D — BOTH terms of the numerator are divided by 4.

- **A** — cancelled the 8 away entirely
- **B** — divided only the first term
- **C** — divided only the second term

1.10 $\frac{x}{3} - \frac{x}{4} = \ldots$ (1)

A) $\frac{2x}{7}$ **B)** $\frac{x}{12}$ ✓

C) $\frac{7x}{12}$ **D)** 0

Answer: B — $\frac{4x}{12} - \frac{3x}{12} = \frac{x}{12}$.

- **A** — subtracted the tops AND the bottoms
- **C** — ADDED the two fractions instead of subtracting
- **D** — the two terms are not equal, so the answer is not 0

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 [9 MARKS]

Simplify the following.

2.1 $\frac{6x^2y}{3xy^3}$ (3)

$6 \div 3 = 2$ *(1)*
$x^2 \div x = x$, and $y \div y^3 = y^{-2}$ *(1)*
$= \frac{2x}{y^2}$ *(1)*
$(x \neq 0$ and $y \neq 0)$

2.2 $\frac{x^2 + 3x}{x}$ (3)

Factorise the numerator first: $\frac{x(x+3)}{x}$ *(2)*
$= x + 3$ *(1)*
$(x \neq 0)$

2.3 $\frac{2x}{3} \times \frac{9}{4x^2}$ (3)

$= \frac{18x}{12x^2}$ *(2)*
$= \frac{3}{2x}$ *(1)*
$(x \neq 0)$

QUESTION 3 [9 MARKS]

Simplify the following. Show ALL your steps.

3.1 $\frac{x}{4} \div \frac{x}{2}$ (3)

Flip the second fraction: $\frac{x}{4} \times \frac{2}{x}$ *(2)*
$= \frac{1}{2}$ *(1)*
$(x \neq 0)$

3.2 $\frac{x}{2} + \frac{x}{3}$ **(3)**

LCD $= 6$ *(1)*

$= \frac{3x}{6} + \frac{2x}{6}$ *(1)*

$= \mathbf{\frac{5x}{6}}$ *(1)*

3.3 Explain why you may NOT cancel the x in $\frac{x^2 + 3x}{x}$ before factorising. **(3)**

You may only cancel FACTORS, never terms *(1)*

$x^2 + 3x$ is a SUM, not a product *(1)*

Factorising first turns it into the product $x(x + 3)$, and then the x may be cancelled *(1)*

TOTAL: 28 marks

This question paper consists of 3 questions.

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