MARKING GUIDELINE

MARKS	DURATION	QUESTIONS
33	50 minutes	3

Name: _____ Class: _____

Date: _____

MARK ____ / 33

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 $\sqrt{144} = \ldots$ (1)

A) 12 ✓ **B)** 72

C) 14 **D)** 1 728

Answer: A — $12 \times 12 = 144$.

- **B** — HALVED 144 instead of rooting it
- **C** — guessed from the digits
- **D** — that is 12 CUBED

1.2 $\sqrt[3]{-27} = \ldots$ (1)

A) non-real **B)** -9

C) 3 **D) -3 ✓**

Answer: D — $(-3)(-3)(-3) = -27$; an ODD root of a negative is a real negative number.

- **A** — only an EVEN root of a negative is non-real
- **B** — that is $-27 \div 3$
- **C** — lost the sign — 3^3 is $+27$

1.3 $\sqrt{-4}$ is ... (1)

A) 2 **B)** -2

C) non-real ✓ **D)** -16

Answer: C — No real number multiplied by itself gives a negative.

- **A** — $2^2 = +4$
- **B** — $(-2)^2 = +4$, not -4
- **D** — that is -4 squared

1.4 $(-5)^2 + (-2)^3 = \ldots$ (1)

A) 17 ✓ **B)** 33

C) -17 **D)** -33

> **Answer: A** — $25 + (-8) = 17$.
> - **B** — made both terms positive
> - **C** — subtracted 25 from 8
> - **D** — made both terms negative

1.5 $\sqrt{64} - \sqrt[3]{64} = \ldots$ (1)

A) 12 **B)** 4 ✓

C) 0 **D)** -4

> **Answer: B** — $\sqrt{64} = 8$ and $\sqrt[3]{64} = 4$, so $8 - 4 = 4$.
> - **A** — ADDED the two roots
> - **C** — assumed the two roots are equal
> - **D** — subtracted the wrong way round

1.6 Which one of the following is a perfect square AND a perfect cube? (1)

A) 81 **B)** 64 ✓

C) 16 **D)** 36

> **Answer: B** — $64 = 8^2$ and $64 = 4^3$.
> - **A** — a square only
> - **C** — a square only
> - **D** — a square only

1.7 Between which TWO consecutive integers does $\sqrt{50}$ lie? (1)

A) 24 and 26 **B)** 6 and 7

C) 7 and 8 ✓ **D)** 8 and 9

> **Answer: C** — $7^2 = 49$ and $8^2 = 64$, and 50 falls between them.
> - **A** — halved 50 instead of rooting it
> - **B** — 36 and 49 — 50 is bigger than 49
> - **D** — 64 and 81 are both above 50

1.8 $(-1)^{100} = \ldots$ (1)

A) 100 **B)** -100

C) -1 **D)** 1 ✓

> **Answer: D** — An EVEN power of -1 is $+1$, because the negatives pair off.
> - **A** — multiplied -1 by 100
> - **B** — multiplied and kept the sign
> - **C** — that is an ODD power of -1

1.9 A cube has a volume of $125\ \text{cm}^3$. The length of one side is ... (1)

A) 41,67 cm **B)** 11,18 cm

C) 5 cm ✓ **D)** 25 cm

> **Answer: C** — $\sqrt[3]{125} = 5$, because $5 \times 5 \times 5 = 125$.
> - **A** — divided the volume by 3
> - **B** — took the SQUARE root of 125 instead of the cube root
> - **D** — that is the area of one face, 5×5

1.10 -2^4 and $(-2)^4$ differ because ... (1)

A) the brackets decide whether the MINUS is also raised to the power ✓ **B)** brackets never matter

C) they are actually equal **D)** one is a cube

> **Answer: A** — $-2^4 = -16$ but $(-2)^4 = +16$.
> - **B** — here they change the sign of the answer
> - **C** — -16 and $+16$ are not equal
> - **D** — both are fourth powers

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]

Calculate the following WITHOUT using a calculator.

2.1 $(-5)^2 - (-4^2)$ (4)

> $(-5)^2 = 25$ *(1)*
> $-4^2 = -16$ *(1)*
> $25 - (-16)$ *(1)* $= \mathbf{41}$ *(1)*

2.2 $\sqrt[3]{-27} + \sqrt{64}$ (3)

> $\sqrt[3]{-27} = -3$ *(1)*
> $\sqrt{64} = 8$ *(1)*
> $-3 + 8 = \mathbf{5}$ *(1)*

2.3 $(-3)^2 - 4 \times (-2)$ (3)

> $= 9 - (-8)$ *(2)* $= \mathbf{17}$ *(1)*

QUESTION 3 [13 MARKS]

Calculate the following, showing the order in which you worked.

3.1 $(-20 + 8) \div (-3) - (-5)$ **(4)**

> Brackets: $-20 + 8 = -12$ *(1)*
> $(-12) \div (-3) = 4$ *(1)*
> $4 - (-5)$ *(1)* $= \mathbf{9}$ *(1)*

3.2 $\sqrt{36} + 2(7 - 3)^2$ **(4)**

> $\sqrt{36} = 6$ *(1)*
> $(7 - 3)^2 = 16$ *(1)*
> $6 + 2(16)$ *(1)* $= \mathbf{38}$ *(1)*

3.3 Explain the difference between $(-3)^2$ and -3^2. **(2)**

> In $(-3)^2$ the bracket means the NEGATIVE is squared too, giving 9 *(1)*
> In -3^2 only the 3 is squared and the minus stays, giving -9 *(1)*

3.4 Explain why $\sqrt{-25}$ has no answer in the real numbers, but $\sqrt[3]{-27}$ does. **(3)**

> No real number multiplied by ITSELF gives a negative *(1)*
> But $(-3) \times (-3) \times (-3) = -27$ *(1)*, so an odd root of a negative does exist *(1)*

TOTAL: 33 marks

This question paper consists of 3 questions.

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