Questions

Q1.

(a) Find the value of $\sqrt[3]{8 \times 10^6}$

.....

(1)

(b) Find the value of $144^{\frac{1}{2}} \times 64^{-\frac{1}{3}}$

.....

(2)

(c) Solve $3^{2x} = \frac{1}{81}$

x = ...

(2)

(Total for question = 5 marks)

Q2.

(a) Write down the value of $64^{\frac{1}{2}}$

.....

(1)

(b) Find the value of $\left(\frac{8}{125}\right)^{-\frac{2}{3}}$

.....

(2)

(Total for question = 3 marks)

Q3.

(a) Simplify fully $(3x^5y^6)^4$

.....

(2)

(b) Expand and simplify $(x + 2)(x - 3)(x + 4)$

.....

(3)

(Total for question = 5 marks)

Q4.

(a) Expand and simplify $(x - 2)(2x + 3)(x + 1)$

.....

(3)

$$\frac{y^4 \times y^n}{y^2} = y^{-3}$$

(b) Find the value of n.

.....

(2)

(c) Solve $5x^2 - 4x - 3 = 0$

Give your solutions correct to 3 significant figures.

.....

(3)

(Total for question = 8 marks)

Q5.

(a) Find the value of $\sqrt[4]{27 \times 3 \times 10^8}$

.....

(2)

(b) Find the value of $\left(\frac{216}{1000}\right)^{-\frac{2}{3}}$

.....

(2)

(Total for question = 4 marks)

Q6.

(i) Find the value of $\sqrt[5]{3.2 \times 10^{11}}$

.....

(ii) Find the value of $10^{\frac{3}{4}}$
Give your answer correct to 1 decimal place.

.....

(Total for question = 2 marks)

Q7.

(a) Find the reciprocal of 2.5

.....

(1)

(b) Work out $\sqrt[3]{\frac{4.3 \times \tan 39^\circ}{23.4 - 6.06}}$

Give your answer correct to 3 significant figures.

.....

(2)

(Total for question is 3 marks)

Q8.

Write down the value of $125^{\frac{2}{3}}$

.....

(Total for question is 1 mark)

Q9.

(a) Write $\frac{3^5 \times 3^4}{3^2}$ as a power of 3

.....

(2)

(b) Write down the value of 12^0

.....

(1)

(c) Write down the value of 3^{-2}

.....

(1)

(Total for question = 4 marks)

Q10.

Work out the value of $\frac{3^7 \times 3^{-2}}{3^3}$

.....

(Total for question = 2 marks)

Q11.

Work out the value of $\frac{\left(5\frac{4}{9}\right)^{-\frac{1}{2}} \times \left(4\frac{2}{3}\right)}{2^{-3}}$

You must show all your working.

.....

(Total for question = 4 marks)

Q12.

Simplify $(2^{-5} \times 2^{8})^{2}$

Give your answer as a power of 2

.....

(Total for question = 2 marks)

Q13.

Work out the value of $\left(\frac{8}{27}\right)^{\frac{4}{3}}$

.....

(Total for question = 2 marks)

Q14.

(a) Write $\frac{1}{16}$ in the form 4^{n} where n is an integer.

.....

(1)

(b) Work out the value of $8^{\frac{5}{3}} - 9^{\frac{3}{2}}$

.....

(3)

(Total for question = 4 marks)

Q15.

(a) (i) Write down the value of 5^0

.....

(1)

(ii) Write down the value of 5^{-2}

.....

(1)

(b) Write $\frac{2^5 \times 2^4}{2^3}$ in the form 2^n where n is an integer.

.....

(2)

(Total for question = 4 marks)

Q16.

Work out the value of $27^{\frac{2}{3}} + \left(\frac{1}{2}\right)^{-3}$

.....

(Total for question = 3 marks)

Q17.

$2^x = \frac{2^n}{\sqrt[3]{2}}$ $\quad 2^y = \left(\sqrt{2}\right)^5$

Given that $x + y = 8$

work out the value of n.

$n =$ .....

(Total for question = 3 marks)

Q18.

(a) Work out $25^{\frac{1}{2}} \times 8^{\frac{1}{3}}$

.....

(2)

(b) Find the value of $\left(\frac{1}{32}\right)^{\frac{3}{5}}$

.....

(2)

(Total for question = 4 marks)

Q19.

(a) Simplify fully $2x^3y^5 \times 7x^2y$

.....

(2)

(b) Simplify $(m^2)^{-3}$

.....

(1)

(Total for question = 3 marks)

Q20.

Given that $9^{-\frac{1}{2}} = 27^{\frac{1}{4}} \div 3^{x+1}$
find the exact value of x.

$x =$ .....

(Total for question = 3 marks)

Q21.

(a) Work out the value of $\left(\frac{16}{81}\right)^{\frac{3}{4}}$

.....

(2)

$3^a = \frac{1}{9}$ $3^b = 9\sqrt{3}$ $3^c = \frac{1}{\sqrt{3}}$

(b) Work out the value of $a + b + c$

.....

(2)

(Total for question = 4 marks)

Q22.

(a) Simplify $(x^3)^5$

.....

(1)

(b) Expand and simplify $4(x + 3) + 7(4 - 2x)$

.....

(2)

(c) Factorise fully $15x^3 + 3x^2y$

.....

(2)

(Total for question = 5 marks)

Q23.

(a) Simplify $(m^2)^3$

.....

(1)

(b) Simplify $x^5 \times x^8$

.....

(1)

(c) Expand $4p\ (p^2 + 3p)$

.....

(2)

(Total for question = 4 marks)

Q24.

Write

$$\frac{(6x^5y^3)^2}{3x^2y^7 \times 4xy^{-3}}$$

in the form $ax^b y^c$ where a, b and c are integers.

.....

(Total for question = 3 marks)

Q25.

(a) Simplify $n^3 \times n^5$

.....

(1)

(b) Simplify $\frac{c^3d^4}{c^2d}$

.....

(2)

(c) Solve $\frac{5x}{2} > 7$

.....

(2)

(Total for question = 5 marks)

Q26.

(a) Express $\sqrt{\frac{10^{360}}{10^{150} \times 10^{90}}}$ as a power of 10

.....

(3)

Liam was asked to express $(12^{50})^2$ as a power of 12

Liam wrote $(12^{50})^2 = 12^{50^2} = 12^{2500}$

Liam's method is wrong.

(b) Explain why.

.....

.....

.....

(1)

(Total for question = 4 marks)

Q27.

$(ax^6)^{\frac{1}{n}} = 7x^3$

Work out the value of a and the value of n.

a = ...

n = ...

(Total for question = 2 marks)

Q28.

$16^{\frac{1}{5}} \times 2^x = 8^{\frac{3}{4}}$

Work out the exact value of x.

.....

(Total for question = 3 marks)

Q29.

Given that $3^{-n} = 0.2$

find the value of $(3^4)^n$

.....

(Total for question = 2 marks)

Q30.

(a) Write down the value of 7^0

.....

(1)

(b) Find the value of $3 \times 3^6 \times 3^{-6}$

.....

(1)

(c) Find the value of 2^{-4}

.....

(1)

(d) Find the value of $27^{\frac{1}{3}}$

.....

(1)

(Total for question = 4 marks)

Q31.

(a) Write down the value of $100^{\frac{1}{2}}$

.....

(1)

(b) Find the value of $125^{\frac{2}{3}}$

.....

(2)

(Total for question = 3 marks)

Q32.

$p^3 \times p^x = p^9$

(a) Find the value of x.

x = ...

(1)

$(7^2)^y = 7^{10}$

(b) Find the value of y.

y = ...

(1)

$1000^a \times 1000^b$ can be written in the form 10^w

(c) Show that $w = 2a + 3b$

(2)

(Total for question = 4 marks)

Q33.

Find the value of $64^{-\frac{2}{3}}$

.....

(Total for question = 1 mark)

Q34.

(a) Find the value of $81^{-\frac{1}{2}}$

.....

(2)

(b) Find the value of $\left(\frac{64}{125}\right)^{\frac{2}{3}}$

.....

(2)

(Total for question = 4 marks)

Q35.

(a) Write down the value of $36^{\frac{1}{2}}$

.....

(1)

(b) Write down the value of 23^0

.....

(1)

(c) Work out the value of $27^{-\frac{2}{3}}$

.....

(2)

(Total for question = 4 marks)

Mark Scheme

Q1.

Question	Working	Answer	Notes	
a		200	B1	200 or 2×10^2
b		3	B1	12 and $\frac{1}{4}$
			A1	3 cao
c		-2	M1	$81 = 3^4$ or $\frac{1}{81} = 3^{-4}$
			A1	cao

Q2.

Paper 1MA1: 1H			
Question	Working	Answer	Notes
(a)		8	B1
(b)		$\frac{25}{4}$ oe	M1 for correct first step
			A1