

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

10 (a) Simplify fully $(16x^8y^6)^{\frac{1}{2}}$

(2)



P 5 9 0 2 4 A 0 1 1 2 4

11 (a) Simplify fully $(8e^{15})^{\frac{2}{3}}$

.....
(2)

(b) Express $\left(\frac{y}{2}\right)^{-4}$ in the form ay^n where a and n are integers.

.....
(2)

DO NOT WRITE IN THIS AREA



11 Express $\left(\frac{m^6 k^{10}}{25}\right)^{\frac{3}{2}}$ in the form $\frac{m^a k^b}{c^d}$ where a , b and c are integers to be found.

(Total for Question 11 is 2 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

11 Simplify fully $\left(\frac{9t^4w^9}{18t^6w^{10}}\right)^{-2}$

(Total for Question 11 is 3 marks)



12 $3^{\frac{1}{2}} \times 3^{\frac{2}{5}} = 3^m$

(a) Work out the value of m

$$m = \dots\dots\dots (1)$$

$$5^{-10} \div 5^{-4} = 5^n$$

(b) Work out the value of n

$$n = \dots\dots\dots (1)$$

(Total for Question 12 is 2 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

12 (a) Simplify $\frac{2}{y^0}$

(1)

(b) Simplify fully $(16a^4)^{\frac{3}{4}}$

(2)



12 (a) Simplify $(16e^{10}f^6)^{\frac{1}{2}}$

.....
(2)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Given that $4^{k+3} = 16 \times 2^k$

(c) find the value of k .
Show your working clearly.

$k =$
(4)

(Total for Question 12 is 9 marks)



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(b) Simplify completely $\left(\frac{16w^8}{y^{20}}\right)^{-\frac{3}{4}}$

.....
(3)

(Total for Question 13 is 6 marks)



12 $2^7 \times 4^5 = 4^x$

(a) Calculate the value of x

$$x = \dots\dots\dots (2)$$

(b) Simplify fully $(125p^6y^{24})^{\frac{2}{3}}$

$$\dots\dots\dots (2)$$

(Total for Question 12 is 4 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



12

(c) Write $\frac{\sqrt[4]{y}}{y}$ in the form y^b where b is a fraction.

(2)



14

(b) Simplify fully $\left(\frac{a^3b}{a^9b^5}\right)^{-\frac{1}{2}}$

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(3)

(Total for Question 14 is 6 marks)



14 Simplify fully $\left(\frac{9x^4}{16y^{10}}\right)^{-\frac{1}{2}}$

(Total for Question 14 is 3 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



14 (a) Simplify fully $(x^{12}y^8)^{\frac{3}{4}}$

.....
(2)

Given that $3^n = \frac{3^x}{9^y}$

(b) find an expression for n in terms of x and y .

$n =$
(2)

(Total for Question 14 is 4 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



15 (a) Simplify fully $\left(\frac{256x^{20}}{y^8}\right)^{-\frac{1}{4}}$

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

15 (a) Simplify fully $(32a^{15})^{\frac{3}{5}}$

(2)

(b) Express $\left(\frac{1}{10x}\right)^{-3}$ in the form px^n where p and n are integers.

(2)



16

(b) Given that $\left(\sqrt{\frac{y}{x}}\right)^{-5} = \frac{x^m}{y^m}$ where $x \neq y$

find the value of m .

$m = \dots\dots\dots$

(1)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



16

(b) Simplify fully $\left(\frac{2x^5}{8xy^2}\right)^{-2}$

.....
(3)

(Total for Question 16 is 6 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

17 (a) $\left(\sqrt[4]{k^{12}}\right)^5 = k^n$

Find the value of n

$$n = \dots\dots\dots$$

(1)



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

19 Given that $\left(\sqrt[3]{\frac{1}{x}}\right)^4 = x^m$

(a) find the value of m

$$m = \dots\dots\dots (1)$$



19 (a) Simplify $8^2 \times \sqrt[3]{4^6}$

Give your answer in the form 2^a where a is an integer.

Show each stage of your working clearly.

.....
(3)

Given that $n^{\left(-\frac{4}{5}\right)} = \left(\frac{1}{2}\right)^4$ where $n > 0$

(b) find the value of n .

$n =$

(4)

(Total for Question 19 is 7 marks)



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

20 $a = 25 \times 10^{14n}$ where n is an integer.

Find an expression, in terms of n , for $a^{\frac{3}{2}}$
Give your answer in standard form.

(Total for Question 20 is 3 marks)

