

1 Given that $M = \frac{18^{4n} \times 2^{3(n^2-6n)} \times 3^{2(1-4n)}}{12^2}$

find the values of n for which $M = 2$

(Total for Question 1 is 5 marks)

2 Given that $150^x = 1$

(a) write down the value of x .

$$x = \dots\dots\dots$$

(1)

Given that $3^{-8} \div 3^{-6} = 3^n$

(b) find the value of n .

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

(1)

(Total for Question 2 is 2 marks)

3 (a) Write $5^{17} \times 5^2$ as a single power of 5

.....
(1)

(b) Write 800 as a product of its prime factors.
Show your working clearly.

.....
(2)

(Total for Question 3 is 3 marks)

4 (c) Simplify $(p^2 + 3)^0$

.....
(1)

(Total for Question 4 is 1 marks)

5 (b) Simplify fully $\left(\frac{27a^{12}}{t^{15}}\right)^{-\frac{2}{3}}$

(3)

(Total for Question 5 is 3 marks)

6 (a) Simplify $\frac{9}{2}$

.....
(1)

(b) Write $\frac{\quad}{7^3}$ as a single power of 7

.....
(2)

(Total for Question 6 is 3 marks)

7 (b) Write down the value of g^0

.....
(1)

(Total for Question 7 is 1 marks)

8 (a) Write down the value of y^0

.....
(1)

(Total for Question 8 is 1 marks)

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

(Total for Question 9 is 3 marks)

- 10** (b) Work out the value of $P^3 \times Q$
Give your answer in the form $3^x \times 5^y \times 7^z$ where x , y and z are positive integers.

.....
(2)

(Total for Question 10 is 2 marks)

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

.....
(3)

(Total for Question 11 is 3 marks)

12 (b) Simplify a^0 where $a > 0$

.....
(1)

(c) Simplify fully $\frac{3xy^3}{6^{-2}}$

.....
(2)

(Total for Question 12 is 3 marks)

13 (a) Simplify $8 \times (4t)^0$

.....
(1)

$$x^6 \div x^{-5} = x^p$$

(b) Find the value of p

$$p = \text{.....}$$

(1)

(c) Simplify fully $(2k^2m^4)^3$

.....
(2)

(Total for Question 13 is 4 marks)

14

$$\frac{18 \times (\sqrt{27})^{4n+6}}{6 \times 9^{2n+8}} = 3^x$$

Express x in terms of n

Show your working clearly and simplify your expression.

$x = \dots\dots\dots$

(Total for Question 14 is 3 marks)

15 (a) Simplify $x^4 \times x^5$

.....
(1)

(b) Simplify $(4y^2)^3$

.....
(2)

(c) Factorise $n^2 - 7n + 12$

.....
(2)

(Total for Question 15 is 5 marks)

16 (a) Write down the value of x^0

.....
(1)

Given that $2^{-3} \times 2^9 = 2^n$

(b) find the value of n

$n =$
(1)

Given that $\frac{7^{206} \times 7^m}{7^{214}} = 7^{-3}$

(c) find the value of m

$m =$
(2)

(Total for Question 16 is 4 marks)

17 (a) Simplify $a^7 \times a^4$

.....
(1)

(b) Simplify $w^{15} \div w^3$

.....
(1)

(c) Simplify $(8x^5y^3)^2$

.....
(2)

(d) Make t the subject of $c = t^3 - 8v$

.....
(2)

(Total for Question 17 is 6 marks)

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

.....
(3)

(Total for Question 18 is 3 marks)

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

.....
(1)

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

.....
(2)

(Total for Question 19 is 3 marks)

20 $3^{\frac{1}{2}} \times 3^{\frac{2}{5}} = 3^m$

(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 20 is 2 marks)

21 (a) Write down the value of $(m + 2)^0$ where m is a positive integer.

.....
(1)

(Total for Question 21 is 1 marks)

22 Find the values of n such that

$$\frac{10^{4n} \times 2^{3(n^2-5n)} \times 5^{2(1-2n)}}{20^2} = 1$$

Show clear algebraic working.

(Total for Question 22 is 5 marks)

23 (a) Simplify $m^{10} \div m^3$

.....
(1)

$$k^n \times k^4 = k^{12}$$

(b) Write down the value of n

$n =$
(1)

(c) Simplify $(3x^6y^8)^2$

.....
(2)

(Total for Question 23 is 4 marks)

24 (a) Simplify $(4^{-2})^0$

.....
(1)

$$3^{-14} \times 3^8 = 3^m$$

(b) Find the value of m

$m =$
(1)

(Total for Question 24 is 2 marks)

25 (a) Simplify $(2c^4d^7)^3$

.....
(2)

(b) Find the value of $5y^0$ where $y > 0$

.....
(1)

(c) Factorise fully $16a^2b^3 + 20a^3b$

.....
(2)

(d) (i) Factorise $x^2 + 9x - 22$

.....
(2)

(ii) Hence solve $x^2 + 9x - 22 = 0$

.....
(1)

(Total for Question 25 is 8 marks)