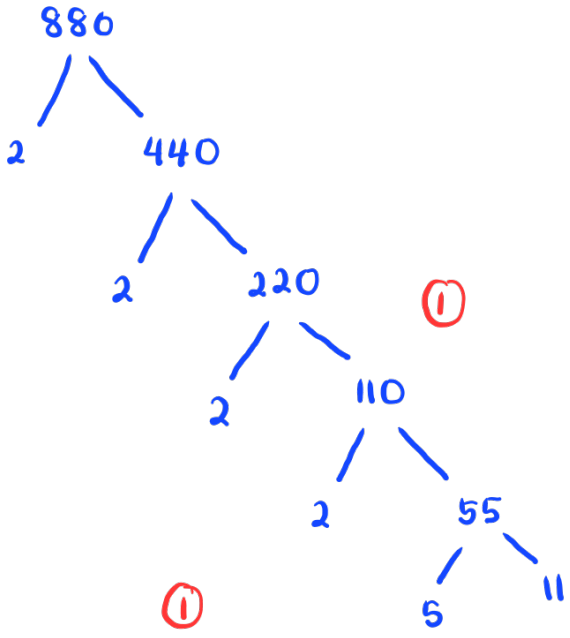
1 Write 880 as a product of powers of its prime factors.
Show your working clearly.

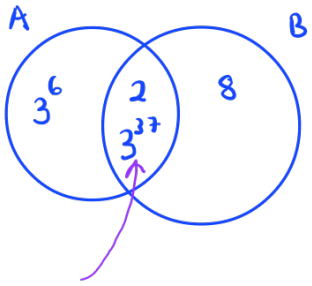


$2^4 \times 5 \times 11$

(Total for Question 1 is 3 marks)

2 $A = 2 \times 3^{43}$
$B = 16 \times 3^{37}$

(a) Find the highest common factor (HCF) of A and B.



HCF of A and B is 2×3^{37}

2×3^{37} (1)

(1)

(b) Express the number $A \times B$ as a product of powers of its prime factors.
Give your answer in its simplest form.

$A = 2 \times 3^{43}$

$B = 16 \times 3^{37}$
$= 2^4 \times 3^{37}$

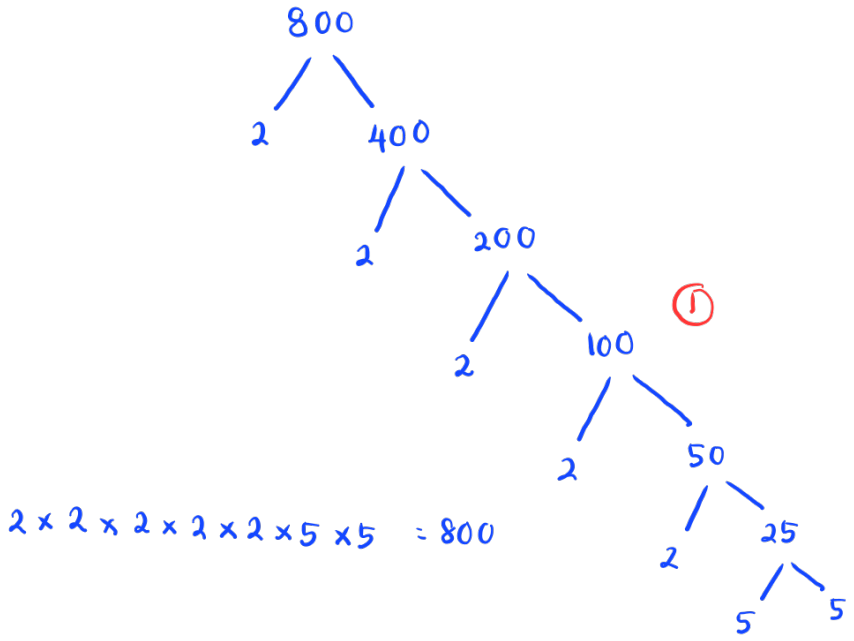
$A \times B = (2 \times 3^{43}) \times (2^4 \times 3^{37})$ (1)
$= 2 \times 2^4 \times 3^{43} \times 3^{37}$
$= 2^{1+4} \times 3^{43+37}$
$= 2^5 \times 3^{80}$ (1)

$2^5 \times 3^{80}$

(2)

(Total for Question 2 is 3 marks)

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



1

2 x 2x2x2x2x5x5 1

(2)

(Total for Question 3 is 2 marks)

4 Find the lowest common multiple (LCM) of 28 and 105

Multiple of 28 : 28, 56, 84, 112, 140, 168, 196, 224, 252, 280, 308, 336, 364, 392, 420 (1)

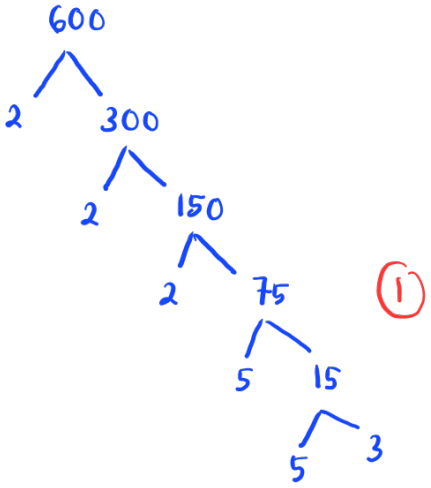
Multiple of 105 : 105, 210, 315, 420

LCM of 28 and 105 is 420. (1)

420

(Total for Question 4 is 2 marks)

5 Write 600 as a product of powers of its prime factors.
Show your working clearly.



$2 \times 2 \times 2 \times 3 \times 5 \times 5$ (1) $= 600$

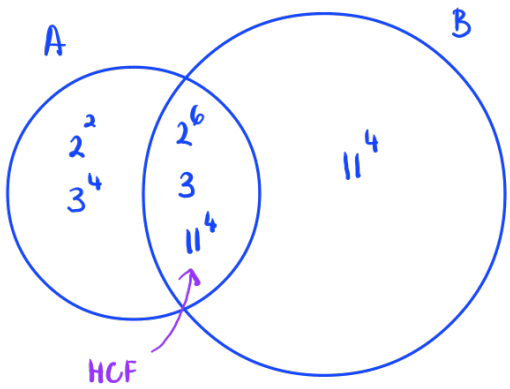
$2^3 \times 3 \times 5^2 = 600$

$2^3 \times 3 \times 5^2$ (1)

(Total for Question 5 is 3 marks)

6 $A = 2^8 \times 3^5 \times 11^4$ $B = 2^6 \times 3 \times 11^8$

(a) Find the highest common factor (HCF) of A and B.



HCF of A and B : $2^6 \times 3 \times 11^4$ (2)

$2^6 \times 3 \times 11^4$

(2)

(b) Find the lowest common multiple (LCM) of $2A$ and $3B$.
Give the LCM as a product of powers of its prime factors.

$2A = 2^9 \times 3^5 \times 11^4$

$3B = 2^6 \times 3^2 \times 11^8$

LCM of 2A and 3B : $2^9 \times 3^5 \times 11^8$ (2)

$2^9 \times 3^5 \times 11^8$

(2)

(Total for Question 6 is 4 marks)

7 $A = 2^3 \times 3^2 \times 5^2 \times 11$
$B = 2^4 \times 3 \times 5^4 \times 13$

Find the lowest common multiple (LCM) of A and B.
Give your answer as a product of powers of prime numbers.

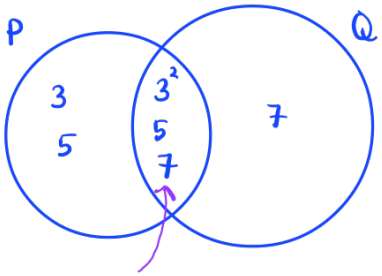
$2^4 \times 3^2 \times 5^4 \times 11 \times 13$ (2)

$2^4 \times 3^2 \times 5^4 \times 11 \times 13$

(Total for Question 7 is 2 marks)

8 $P = 3^3 \times 5^2 \times 7$
$Q = 3^2 \times 5 \times 7^2$

(a) Write down the highest common factor (HCF) of P and Q



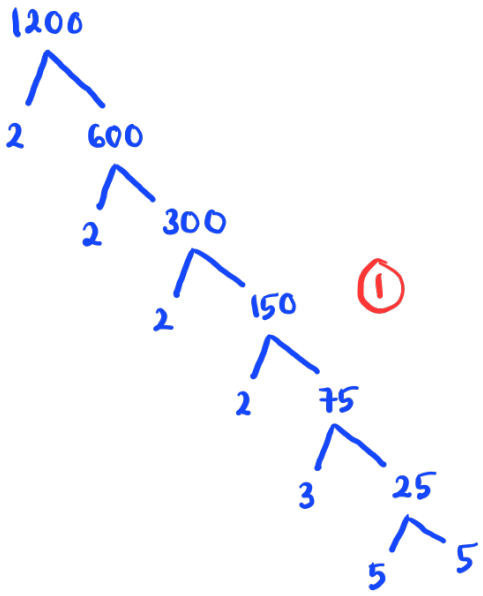
HCF of P and Q = $3^2 \times 5 \times 7$

$3^2 \times 5 \times 7$ (1)

(1)

(Total for Question 8 is 1 marks)

9 Write 1200 as a product of powers of its prime factors.
Show your working clearly.

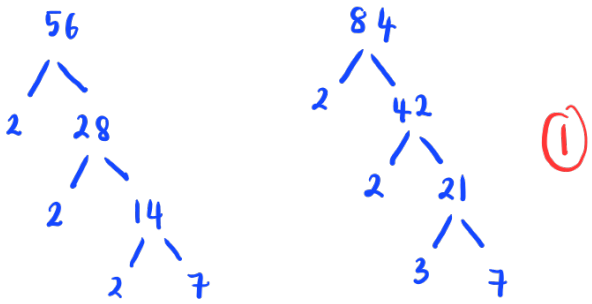


$2 \times 2 \times 2 \times 2 \times 3 \times 5 \times 5 = 2^4 \times 3 \times 5^2$ (1) (1)

$2^4 \times 3 \times 5^2$

(Total for Question 9 is 3 marks)

10 (a) Find the highest common factor (HCF) of 56 and 84
Show your working clearly.



(1)

HCF : $2 \times 2 \times 7 = 28$ (1)

28

(2)

(b) Find the lowest common multiple (LCM) of 60 and 72
Show your working clearly.

multiple of 60 : 60, 120, 180, 240, 300, 360

multiple of 72 : 72, 144, 216, 288, 360 (1)

360 (1)

(2)

(Total for Question 10 is 4 marks)

11 (a) Work out the lowest common multiple (LCM) of 36 and 120

multiples of 36 : 36 , 72 , 108 , 144 , 180 , 216 , 252 , 288 , 324 , 360

multiples of 120 : 120 , 240 , 360 (1)

360 (1)

(2)

$A = 5^2 \times 7^4 \times 11^p$
$B = 5^m \times 7^{n-5} \times 11$

m, n and p are integers such that
$m > 2$
$n > 10$
$p > 1$

(b) Find the highest common factor (HCF) of A and B
Give your answer as a product of powers of its prime factors.

HCF of A and B : $5^2 \times 7^4 \times 11$

$5^2 \times 7^4 \times 11$ (2)

(2)

(Total for Question 11 is 4 marks)

12 Find the lowest common multiple (LCM) of 28, 42 and 63
Show your working clearly.

multiples :

28 = 28, 56, 84, 112, 140, 168, 196, 224, 252

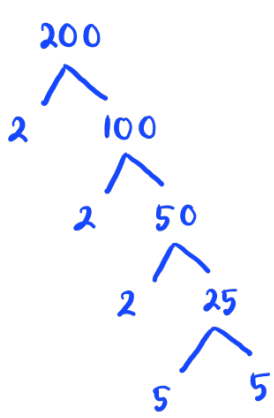
42 = 42, 84, 126, 168, 210, 252 (1)

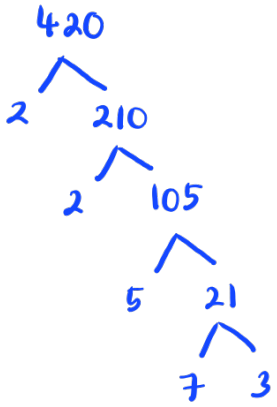
63 = 63, 126, 189, 252 (1)

(1) 252

(Total for Question 12 is 3 marks)

13 (a) Find the highest common factor (HCF) of 200 and 420





$200 = 2^3 \times 5^2$ (1) $420 = 2^2 \times 5 \times 7 \times 3$

HCF $= 2^2 \times 5$

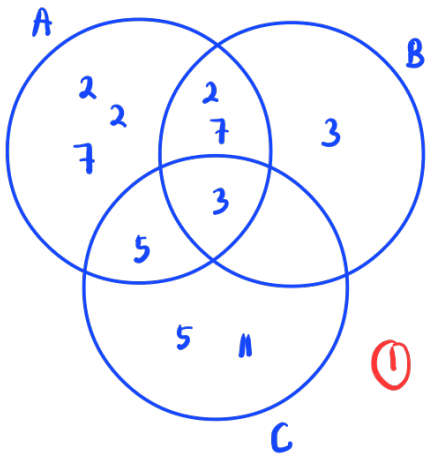
$= 20$ (1)

20

(2)

$A = 2^3 \times 3 \times 5 \times 7^2$
$B = 2 \times 3^2 \times 7$
$C = 3 \times 5^2 \times 11$

(b) Find the lowest common multiple (LCM) of A, B and C
Write your answer as a product of powers of prime factors.



(1)

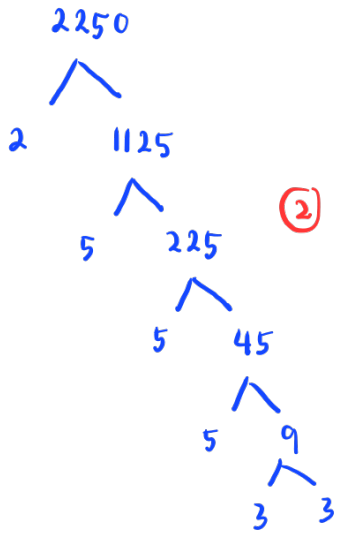
$2^3 \times 3^2 \times 5^2 \times 7^2 \times 11$ (1)

$2^3 \times 3^2 \times 5^2 \times 7^2 \times 11$

(2)

(Total for Question 13 is 4 marks)

14 Write 2250 as a product of powers of its prime factors.
Show your working clearly.



(2)

$2 \times 3^2 \times 5^3 = 2250$

(1)

$2 \times 3^2 \times 5^3$

(Total for Question 14 is 3 marks)

15 Sandeep wants to buy some packets of pens and some boxes of pencils for his stationery shop.

Each packet of pens contains 9 pens.
Each box of pencils contains 12 pencils.

Each packet of pens costs £7.60
Each box of pencils costs £4.80

Sandeep can only buy full packets of pens and full boxes of pencils.
He wants to buy exactly the same number of pens as pencils.

Work out the minimum amount Sandeep needs to pay.

Multiples of 9 and 12 :

pens : 9 , 18 , 27 , (36) (4 packets)

pencils : 12 , 24 , (36) (1) (3 boxes)

4 (7·60) + 3 (4·80) (1)

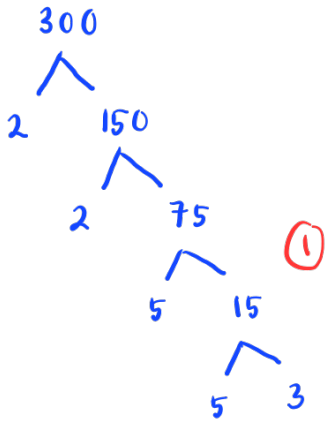
= 30·40 + 14·40 (1)

= 44·80 (1)

£ 44·80

(Total for Question 15 is 4 marks)

16 (a) Write 300 as a product of its prime factors.
Show your working clearly.



$2 \times 2 \times 3 \times 5 \times 5 = 300$ (1)

(1)

$2 \times 2 \times 3 \times 5 \times 5$

.....

(2)

$A = 2 \times 2 \times 2 \times 3 \times 3 \times 5$

$B = 2 \times 2 \times 3 \times 3 \times 3 \times 5$

(b) Find the lowest common multiple (LCM) of $5A$ and $7B$
Show your working clearly.

$5A : 2^3 \times 3^2 \times 5^2 = 1800$ (1)

$7B : 2^2 \times 3^3 \times 5 \times 7 = 3780$

LCM of 5A and 7B $= 2^3 \times 3^3 \times 5^2 \times 7$

$= 8 \times 27 \times 25 \times 7$

$= 37\,800$ (1)

37800

.....

(2)

(Total for Question 16 is 4 marks)