1 Find the lowest common multiple (LCM) of 20 and 35

List multiples of each

Split numbers into common factors

20

10   2

2   5

35

7   5

↳ This has already been included

OR
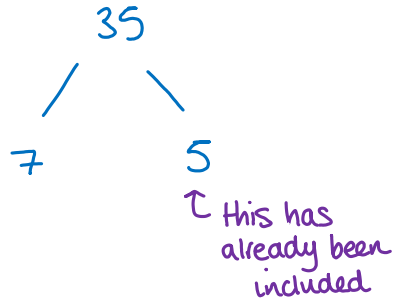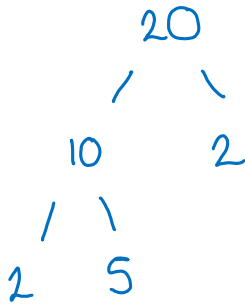
20	35
40	70
60	105
80	(140)
100	
120	
(140)	

$2 \times 2 \times 5 \times 7 = 140$

140

(Total for Question 1 is 2 marks)

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

880

2   440

2   220

2   110

2   55

5   11
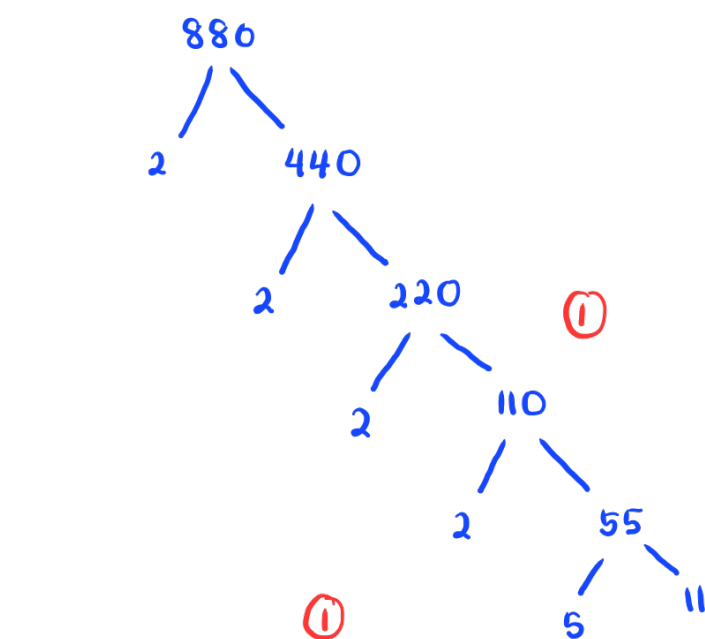
$2 \times 2 \times 2 \times 2 \times 5 \times 11 = 880$
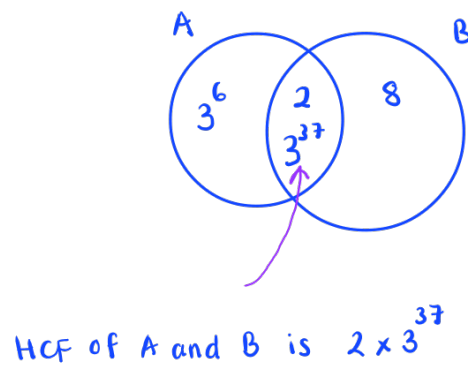
$2^4 \times 5 \times 11 = 880$

$2^4 \times 5 \times 11$

(Total for Question 2 is 3 marks)

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

(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 3 is 3 marks)

4 (a) Write down all the factors of 9

1, 3, 9

1, 3, 9 ①

(1)

(b) Find the lowest common multiple (LCM) of 15 and 70

Multiples of 15 : 15, 30, 45, 60, 75, 90, 105, 120, 135, 150, 165, 180, 195, ⑵10

①

Multiples of 70 : 70, 140, ⑵10

Lcm of 15 and 70 is 210 . ①

210

(2)

(Total for Question 4 is 3 marks)

5   (b) Write down a common factor of 20 and 30

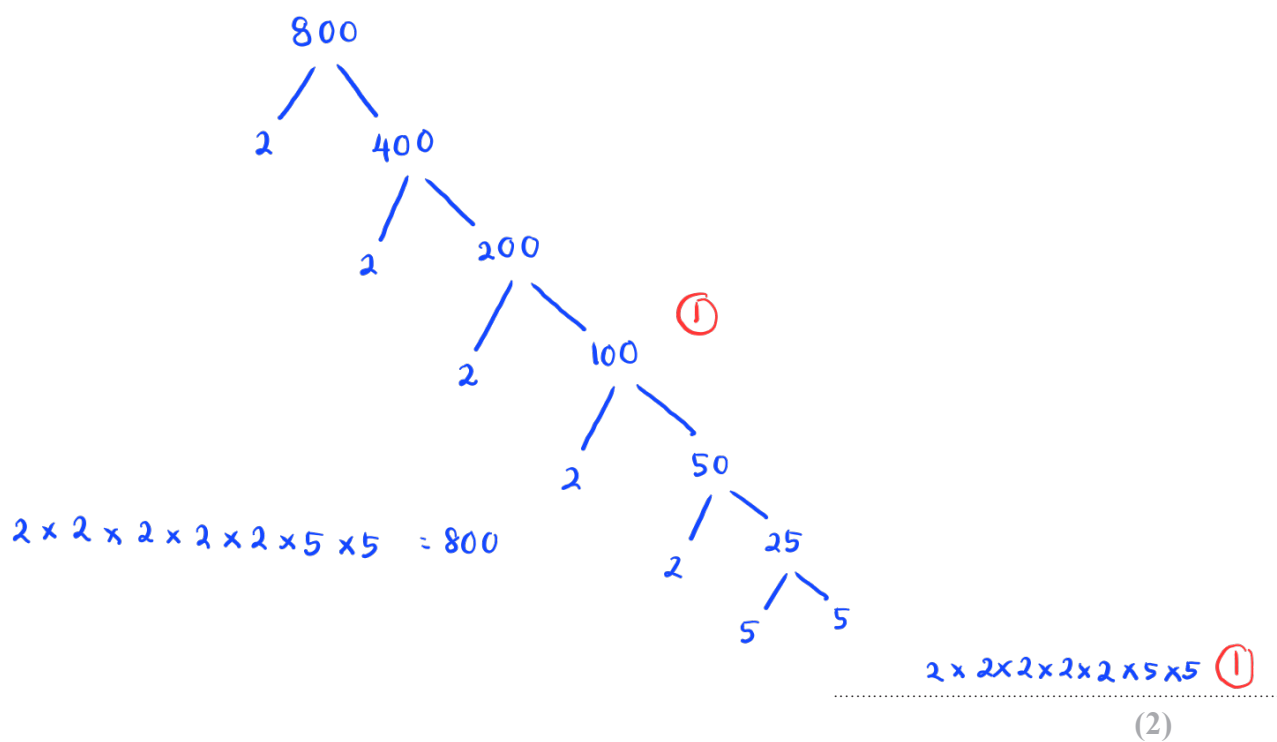factor of 20 : ①,②, 4 ,⑤,⑩, 20

factor of 30 : ①,②, 3 ,⑤, 6 ,⑩, 15 , 30

1, 2, 5, 10 ①
....
(1)

(Total for Question 5 is 1 marks)

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

800

2   400

2   200

①

2   100

2   50

2   25

5   5

$2 \times 2 \times 2 \times 2 \times 2 \times 5 \times 5 = 800$

$2 \times 2 \times 2 \times 2 \times 2 \times 5 \times 5$ ①

(2)

(Total for Question 6 is 2 marks)

7 (a) Find the highest common factor (HCF) of 28 and 70

Factor of 28 : 1, 2, 4, 7, (14) 28   ①

Factor of 70 : 1, 2, 5, 7, 10, (14), 35, 70

HCF of 28 and 70 is 14. ①

14
....
(2)

(b) 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
....
(2)

(Total for Question 7 is 4 marks)

8

8	9	17	35	48	80

From the numbers in the box, write down

(a) a factor of 40

.... **8** ①

(1)

(b) a multiple of 7

.... **35** ①

(1)

(c) a prime number

.... **17** ①

(1)

(d) a square number

$3^2 = 9$

.... **9** ①

(1)

(e) the two numbers with a difference of 31

$48 - 17 = 31$

.... **48** .... and .... **17** ①

(1)

(Total for Question 8 is 5 marks)

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

$$600$$
$$2 \quad 300$$
$$2 \quad 150$$
$$2 \quad 75 \quad ①$$
$$5 \quad 15$$
$$5 \quad 3$$
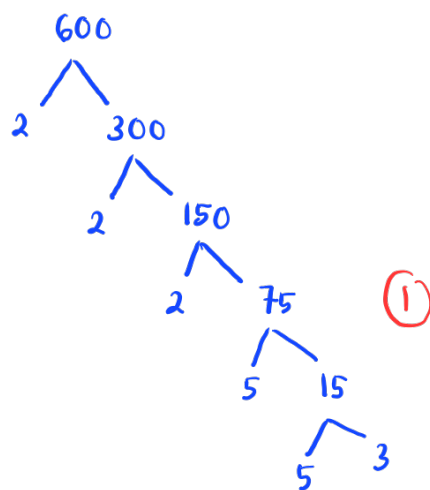
$$2 \times 2 \times 2 \times 3 \times 5 \times 5 \, ① = 600$$

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

$$2^3 \times 3 \times 5^2 \, ①$$

....

(Total for Question 9 is 3 marks)

10 $A = 2^8 \times 3^5 \times 11^4$ $B = 2^6 \times 3 \times 11^8$

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

A

B

2^2

3^4

2^6

3

11^4

11^4

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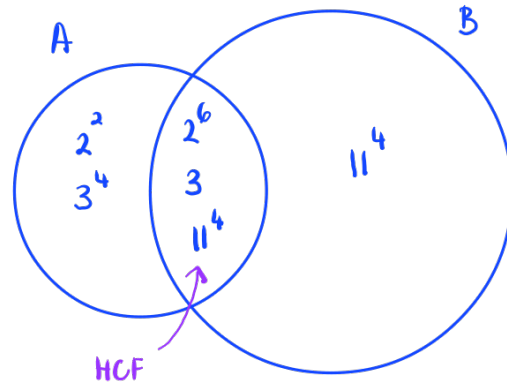
HCF of A and B : $2^6 \times 3 \times 11^4$ ②

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

....

(2)

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

$2A = \left(2^9\right) \times \left(3^5\right) \times 11^4$

$3B = 2^6 \times 3^2 \times \left(11^8\right)$

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 10 is 4 marks)

11 (c) Which of the five numbers on the discs are factors of 21?

1, 3 ②

(2)

(d) Which of the five numbers on the discs are prime numbers?

2, 3 ②

(2)

(Total for Question 11 is 4 marks)

12   Here is a list of numbers in a box.

6	8	17	36	44	76	91

From the numbers in the list, write down

(a) a multiple of 11

44

(1)

(b) a factor of 30

6

(1)

(c) a square number

36

(1)

(d) a prime number

17

(1)

(e) two numbers whose sum is 84

76 + 8 = 84

76 and 8

(1)

(Total for Question 12 is 5 marks)

13

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

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 13 is 2 marks)

14   Here is a list of seven numbers.

$$5 \qquad 16 \qquad 23 \qquad 27 \qquad 50 \qquad 160 \qquad 240$$

(a) From the numbers in the list, write down

(i) a cube number

$3^3 = 27$

.... 27 (1)

(1)

(ii) a factor of 80

Factor of 80: 1, 2, 4, (5), 8, 10, (16), 20, 40, 80

.... 5, 16 (1)

(1)

Two numbers in the list are prime numbers.

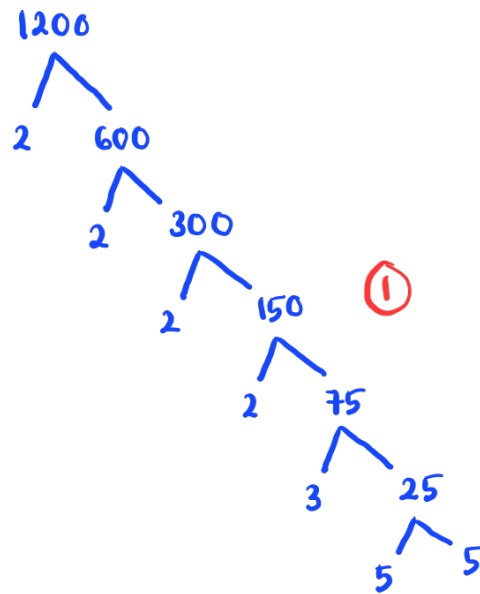(b) Work out the sum of these two prime numbers.

Prime numbers: 5, 23 (1)

$5 + 23 = 28$ (1)

.... 28

(2)

(Total for Question 14 is 4 marks)

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

1200

2   600

2   300   ①

2   150

2   75

3   25

5   5

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

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

(Total for Question 15 is 3 marks)

16 Here is a list of numbers.

$$3 \quad 6 \quad 7 \quad 8 \quad 11 \quad 25 \quad 27$$

(a) From the numbers in the list, write down

(i) an even number

6 or 8 ①

(1)

(ii) a multiple of 9

27 ①

(1)

(iii) a square number

25 ①

(1)

(iv) a prime number

3 or 7 or 11 ①

(1)

(b) Use brackets to make the statement correct.
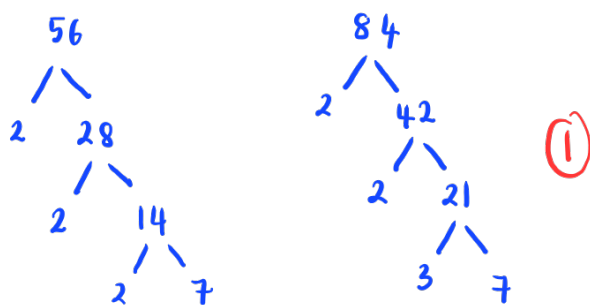You may use more than one pair of brackets in the statement.

$$\left(2^2 + 5\right) \times \left(2 + 3^2\right) = 99$$

①

(1)

(Total for Question 16 is 5 marks)

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

56
/ \
2   28
   / \
   2   14
      / \
      2   7

84
/ \
2   42
   / \
   2   21
      / \
      3   7

①

HCF : 2×2×7 = 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 17 is 4 marks)

18 (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

360

(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)

(Total for Question 18 is 4 marks)

19 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) ①

42 = 42, 84, 126, 168, 210, (252) ①

63 = 63, 126, 189, (252) ①

① 252

(Total for Question 19 is 3 marks)

20 (a) Write down all the factors of 10

1, 2, 5, 10 ①

(1)

(b) Find the lowest common multiple (LCM) of 18 and 60

multiples :

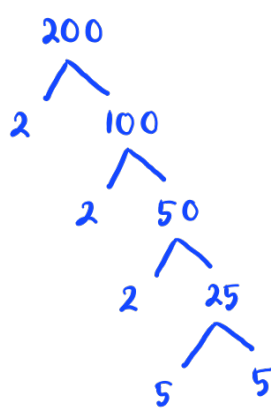18 : 18, 36, 54, 72, 90, 108, 126, 144, 162, ⑱⓪

60 : 60, 120, ⑱⓪   ①

180   ①

(2)

(Total for Question 20 is 3 marks)
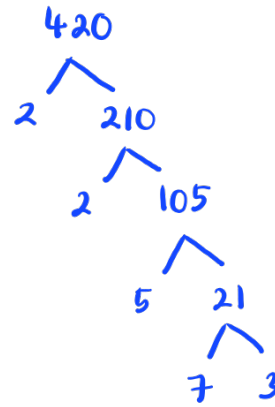
21 (a) Find the highest common factor (HCF) of 200 and 420

200

2   100

2   50

2   25

5   5

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

420

2   210

2   105

5   21

7   3
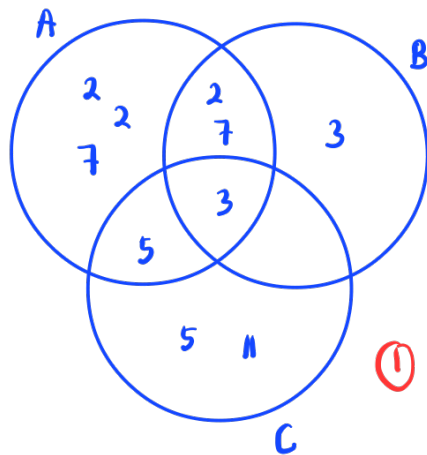
$HCF = 2^2 \times 5$

$= 20$ 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
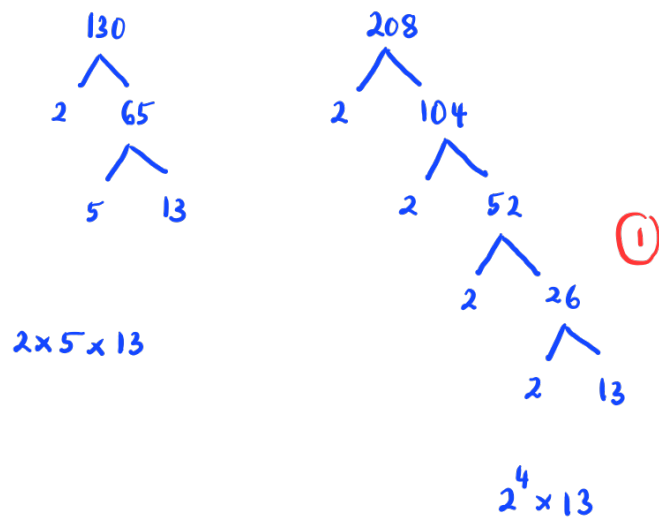Write your answer as a product of powers of prime factors.

A

2
2
7

2
7   3

3

5

5   11

①

B

C

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

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

....

(2)

(Total for Question 21 is 4 marks)

22 (b) Find the highest common factor (HCF) of 130 and 208
Show your working clearly.

130   208

2   65   2   104

    5   13   2   52

                       2   26   ①

$2 \times 5 \times 13$

                         2   13

                   $2^4 \times 13$

$HCF = 2 \times 13 = 26$ ①

26

....

(2)

(Total for Question 22 is 2 marks)

23 (a) Write down the prime number that lies between 90 and 100

97 ①

....

(1)

(b) Find the cube root of 79 507

$\sqrt[3]{79\,507} = 43$

43 ①

....

(1)

(c) Work out the value of $4^2 \times 5^3$

16 × 125 = 2000
   ①   ①

2000

....

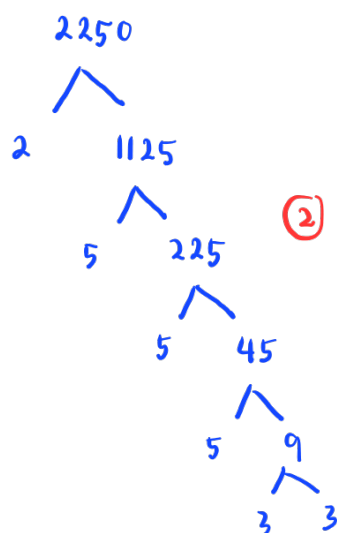**(2)**

(Total for Question 23 is 4 marks)

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

2250

2   1125   ②

5   225

5   45

5   9

3   3

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

①

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

(Total for Question 24 is 3 marks)

25 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)
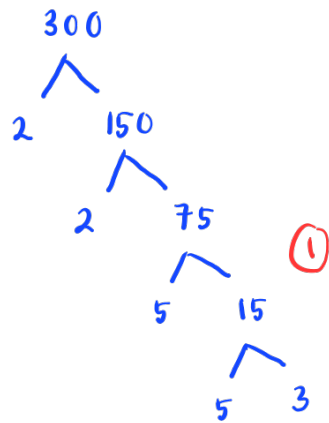
4 (7·60) + 3 (4·80) (1)

= 30·40 + 14·40 (1)

= 44·80 (1)

44·80

£ ....

(Total for Question 25 is 4 marks)

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

$$300$$

2   150

2   75   ①

5   15

5   3

$2 \times 2 \times 3 \times 5 \times 5 = 300$

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

37 800

(2)

(Total for Question 26 is 4 marks)