ST EDWARD'S, OXFORD

Department of Mathematics

14+ Entrance Exam

For Entry in September 2018

Instructions

- 70 Marks
- 1 Hour
- There are 17 questions
- Calculators are allowed
- Write all answers, including your workings, in this booklet.
Q1.
(a) Simplify
(i) \(a \times a \times a \times a\), ...........................................................

(ii) \(5a \times 6b\), ...........................................................

(iii) \(q^8 + q^2\). ...........................................................

(b) Solve \(5 - 2y = 12\)

\[y = \ldots \] ...........................................................

(c) \(v = w^2 - 2w\).
Work out the value of \(v\) when \(w = 6\)

\[v = \ldots \] ...........................................................

(Total for question = 7 marks)

Q2.
There are 6 batteries in a small packet of batteries.
There are 9 batteries in a large packet of batteries.
Chow buys \(m\) small packets of batteries and \(g\) large packets of batteries.
The total number of batteries Chow buys is \(T\).
Write down a formula, in terms of \(m\) and \(g\), for \(T\).

\[\ldots\] ...........................................................

(Total for question = 3 marks)
Q3.
(a) Factorise fully $18e^3f + 45e^2f^4$

(b) Solve $x^2 - 4x - 12 = 0$
   Show clear algebraic working.

Q4.
(a) $A = 2^2 \times 3 \times 5^2$
    $B = 2^3 \times 5$
    (i) Find the Highest Common Factor (HCF) of $A$ and $B$.

    (ii) Find the Lowest Common Multiple (LCM) of $A$ and $B$.

(b) $\frac{8^2 \times 8^3}{8^4} = 2^n$
    Find the value of $n$. 

   $n = \text{..........................}$
Q5.

(a) Simplify, leaving your answers in index form,

(i) \(6^5 \times 6^2 \times 6\)

(ii) \((9^7)^2\)

\[\frac{5^n \times 5^3}{5^5} = 5^4\]

(b) Find the value of \(n\).

\[n = \text{...........................................................}\]

(2)

(Total for question = 4 marks)

Q6.

Change £50 to yen.

\[\begin{array}{|c|c|}
\hline
1 \text{ euro} & = 120 \text{ yen} \\
\hline
£1 & = 1.2 \text{ euros} \\
\hline
\end{array}\]

........................................................... yen

(Total for question = 2 marks)

Q7. Manu, Liam and Ned share £420 in the rations 4 : 5 : 3

Liam then gives Ned £75

Express the amount of money that Ned now has as a percentage of the £420

Give your answer correct to the nearest whole number.

........................................................... %

(Total for question = 4 marks)
Q8.
Nigel bought 12 boxes of melons.
He paid $15 for each box.
There were 12 melons in each box.

\[
\frac{3}{4}
\]
Nigel sold \( \frac{3}{4} \) of the melons for $1.60 each.
He sold all the other melons at a reduced price.
He made an overall profit of 15%

Work out how much Nigel sold each reduced price melon for.

\[
\text{Total for question} = 5 \text{ marks}
\]

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Q9.
The mean of four numbers is 2.6
One of the four numbers is 5

Find the mean of the other three numbers.

\[
\text{Total for Question} \text{ is 3 marks}
\]
Q10.
Lisa sees a dress in a sale.
The normal price of the dress is $45
The price of the dress is reduced by 12% in the sale.

(a) Work out the price of the dress in the sale.

$ ...........................................................

(3)

Lisa's weekly pay increases from $525 to $546

(b) Calculate her percentage pay increase.

........................................................... %

(3)

(Total for question = 6 marks)

Q11.
Three integers have a mean of 7, a median of 5 and a range of 14
Find the three integers.

..............................    ..............................    ..............................

(Total for question = 2 marks)
Q12.

The shape $ABCD$ is made from a rectangle $ANCD$ and the right-angled triangle $NBC$.

$ANB$ is a straight line.

$AN = 9$ cm.

$NB = 5$ cm.

The area of rectangle $ANCD$ is $36$ cm$^2$.

Work out the area of shape $ABCD$.

........................................................................... cm$^2$

(Total for question = 4 marks)

Q13.

Make $t$ the subject of $5(t - g) = 2t + 7$

...........................................................................

(Total for question = 3 marks)
Q14.

(a) Solve the simultaneous equations

\[3x + 5y = 14\]
\[4x + 3y = 4\]

Show clear algebraic working.

\[x = \ldots..................\]
\[y = \ldots..................\]

(b) Write down the coordinates of the point of intersection of the two lines whose equations are \(3x + 5y = 14\) and \(4x + 3y = 4\)

\((\ldots.................., \ldots..................)\)

(Total for Question is 5 marks)
Q15.

A washing line is attached at points A and B on two vertical posts standing on horizontal ground.

Point A is 2.1 metres above the ground on one post.

Point B is 1.7 metres above the ground on the other post. The horizontal distance between the two posts is 6 metres.

Calculate the distance $AB$.

Give your answer correct to 3 significant figures.

........................................................... m

(Total for question = 4 marks)
Work out the area of the triangle.
Give your answer correct to 3 significant figures.

\[
\text{Area} = \frac{1}{2} \times 14 \text{ cm} \times h
\]

Diagram NOT accurately drawn

\[
\text{cm}^2
\]

(Total for question = 4 marks)
Q17.

The diagram shows a triangle.

The lengths of the sides of the triangle are $3x$ cm, $(3x - 5)$ cm and $(4x + 2)$ cm.

The perimeter of the triangle is 62 cm.

Work out the value of $x$.
Show clear algebraic working.

$$x = \text{...........................................................}$$

(Total for question = 4 marks)