Rewarding Learning

Candidate Number

General Certificate of Secondary Education
2013

Mathematics

Unit T6 Paper 2
(With calculator)
Higher Tier

[GMT62]

GMT62

FRIDAY 14 JUNE, 10.45 am – 12.00 pm

TIME

1 hour 15 minutes.

INSTRUCTIONS TO CANDIDATES

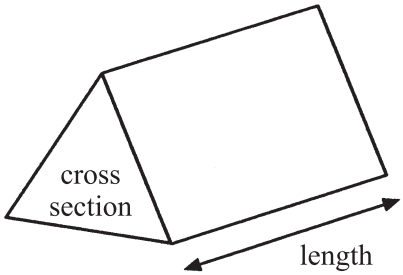
Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
You must answer the questions in the spaces provided. Do not write outside the box, around each page, on blank pages or tracing paper.
Complete in blue or black ink only. **Do not write with a gel pen.**
Answer **all fifteen** questions.
Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.
You **may** use a calculator for this paper.

INFORMATION FOR CANDIDATES

The total mark for this paper is 50.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
Functional Elements will be assessed in this paper.
Quality of written communication will be assessed in **question 15**.
You should have a calculator, ruler, compasses and protractor.
The Formula Sheet is on page 2.

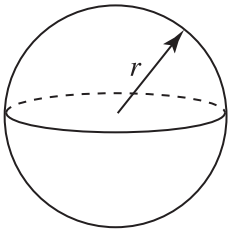
Formula Sheet

Volume of prism = area of cross section × length



Volume of sphere $= \frac{4}{3}\pi r^3$

Surface area of sphere $= 4\pi r^2$

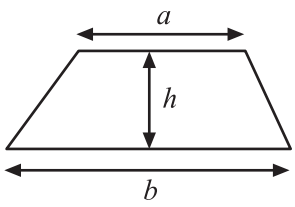


Quadratic Equation

The solutions of $ax^2 + bx + c = 0$
where $a \neq 0$, are given by

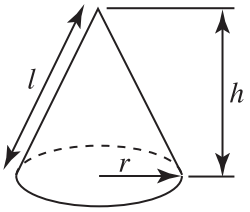
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Area of trapezium $= \frac{1}{2}(a+b)h$

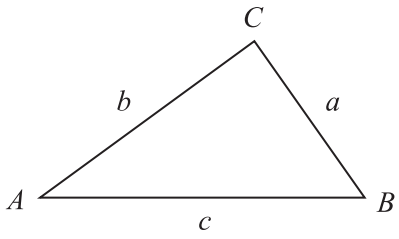


Volume of cone $= \frac{1}{3}\pi r^2 h$

Curved surface area of cone $= \pi r l$



In any triangle *ABC*



Sine Rule: $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

Cosine Rule: $a^2 = b^2 + c^2 - 2bc\cos A$

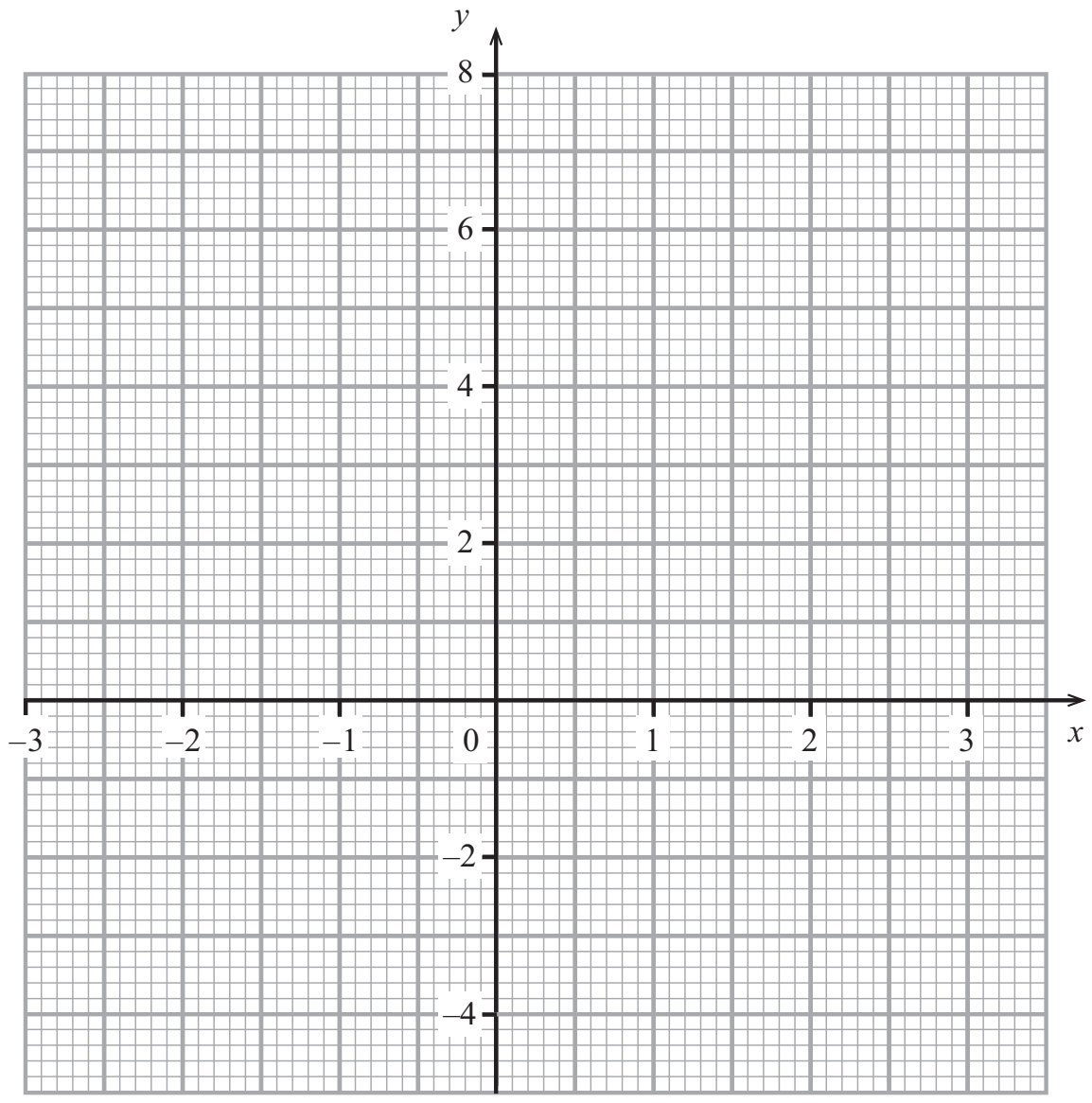
Area of triangle $= \frac{1}{2}ab\sin C$

1 **(a)** Complete the table for $y = 6 - x^2$

x	–2	–1	0	1	2	3
$y = 6 - x^2$		5	6	5	2	–3

[1]

(b) Draw the graph of $y = 6 - x^2$



[2]

Examiner Only	
Marks	Remark
Total Question 1	

8172

[Turn over

2 On the way to school Sean stops at the shop. When he goes to pay for a drink he finds he has forgotten his money. He runs back home to get it and arrives home at 8.35 am.

The graph opposite shows his journey.

(a) What was Sean's average speed running home in km/h?

Answer _____ km/h [2]

On his way home Sean meets his sister Maura on her way to school.

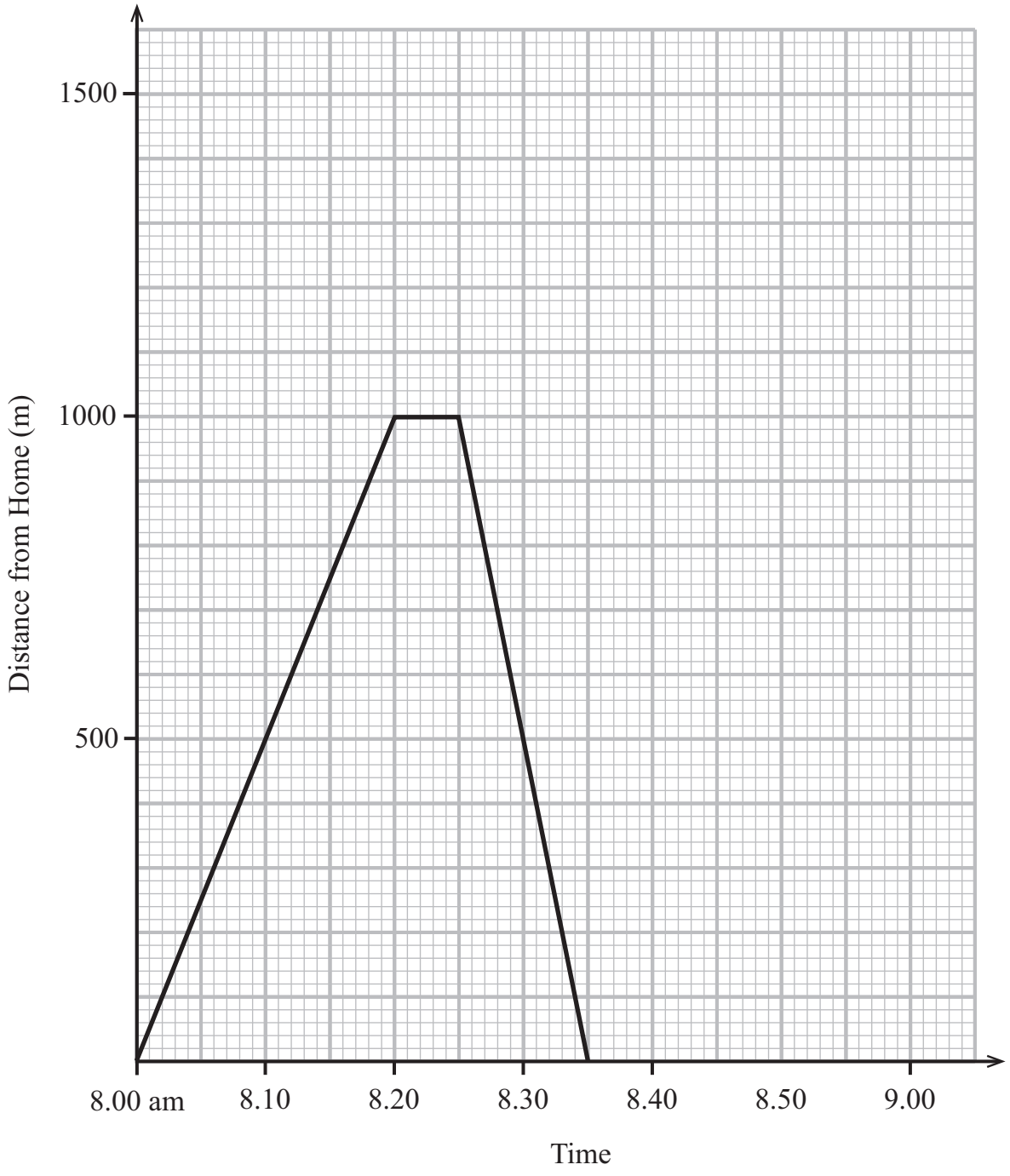
She left home at 8.15 am and arrives in school which is 1500 m away at 8.50 am.

(b) Draw on the graph Maura's journey to school. [1]

(c) At what time does Sean meet Maura?

Answer _____ am [1]

Examiner Only	
Marks	Remark
Total Question 2	



[Turn over

3 Use your calculator to find the value of

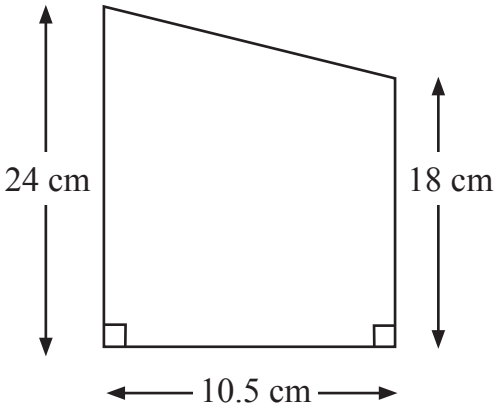
$$\frac{3.862 + 42.19}{23.17 - 5.967}$$

Give your answer correct to one decimal place.

Answer _____ [2]

Examiner Only	
Marks	Remark
Total Question 3	

4 Calculate the area of the trapezium shown.



Give your answer to an appropriate degree of accuracy.

Answer _____ cm^2 [3]

Total Question 4	

5 A car travels 450 km in 6 hours 15 minutes.

Calculate its average speed in km/h.

Answer _____ km/h [3]

Examiner Only	
Marks	Remark
Total Question 5	

[Turn over

6 For a charity event pupils in a school were asked to guess how many sweets were in a jar.

The pupils paid 10p for a guess and the results were collected in a table.

Number of sweets guessed	Frequency
50–75	24
76–100	86
101–125	113
126–150	97

(a) Calculate the probability that the guess was greater than 100

Answer _____ [2]

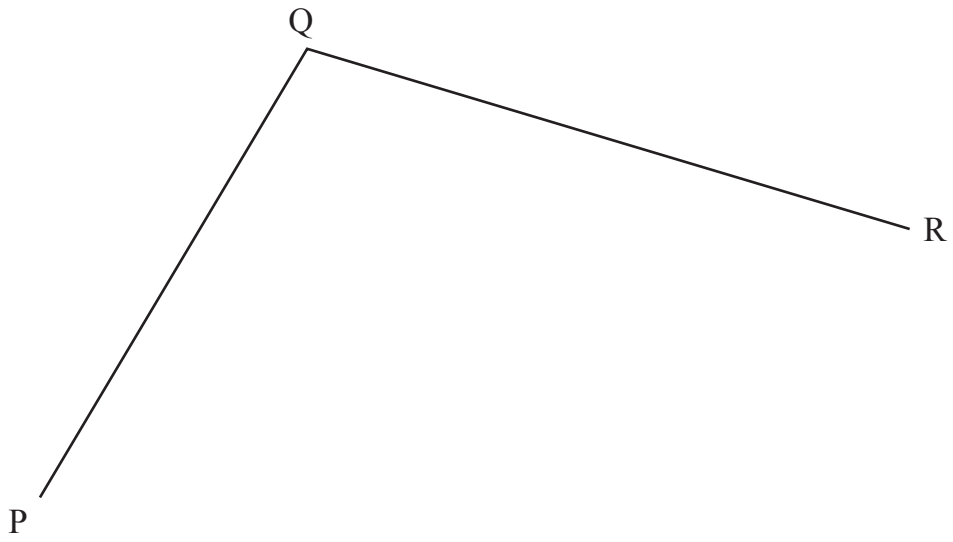
No one guessed the correct number of sweets and it was decided that everyone who guessed within 5 of the correct answer would get a prize of 50p. The probability of someone guessing within 5 turned out to be 0.05 and the sweets originally cost £5

(b) How much profit was made and passed on to the charity?

Answer £ _____ [2]

Examiner Only	
Marks	Remark
Total Question 6	

7 Using **ruler and compasses only** bisect the angle PQR shown.



[2]

Examiner Only	
Marks	Remark
Total Question 7	

8 The angles in a triangle are in the ratio of 3 : 5 : 7

Work out the sizes of the angles in the triangle.

Answer _____ , _____ , _____ [3]

Total Question 8

[Turn over

9 A small gold bar has a cross-sectional area of 8 cm^2 and a length of 5.5 cm.
The mass of the bar is 849 g.
Find the density of the gold.

Answer _____ g/cm^3 [3]

Examiner Only	
Marks	Remark
Total Question 9	

10 Solve $4x - 10 < 5$

Answer _____ [2]

Total Question 10	

11 The speed of light is approximately 2.9979×10^8 m/s.
The speed of sound is approximately 3.4×10^2 m/s.
Work out how many times faster the speed of light is than the speed of sound.
Give your answer in standard form, correct to 2 significant figures.

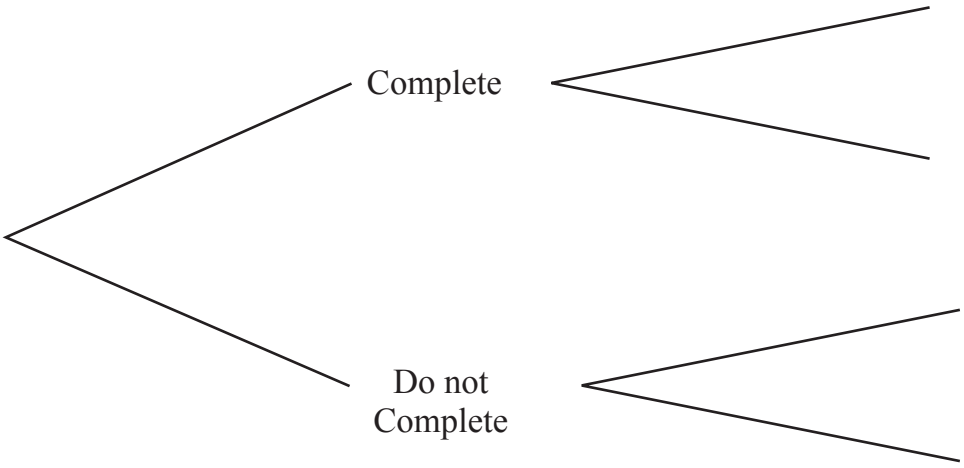
Answer _____ [2]

Examiner Only	
Marks	Remark
Total Question 11	

[Turn over

12 A maths teacher estimates that the probability of a student obtaining a grade A in their final examination is improved if they complete all their assignments throughout the year. Two thirds of his class complete all the assignments and their probability of getting grade A is 0.6
For those who do not complete the assignments the probability of getting grade A is 0.3

(a) Complete the tree diagram below to show this information.



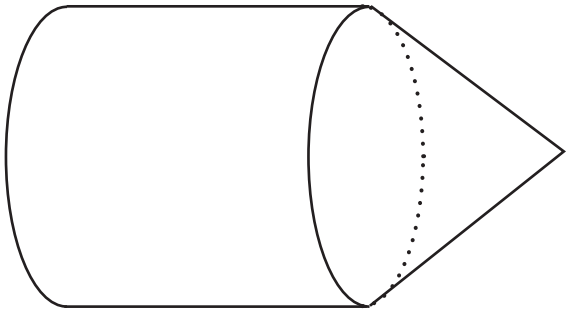
[3]

(b) Calculate the probability that a student taken at random from the class will get a grade A.

Answer _____ [3]

Examiner Only	
Marks	Remark
Total Question 12	

13 A solid is formed by attaching a cylinder to a cone.
The cylinder has a base radius of 3 cm and a height of 7.2 cm.
The slant height of the cone is 4.2 cm.
Find the total surface area of the solid.

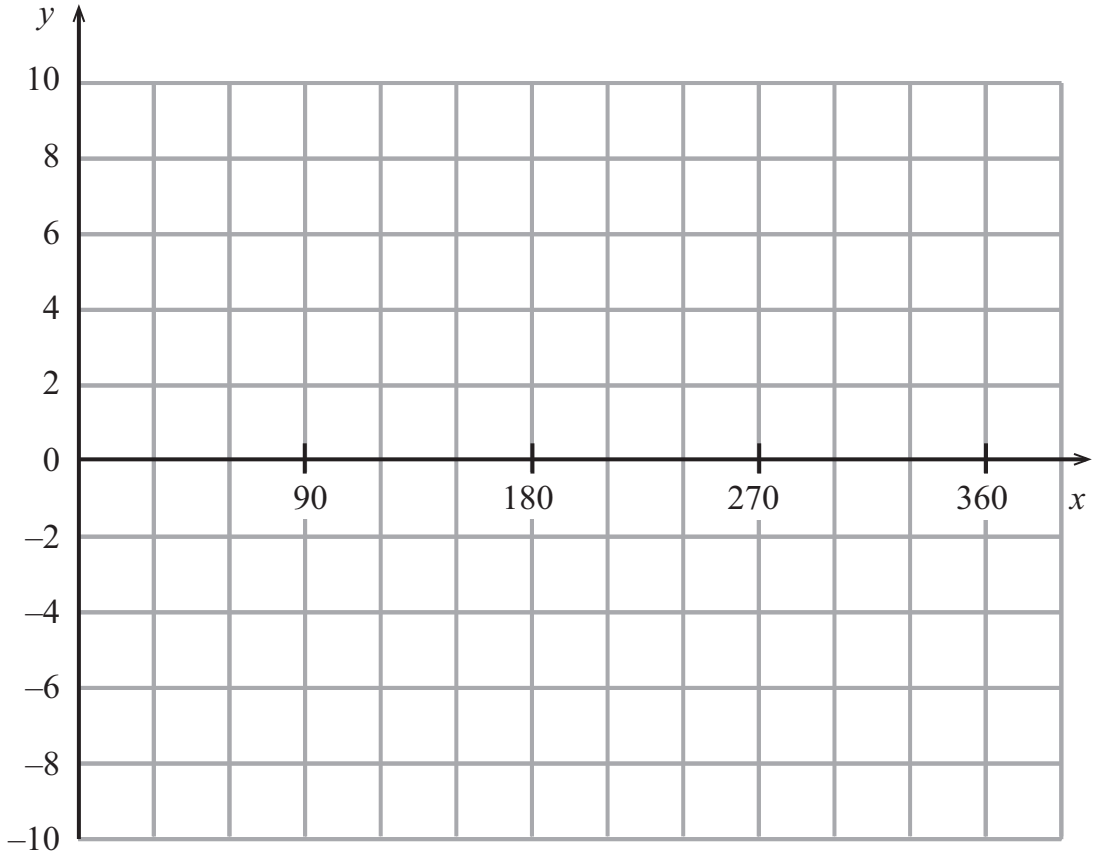


Answer _____ cm^2 [4]

Examiner Only	
Marks	Remark
Total Question 13	

[Turn over

14



(a) Sketch the graph of $y = \tan x$ on the axes provided. [3]

(b) Use the graph to find solutions of

$$\tan x + 4 = 0$$

for $0 \leqslant x \leqslant 360°$

Answer _____ [2]

Examiner Only	
Marks	Remark
Total Question 14	

Quality of written communication will be assessed in this question.

15 Simplify $\left(\frac{n}{n+1}\times\frac{n}{n+2}\right)\div\left(\frac{n}{n+1}-\frac{n}{n+2}\right)$

[4]

Examiner Only	
Marks	Remark
Total Question 15	

THIS IS THE END OF THE QUESTION PAPER

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For Examiner's use only	
Question Number	**Marks**
1	
2	
3	
4	
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7	
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9	
10	
11	
12	
13	
14	
15	
Total Marks	

Examiner Number