Upper Primary
Years 5 & 6
(Australian school years)

INSTRUCTIONS

• Do not open the CAT paper until told to do so.
• Maintain silence at all times.
• Do not bring mobile phones into the room.
• You may use calculators and printed language dictionaries.
• You may NOT borrow equipment without a supervisor’s permission.
• There are 15 questions. Questions 1–6 are multiple-choice with five possible answers given. Questions 7–15 require a three-digit answer. Attempt all questions. Penalties do not apply.
• You are allowed working time of one hour (60 minutes). There is no extra reading time.
• This is a competition not a test; do not expect to answer all questions.
• Diagrams are NOT drawn to scale. They are intended only as aids.
• The questions have been thoroughly checked. Each question stands as written. No further explanation of questions can be provided.
• You must not leave your seat. If you have any other questions or problems, please raise your hand and wait for a supervisor.
• If you wish to leave the room a supervisor must accompany you.
• Record all your answers on the answer sheet provided.
• Use B or 2B lead pencils only. Ball point and ink pen markings may not activate the optical scanner.
• Do not make any other marks on the answer sheet as these may make the sheet unreadable.
• If you make an error, use a plastic eraser to completely remove all lead marks and smudges.
• Check the number of the answer you are filling in is the same as the number of the question you are answering. This is particularly important if you decide to leave a question blank.
• To ensure the integrity of the CAT and to identify outstanding students, the AMT reserves the right to re-examine students before deciding whether to grant official status to their score.

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Part A: Questions 1–6

Each question should be answered by a single choice from A to E. Questions are worth 3 points each.

1. Double to Evens

Anna likes even numbers. She plays a number game on her special *Doubles Calculator*. The only button on the calculator doubles the number entered.

She likes to count how many times she has to press the button to get a number with only even digits. For instance, if she starts with 17, she would have to press the button twice, getting 34 and then 68.

If she starts with 9, how many button presses would she need to get to a number with only even digits?

(A) 2  (B) 3  (C) 4  (D) 5  (E) 6

2. Hospital Symbols

A hospital uses symbols to record patient hair type.

For instance, the symbol ♥ would be used for a patient with brown, straight, long, thin hair.

What symbol would be used for a patient with thick, straight, long, black hair?

(A) ♡  (B) ♢  (C) ♣  (D) ♥  (E) ♠
3. Star Distances

An ant has to get from the centre of the star to one of its tips. It can only walk along the line segments shown in the diagram below. Each segment has a number on it, and the ant adds up all the numbers on its path. What is the smallest sum that the ant can make on its way from the centre to one of the tips?

![Star diagram]

(A) 9  (B) 10  (C) 11  (D) 12  (E) 13

4. Pizza Delivery

Mark has to deliver pizzas to 6 houses that are one kilometre apart around the shore of a lake.

![Pizza delivery diagram]

The pizzas must be delivered in the order A B C D E F, starting from and returning to the pizza shop at *, which is one kilometre from houses C and B.

What is the least distance (in kilometres) Mark has to cover when he delivers the pizzas?

(A) 16  (B) 17  (C) 18  (D) 19  (E) 20
5. Fossils

There are fossils at each of 5 sites on a science trip. But time is tight and you will only have time to visit two of them. The map below shows how many minutes each leg will take, and the circles indicate the sites of the fossils.

What is the least amount of time (in minutes) you could take to visit two sites on your trip from Start to Finish?

(A) 20  (B) 21  (C) 22  (D) 23  (E) 24

6. Word Play

The letters of the word THROW are rearranged to make all of the different combinations of letters possible. They are then arranged in alphabetical order. For example, the first word on the list is HORTW and the second is HORWT.

Which combination would be immediately before THROW?

(A) THORW  (B) THOWR  (C) THWOR  (D) THWRO  (E) TOWRH
Part B: Questions 7–15

Each question should be answered by a number in the range 0–999. Questions are worth 2 points each.

7–9. Swampy Ground

A road has to be built over swampy ground from A to B. This will involve building five bridges. The diagrams below show the possible routes, with the thick horizontal lines showing the possible bridge sites. The number above each bridge represents its cost. For each diagram, what is the lowest possible cost of the five bridges? (The road can only go from left to right.)

7.

8.

9.
10–12. Flow Diagram

Flow diagrams provide a visual way of showing a process or algorithm. In the diagrams below, a box is used for an action, an ellipse (shaded) for making a decision, and arrows indicate the flow of control.

For example, in the flow diagram below, if A was input as 9 it would be output as 13, whilst if it was input as 11 it would be unchanged and output as 11.

For each of the following diagrams, what is the value of the output?

10. 

Input A = 7

Is A greater than 99?

no → Double A

yes → Output A

11. 

Input A = 48392

Is A less than 10?

no → Reverse the digits of A → Remove the first digit of A

yes → Output A

Note that if A was 123, reversing its digits would make A equal to 321, and then removing its first digit would make A equal to 21.
12.

Input $A = 10, B = 44$

Is $B$ greater than $A$?

- yes → Subtract $A$ from $B$
- no → Output $B$

Note that if $A$ was 2 and $B$ was 6, then ‘Subtract $A$ from $B$’ would make $B$ equal to 4 but leave $A$ unchanged at 2.

13–15. Number on a Stick

A stick has several digits on it, making up a number. The stick can be broken in one place and the pieces rearranged to make a new number.

For instance, 1 2 3 could be broken between the 1 and 2 to make 2 3 1, or between the 2 and 3 to make 3 1 2. (3 2 1 is not possible.)

\[
\begin{array}{c}
1 \{2 \{3 \} \\
\end{array}
\rightarrow
\begin{array}{c}
2 \{3 \{1 \} \\
\end{array}
\text{ or }
\begin{array}{c}
3 \{1 \{2 \} \\
\end{array}
\]

For each of the following sticks what are the last three digits of the largest number that could be made?

13. $3 1 5 2 5 4 5 3$

14. $2 5 4 3 5 4 2 5 3 4$

15. $4 5 3 1 5 3 2 5$
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