International Mathematics Assessments for Schools

2011 UPPER PRIMARY DIVISION FIRST ROUND PAPER

Time allowed：75 minutes

INSTRUCTION AND INFORMATION

GENERAL
1. Do not open the booklet until told to do so by your teacher.
2. No calculators, slide rules, log tables, math stencils, mobile phones or other calculating aids are permitted. Scribbling paper, graph paper, ruler and compasses are permitted, but are not essential.
3. Diagrams are NOT drawn to scale. They are intended only as aids.
4. There are 20 multiple-choice questions, each with 5 possible answers given and 5 questions that require a whole number answer between 0 and 999. The questions generally get harder as you work through the paper. There is no penalty for an incorrect response.
5. This is a mathematics assessment not a test; do not expect to answer all questions.
6. Read the instructions on the answer sheet carefully. Ensure your name, school name and school year are filled in. It is your responsibility that the Answer Sheet is correctly coded.
7. When your teacher gives the signal, begin working on the problems.

THE ANSWER SHEET
1. Use only lead pencil.
2. Record your answers on the reverse of the Answer Sheet (not on the question paper) by FULLY colouring the circle matching your answer.
3. Your Answer Sheet will be read by a machine. The machine will see all markings even if they are in the wrong places, so please be careful not to doodle or write anything extra on the Answer Sheet. If you want to change an answer or remove any marks, use a plastic eraser and be sure to remove all marks and smudges.

INTEGRITY OF THE COMPETITION
The IMAS reserves the right to re-examine students before deciding whether to grant official status to their score.

Questions 1-10, 3 marks each

1. $2011 - 1022 = ?$
   （A）999　　　　（B）998　　　　（C）989　　　　（D）899　　　　（E）889

2. Lynne's last class of the day starts at 2:30 pm. Each class lasts 45 minutes. When this class is over, what is the angle, the one less than 180°, which is formed by the hour hand and the minute hand of her watch?
    （A）90°　　　　（B）larger than 90°　　　（C）Larger than 0°and less than 90°
    （D）0°　　　　（E）could not be determined

3. Each small square in all the following figures has side length 1. Which figure has the largest area?
    （A）　　　　　（B）　　　　　（C）　　　　　（D）　　　　　（E）
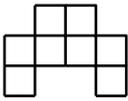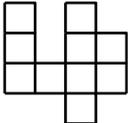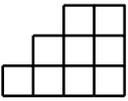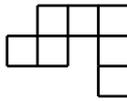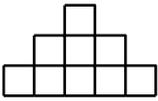
4. In which of the following figures does the shaded part occupies more than $\dfrac{3}{4}$ of the total area?
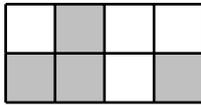
    （A）　　　　　　　　　　　　（B）　　　　　　　　　　　　（C）
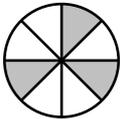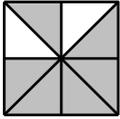
    （D）　　　　　　　　　　　　（E）
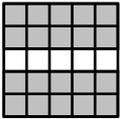
5. Bruce is reading a story book. One of the stories takes up two consecutive pages, and the sum of the page numbers is 345. On which page does this story begin?
    （A）114　　　　（B）115　　　　（C）171　　　　（D）172　　　　（E）173

6. If we copy the letters "MATHS" repeatedly, we get "MATHSMATHS. . . ". What is the 2011-th letter from the left?
   （A）M　　　　（B）A　　　　（C）T　　　　（D）H　　　　（E）S

7. From $2 + 2 = 2 \times 2$, we observe that the sum of the two numbers 2 and 2 is equal to their product. Of the following pairs of numbers, which has this property?
    （A）2 and $\dfrac{2}{3}$　（B）3 and $\dfrac{3}{2}$　（C）4 and $\dfrac{4}{5}$　（D）5 and $\dfrac{6}{5}$　（E）6 and $\dfrac{7}{5}$

8. A certain percentage of the area of the given figure is shaded. What is this percentage?
   （A）25%   （B）27.5%   （C）36.5%
   （D）37.5%   （E）42.5%
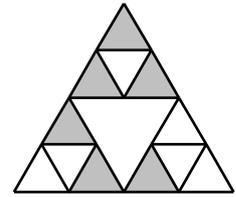
9. Thirty students are standing in a row. They start calling out 1, 2, 3, . . . from the left, and Mickey calls out 13. If the calling starts from the right instead, what number will Mickey call out?
   （A）18   （B）17   （C）16   （D）14   （E）13

10. The box contains 20 balls numbered from 1 to 20, but identical otherwise. Eve draws a ball at random from the box. Which of the following outcome is the most likely?
   （A）drawing the ball numbered 11.
   （B）drawing balls that are of even number.
   （C）drawing balls that ended with the digit 5, 6, 7, 8.
   （D）drawing balls that contain the digit 1.
   （E）drawing balls with a one-digit number.

Questions 11-20, 4 marks each

11. There is a pattern to the given sequence of figures.

   （1） （2） （3） （4） （5） （6） （7）
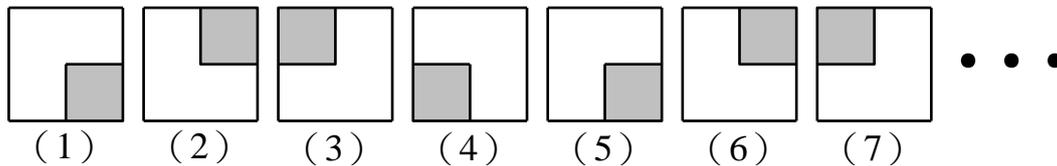
   Which of the following will be the 2011-th figure of the sequence?
   （A）   （B）   （C）   （D）   （E）

12. Woody has a rabbit which eats three carrots and one cabbage every two days. He is going on a 7-day holiday. At least how many carrots and cabbages must he leave behind for the rabbit? (Assume that all carrots are of the same size, as are the cabbages.)
   （A）9 carrots and 3 cabbages   （B）10 carrots and 3 cabbages
   （C）11 carrots and 3 cabbages   （D）10 carrots and 4 cabbages
   （E）11 carrots and 4 cabbages

13. The given figure is the net of a cube, and each face is labeled with a letter. When the cube is formed, which letter is on the face opposite to the one labeled with the letter I?
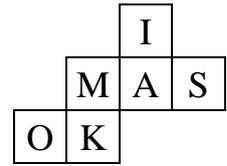
（A）A （B）K （C）M （D）O （E）S

14. Mark's bicycle has a front wheel and a back wheel of different sizes. The front wheel advances 3 metres per revolution, and the back wheel advances 2 metres per revolution. Which statement accurately describes Mark's 6-kilometre trip from home to school?

(A) The front wheel makes 3000 revolutions.

(B) The front wheel and the back wheel makes the same number of revolutions.

(C) The front wheel makes 1.5 times the number of revolutions of the back wheel.

(D) The front wheel run 1000 revolutions less than the back wheel.

(E) The back wheel run 1000 revolutions less than the front wheel.

15. The given rectangle is formed of six small squares. If the perimeter of the rectangle is 30 centimetres, what is its area in square centimetre?
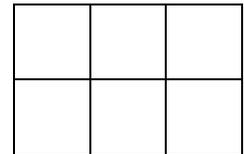
（A）24 （B）36 （C）54
（D）150 （E）216

16. The given diagram shows five differently coloured disks. The orange disk is above the green disk but below all the others. The purple disk is above the blue disk but below the red disk. What is the colour of the disk labeled Z?
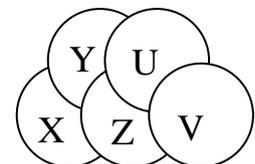
（A）Red （B）Orange （C）Green
（D）Blue （E）Purple

17. Gia's grandfather, a watchmaker, gives her a special watch. The long hand makes one revolution per hour, and the short hand makes one revolution per 24 hours. When Gia's favorite television show starts, the positions of the two hands are as shown. At this moment, what is the standard time?
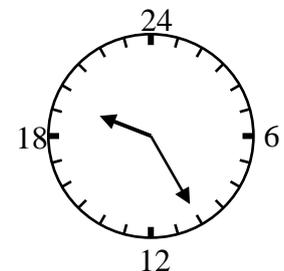
（A）18：20 （B）19：20 （C）19：25
（D）19：30 （E）20：25

18. The given menu is from a restaurant serving a buffet dinner. What is the minimum expenditure for four adults and three children under 12 to eat there?

Adult	$30
Child (under the age of 12)	$25
Family Set A(1 adult and 1child)	$45
Family Set B(2 adults and 1child)	$70

（A）$155   （B）$160   （C）$165   （D）$180   （E）$195

19. Wendy throws three cubical dice, with the numbers 1, 2, 3, 4, 5 and 6 on the faces. Which of the following numbers cannot be the product of three numbers on the dice?

（A）48   （B）84   （C）120   （D）180   （E）216

20. Leon is given five wooden blocks:

Which of the following blocks should be added so that he can make a 4×4×4 cube? (None of the blocks can be dissected)

（A）   （B）   （C）   （D）   （E）

Questions 21-25, 6 marks each

21. In the given table, the sum of the numbers on each row, each column and each of the two diagonals is the same. What is the value of $(B - A \div C) \times D$?

D	12	C
6	10	A
B	8	9

22. In the given diagram shows the playing area of a video game Minesweepers. The blank squares and the squares with numbers contain no mines. A shaded square may contain a mine. The number on a square indicates the total number of mines in the eight squares sharing a common edge or vertex with that square. What is the total number of mines among the squares A, B, C, D and E?

23. Consider all four-digit numbers using each of the digits 1, 2, 3 and 4 exactly once, possibly with a decimal point somewhere. Starting with the smallest such number, namely, 1.234, they are listed in ascending order. What is 1000 times the difference of the 23rd and the 20th numbers?

24. In a row are six counters, each either black or white. Between every two adjacent counters, we place a new counter. If the two adjacent counters are of the same colour, we place a white counter. If they are of different colours, we place a black counter. Then we remove the original six counters, leaving behind a row of five counters. We now repeat this operation one more time, reducing the number of counters in the row to four. If the last four counters are all white, how many different colour patterns for the original six counters are there?
An example is attached.
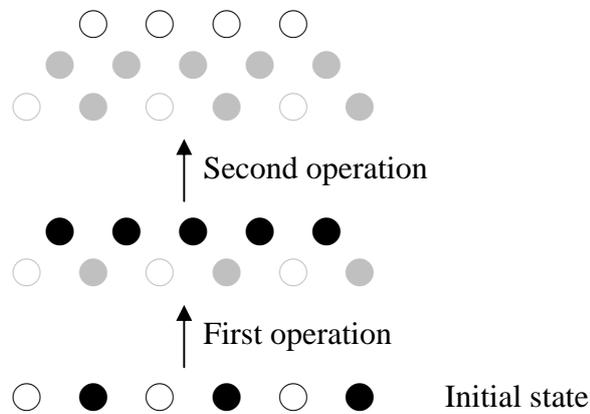
25. Mickey lives in a city with six subway lines. Every two lines have exactly one common stop for changing lines, and no three lines meet at a common stop. His home is not at one of the common stops. One day, Mickey suddenly decides to leave home and travel on the subway, changing trains at least once at each stop before returning home. What is the minimum number of changes he has to make to accomplish this task?