6th International Mathematics Assessments for Schools (2016-2017)

Middle Primary Division Round 2

Time: 120 minutes

Printed Name: ____________ *Code*: ________ *Score*: ________

Instructions:

- Do not open the contest booklet until you are told to do so.
- Be sure that your name and code are written on the space provided above.
- Round 2 of IMAS is composed of three parts; the total score is 100 marks.
- Questions 1 to 5 are given as a multiple-choice test. Each question has five possible options marked as A, B, C, D and E. Only one of these options is correct. After making your choice, fill in the appropriate letter in the space provided. Each correct answer is worth 4 marks. There is no penalty for an incorrect answer.
- Questions 6 to 13 are a short answer test. Only Arabic numerals are accepted; using other written text will not be honored or credited. Some questions have more than one answer, as such all answers are required to be written down in the space provided to obtain full marks. Each correct answer is worth 5 marks. There is no penalty for incorrect answers.
- Questions 14 and 15 require a detailed solution or process in which 20 marks are to be awarded to a completely written solution. Partial marks may be given to an incomplete presentation. There is no penalty for an incorrect answer.
- Use of electronic computing devices is not allowed.
- Only pencil, blue or black ball-pens may be used to write your solution or answer.
- Diagrams are not drawn to scale. They are intended as aids only.
- After the contest the invigilator will collect the contest paper.

The following area is to be filled in by the judges;
the contestants are not supposed to mark anything here.

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total Score	Signature
Score																	
Score																	

Middle Primary Division Round 2

Questions 1 to 5, 4 marks each

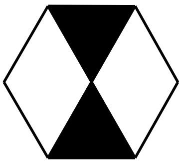
1. Among the numbers 5, 7, 11, 15 and 19, which number cannot be expressed as a sum of two prime numbers?

(A) 5　　(B) 7　　(C) 11　　(D) 15　　(E) 19

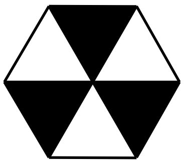
Answer：______________

2. There is a dart game in an amusement park where the goal is to hit the black portions of the regular hexagon in order to win a prize. From the choices below, which dart board will give the highest chance of winning?

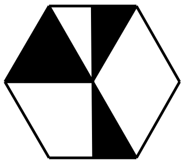
(A)



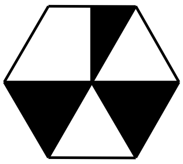
(B)



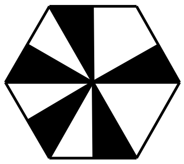
(C)



(D)



(E)



Answer：______________

3. What is the units digit of the value of $\underbrace{2\times2\times\cdots\times2}_{\text{2016 terms}}+\underbrace{3\times3\times\cdots\times3}_{\text{2017 terms}}$?

(A) 1　　(B) 3　　(C) 6　　(D) 7　　(E) 9

答：______________

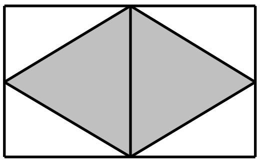
4. Alex bought a total of nine pencils and ball pens. One ball pen costs \$3 each, while one pencil costs \$2 each. If Alex spent a total of \$22, how many ball pens did he buy?

(A) 2　　(B) 3　　(C) 4　　(D) 5　　(E) 6

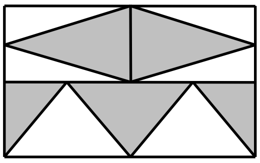
Answer：______________

5. In each of the following options, the dimensions of the rectangle are 10 cm by 6 cm. There are some shaded triangles inside each rectangle. The vertices of the shaded triangles must be either at the endpoints of a line segment or points that divide it into equal parts. From the options below, which figure has the largest shaded region?

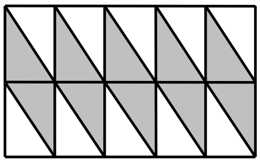
（A）



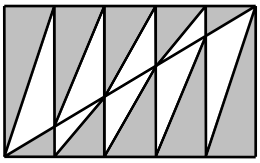
（B）



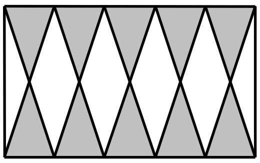
（C）



（D）



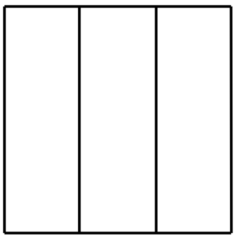
（E）



Answer：____________

Questions 6 to 13, 5 marks each

6. In the diagram below, a square of area 81 cm^2 is made up of three small identical rectangles. What is the perimeter of one small rectangle?



Answer：____________ cm

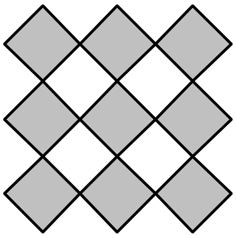
7. In adding up two numbers, Max has mistakenly read the tens digits ‘3’ of the first number as ‘5’ and the hundreds digit ‘9’ of the second number as ‘6’. If Max got 2017 as the result, what should be the correct sum of the two numbers?

Answer：____________

8. A hotel staff distributes four room keys to four travelers randomly. It is known that exactly two of the travelers get their correct room keys. How many different ways are there of distributing the keys to the four travelers?

Answer：____________ ways

9. Refer to the diagram below, where 9 black bricks and 4 white bricks are arranged alternately such that it will form a figure in which there are 5 bricks on its diagonals, and all the outer bricks are black.



Using the similar pattern stated above, if we want to form figures in which there are 7 bricks on its diagonals, how many black bricks are required?

Answer：__________ black bricks

10. The average weight of five cars *A*, *B*, *C*, *D* and *E* is 200 kg. If the average weight of cars *A*, *B* and *C* is 198 kg, while the average weight of cars *C*, *D* and *E* is 203 kg, what is the weight of car *C*, in kg?

Answer：__________ kg

11. Fill in each ○ in the expression below with digits 1, 2, 3, 4, 5 and 6. Each digit can be used once and two 3-digit numbers are formed. What is the minimum difference of the expression below?

○○○−○○○= ______

Answer：__________

12. Six pairs of integers are formed from the list of positive integers 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12. It is known that the sums of the five pairs are: 4, 6, 14, 20 and 21. What is the product of the remaining pair of numbers?

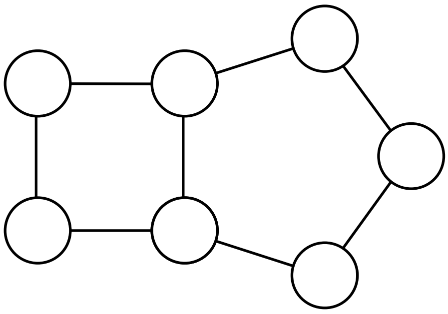
Answer：__________

13. The sum of two three-digit numbers is 999. If the digits in the two three-digit numbers are all different without repetition, how many possible combinations are there?

Answer：__________ combinations

Questions 14 to 15, 20 marks each
(Detailed solutions are needed for these two problems)

14. Fill in the circles with the numbers 1, 2, 3, 4, 5, 6 and 7. Each number can be used once without repetitions. The sum of the digits inside the circles at the four vertices of the square on the left is 15 and the sum of the digits inside the circles at the vertices of the regular pentagon on the right is 24. How many possible arrangements are there?



Answer： ______ arrangements

15. A bag contains 2017 balls that are numbered from 1 to 2017. At least how many balls must be taken out so that among those balls, there will always be 3 balls, in which the sum of the numbers on the first two balls is the number on the third ball?

Answer： ____________ balls