

INSTRUCTIONS. Please read all the instructions below carefully.

- a) Please DO NOT OPEN the contest link until the Proctor has given permission to start.
- b) There are a total of 25 questions, which are divided into three parts. In the first part, choose only ONE correct answer among the 5 choices and darken its corresponding circle in your answer sheet. In the second part and third part, write the final answer for each question and darken their corresponding circles in your answer sheet.
- c) Write your answers in the respective blank.
 - ✔ When the answer is a 1-digit number, type "000" for the tens, the hundreds and the thousands place. Example: if the answer is 7, then type 0007.
 - ✔ When the answer is a 2-digit number, type "00" for the hundreds place and the thousands place. Example: if the answer is 23, then type 0023.
 - ✔ When the answer is a 3-digit number, type "0" for the thousands place. Example: if the answer is 191, then type 0191.
 - ✔ When the answer is a 4-digit number, type as it is. Example: if the answer is 6419, then type 6419.
- d) Dictionaries are allowed, but calculators are not.
- e) Figures may not be drawn to scale.

Remark. Counting numbers are whole numbers except 0, i.e. 1, 2, 3, 4, 5, ...

GOOD LUCK!



SECTION A (CORRECT ANSWER = 2 MARKS; NO ANSWER = 0; INCORRECT ANSWER = MINUS 1 MARKS)

Question 1. Find the value of the following

$$(1996 + 2497 + 3507) \div 6.$$

- ☐ (A) 500. ☐ (B) 800. ☐ (C) 5000.
☐ (D) 8000. ☐ (E) None of the above.

Question 2. Which of the following is NOT a rational number?

- ☐ (A) π^2 . ☐ (B) 0.33333..... ☐ (C) $(\sqrt{17})^4$.
☐ (D) $\frac{\sqrt[3]{125}}{\sqrt{121}}$. ☐ (E) None of the above.

Question 3. Which steps have mathematical errors in the following sequence of reasoning?

$$0 \times 7 = 0 \text{ and } 0 \times 8 = 0 \quad (1)$$

$$0 \times 7 = 0 \times 8 \quad (2)$$

$$\frac{0}{0} \times 7 = \frac{0}{0} \times 8 \quad (3)$$

$$\text{Since } \frac{0}{0} = 1 \quad (4)$$

$$1 \times 7 = 1 \times 8. \text{ Therefore, } 7 = 8.$$

- ☐ (A) (1) and (3). ☐ (B) (1) and (4). ☐ (C) (2) and (3).
☐ (D) (3) and (4). ☐ (E) (1), (2), (3) and (4).

Question 4. If p is a prime number, then which of the following is NOT ALWAYS true?

- ☐ (A) The number $2 \times p$ is an even number.
☐ (B) The number $2 \times p + 3$ is an odd number.
☐ (C) The number $p \times p$ is not a prime number.
☐ (D) The number $3 \times p + p$ is not a prime number..
☐ (E) The number $p + 1$ is an even number..

Question 5. Ronald rolls two 6-sided standard dice and calculates the sum of the two numbers shown on them. What is the most likely to occur among the choices below?

- ☐ (A) The sum is 4..
☐ (B) The sum is an even number..
☐ (C) The sum is 15..
☐ (D) The sum is 12..
☐ (E) The sum is an odd number less than 5..

Question 6. You received 4 gift vouchers from "Forever Chic" store. Which option will save you the most money if you want to buy 2 items of the same price?

- ☐ (A) Buy 1, get 1 free.
☐ (B) 1st item: 80% sale. 2nd item: 20% of the 1st item's sale price.

- (C) 1st item: 60% sale. 2nd item: 60% of the 1st item's sale price.
 (D) 1st item: 70% sale. 2nd item: 30% of the 1st item's sale price.
 (E) All have the same price.

Question 7. Goofy started running at 12 m/s (meters per second) at 4 : 00 pm. His dog, Pluto, started following him at 4 : 03 pm and runs at 18 m/s. At what time would Pluto catch up to Goofy?

- (A) 4 : 08. (B) 4 : 09. (C) 4 : 10.
 (D) 4 : 11. (E) None of the above.

Question 8. What is the smallest possible value of n such that the sum $1 + 2 + \dots + n$ is divisible by 5 and 9?

- (A) 5. (B) 9. (C) 10.
 (D) 45. (E) None of the above.

Question 9. Integers starting from 1 are arranged in the following way:

1					Row 1
2	3				Row 2
4	5	6			Row 3
7	8	9	10		Row 4
11	12	13	14	15	Row 5
...					

In what row can you find 2018?

- (A) 46. (B) 63. (C) 64.
 (D) 66. (E) None of the above.

Question 10. Machine A can produce 450 cheese blocks in m hours. If machine A and machine B work together at their respective rates, their combined production in n hours is 450 cheese blocks altogether. If machine B works alone, how long would it take to produce 450 cheese blocks?

- (A) $\frac{m-n}{m \times n}$. (B) $\frac{m \times n}{m-n}$. (C) $\frac{n}{m+n}$. (D) $\frac{n-m}{m \times n}$. (E) $\frac{m \times n}{n-m}$.

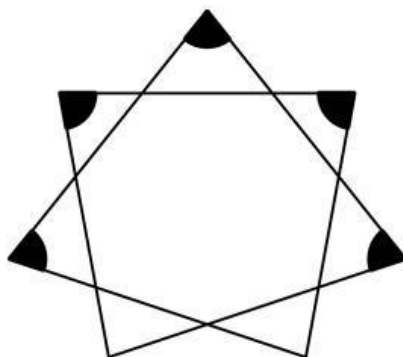
Question 11. Let $n! = 1 \times 2 \times 3 \times \dots \times n$. For example, $4! = 1 \times 2 \times 3 \times 4$ and $3! = 1 \times 2 \times 3$. Find the last digit of $9! + 99! + 999! + 9999! + 99999!$.

- (A) 1. (B) 4. (C) 6.
 (D) 9. (E) None of the above.

Question 12. The least common multiple (LCM) of two positive integers is 216. If their ratio is 2 : 9, find their highest common factor (HCF).

- (A) 12. (B) 18. (C) 24.
 (D) 108. (E) None of the above.

Question 13. Find the sum of the shaded angles in the figure.



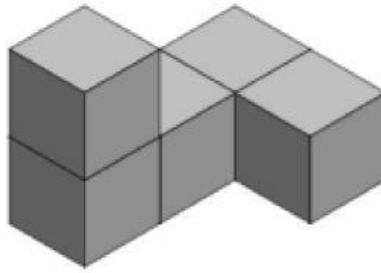
- (A) 360° .
(D) 900° .

(B) 540° .

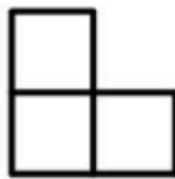
(C) 720° .

(E) None of the above.

Question 14.



The figure above is made of 5 cubes. The front and side views of the figure are shown below.

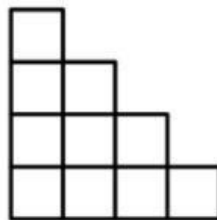


Front View
(Mặt trước)

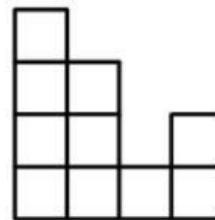


Side View
(Mặt bên)

What is the largest number of cubes in a figure with the following front and side views?



Front View
(Mặt trước)



Side View
(Mặt bên)

- (A) 20.
(D) 30.

(B) 35.

(C) 32.

(E) None of the above.

Question 15. Danica, Jessica, Marina, Neo and Samantha went to a popular pet store at different times and bought different pets. Marina is the second person who went inside the store. Danica went in before the person who bought a cat but went inside after the person who bought a hamster. Jessica went inside after Neo. The last person who went inside bought a rabbit. Marina did not buy a cat, and Samantha bought a dog. Who bought a fish?

(A) Danica.

(B) Jessica.

(C) Marina.

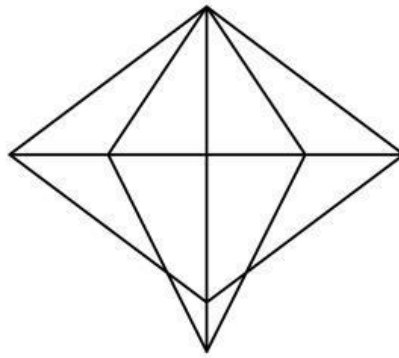
(D) Neo.

(E) Samantha.

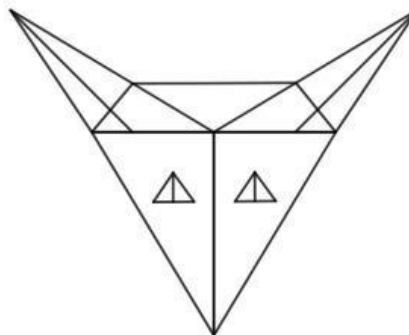
B

SECTION B: CORRECT ANSWER = 4 MARKS; INCORRECT OR NO ANSWER = 0

Question 16. How many triangles are there in the figure below?



Question 17. The bar chart below shows the production growth of cars in a factory for the first half of the year. The average number of cars manufactured in the first half of the year is 20% less than the average number of cars manufactured in the second half of the year. What is the average number of cars manufactured in the entire year?



Question 18. Find the smallest positive integer n for which $250n$ is a multiple of 900.

Question 19. An operator Δ acts on two numbers to give the following results:

$$7\Delta 2 = 94, \quad 3\Delta 3 = 66, \quad 5\Delta 4 = 98, \quad 11\Delta 9 = 2018.$$

What is $4\Delta 7$ equal to?

Question 20. Given a, b, c and d are positive integers such that

$$a^4 + b^4 + c^4 + d^4 = 2018,$$

find the value of $a^2 + b^2 + c^2 + d^2$.

Question 21. In a class of 33 students, 20 of them have been to Universal Studios and 14 of them have been to Legoland. What is the largest possible number of students who have not been to neither Universal Studios nor Legoland?

Question 22. Hannah, Ivan and Jefferson collected shells on Barbados island. Hannah collected $\frac{11}{19}$ of the total shells. The rest was shared by Ivan and Jefferson in the ratio 13 : 11. If Hannah collected 44 more shells than Jefferson, what is the total number of shells they collected altogether?

Question 23. The sum of 4 different positive integers is 25. Find the smallest possible value of the largest of these 4 numbers.

Question 24. A computer code generated 500 fractions with the following pattern:

$$\frac{2}{9}, \frac{4}{11}, \frac{6}{13}, \frac{8}{15}, \dots, \frac{1000}{1007}.$$

How many of these fractions are in simplest form?