

CHAPTER 01 A SQUARE AND A CUBE (Ganita Prakashan)

SUBJECT: MATHEMATICS

MAX. MARKS : 40

CLASS : VIII

DURATION : 1½ hr

General Instructions:

- (i). All questions are compulsory.
 - (ii). This question paper contains 20 questions divided into five Sections A, B, C, D and E.
 - (iii). **Section A** comprises of 10 MCQs of 1 mark each. **Section B** comprises of 4 questions of 2 marks each. **Section C** comprises of 3 questions of 3 marks each. **Section D** comprises of 1 question of 5 marks each and **Section E** comprises of 2 Case Study Based Questions of 4 marks each.
 - (iv). There is no overall choice.
 - (v). Use of Calculators is not permitted
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SECTION – A

Questions 1 to 10 carry 1 mark each.

- 1. A number ends with 2. What can be concluded about this number?
 - (a) It is a perfect square.
 - (b) It is not a perfect square.
 - (c) It can be a perfect square, but only if the other digits form a perfect square.
 - (d) Cannot be determined.
- 2. A number is a perfect square. What must be true about the number of zeros at its end?
 - (a) The number of zeros must be odd.
 - (b) The number of zeros must be even.
 - (c) The number of zeros must be 0.
 - (d) The number of zeros can be either even or odd.
- 3. The side of a square tile is 1.5 units. The area of the tile is:
 - (a) 2.25 square units (b) 3.0 square units (c) 2.5 square units (d) 1.5 square units
- 4. How many non-perfect square numbers are between 14^2 and 15^2 ?
 - (a) 14 (b) 28 (c) 29 (d) 30
- 5. Without calculating, what is the units digit of the cube of 8?
 - (a) 8 (b) 6 (c) 4 (d) 2
- 6. A number is a perfect cube. What can be said about the number of factors it has?
 - (a) It must have an even number of factors.
 - (b) It must have an odd number of factors.
 - (c) It can have either an odd or even number of factors.
 - (d) It must have a prime number of factors.
- 7. The volume of a cubical box is 512 cubic units. The side length of the box is:
 - (a) 7 units (b) 8 units (c) 9 units (d) 10 units
- 8. A student states that the sum of the first n odd numbers is 100. Based on this, what must be the value of n?
 - (a) 10 (b) 12 (c) 14 (d) 16

In the following questions 9 and 10, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

- (a) Both A and R are true and R is the correct explanation of A.
- (b) Both A and R are true but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) A is false but R is true.

9. **Assertion (A):** The sum of the first 6 odd natural numbers is 36.

Reason (R): The sum of the first n odd natural numbers is n^2 .

10. **Assertion (A):** The number 729 is a perfect cube.

Reason (R): The prime factorization of 729 is 3^6 , and its prime factors can be grouped into three identical sets.

SECTION – B

Questions 11 to 14 carry 2 marks each.

- 11. Find the smallest square number which is a multiple of 8, 12, and 18.
- 12. Find the square root of 576 by the prime factorisation method.
- 13. Find the cube root of 5832 by the prime factorization method.
- 14. What is the smallest number by which 121 must be multiplied so that the product is a perfect cube?

SECTION – C

Questions 15 to 17 carry 3 marks each.

- 15. Find the smallest number by which 288 must be divided to obtain a perfect square. Also, find the square root of the quotient.
- 16. Find the smallest number by which 3267 must be divided so that the quotient has a cube root. Also, find the cube root of the quotient.
- 17. Find the smallest number which when multiplied with 540 will make the product a perfect cube. Find the cube root of the product.

SECTION – D

Questions 18 carry 5 marks each.

- 18. The students of a class collected 2601 rupees for a fund. Each student contributed as many rupees as there were students in the class. Find the number of students in the class and the amount each student contributed.

SECTION – E (Case Study Based Question)

Question 19 to 20 carry 4 mark

19. **Case Study-1 (The King's Fort):**

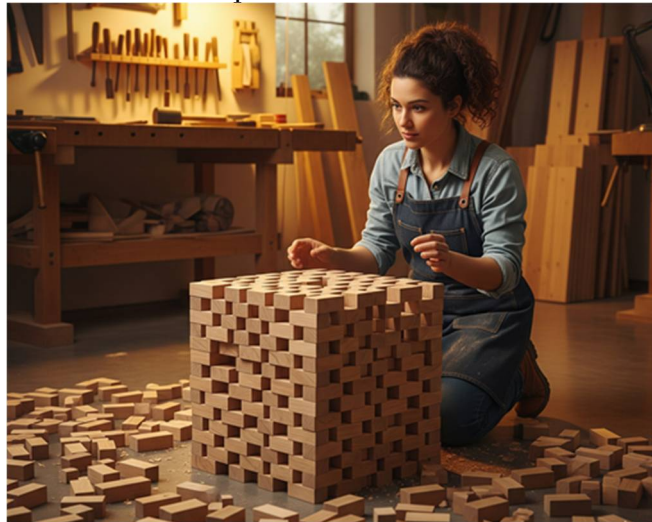
King Vikramaditya wanted to build a new fort in the shape of a perfect square. He had 1500 soldiers to stand on all four sides of the fort, and he wanted to arrange them in a way that each side of the fort had an equal number of soldiers. He realized that with his current number of soldiers, he would be left with a few extra soldiers. He wanted to know how many more soldiers he would need to form a perfect square with no extra soldiers.



- (i) What is the largest perfect square number of soldiers less than 1500?
- (ii) How many soldiers would be left over?
- (iii) What is the smallest perfect square number of soldiers greater than 1500?
- (iv) How many more soldiers are needed to form the next perfect square?

20. Case Study-2 (The Building Block Challenge):

A young builder named Maya is given a large number of cubical wooden blocks. She is challenged to arrange them to form a large perfect cube. She has a total of 5400 blocks. She realizes she needs to either add or remove some blocks to form a perfect cube.



- (i) What is the prime factorization of 5400?
- (ii) How many blocks must be removed to make it a perfect cube?
- (iii) What will be the side length of the new perfect cube formed by adding the minimum number of blocks?

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