

Time: 3 Hours

Max. Marks: 80

Instructions:

1. The question paper has 4 sections and 33 questions. Answer all the questions.
2. Section A: 20 multiple choice questions of 1 mark each. Write the letter of the correct answer.
3. Section B: 4 questions of 2 marks each. Section C: 5 questions of 4 marks each.
4. Section D: 4 questions of 8 marks each. Each question in Section D has an internal choice.
5. Draw figures neatly wherever necessary and show all the steps.

SECTION – A

20 × 1 = 20

Choose the correct answer and write its letter.

1. Which of the following is a perfect square?
A) 1000 B) 1024 C) 1050 D) 1210
2. The units digit of the square of 27 is
A) 7 B) 9 C) 3 D) 1
3. The square root of 196 is
A) 13 B) 14 C) 16 D) 18
4. A perfect square can never end with the digit
A) 1 B) 4 C) 6 D) 8
5. Which of the following is a perfect cube?
A) 125 B) 150 C) 250 D) 400
6. The smallest number by which 72 must be multiplied to get a perfect square is
A) 2 B) 3 C) 4 D) 6
7. 1729 is called the Hardy–Ramanujan number because it is
A) a perfect square
B) the sum of two cubes in two different ways
C) a prime number
D) a perfect cube
8. The value of $(-2)^5$ is
A) 32 B) -32 C) -10 D) 10
9. $2^3 \times 2^4 =$
A) 2^7 B) 2^{12} C) 4^7 D) 2^1
10. 4,50,00,000 written in scientific notation (standard form) is
A) 4.5×10^6 B) 4.5×10^7 C) 45×10^7 D) 4.5×10^8
11. If 5 pens cost ₹40, then 8 such pens cost
A) ₹56 B) ₹64 C) ₹72 D) ₹48
12. In Roman numerals, XL stands for
A) 60 B) 40 C) 90 D) 140

13. The ancient Mesopotamian (Babylonian) number system used the base

- A) 10 B) 20 C) 60 D) 2

14. The sum of the interior angles of a quadrilateral is

- A) 180° B) 270° C) 360° D) 540°

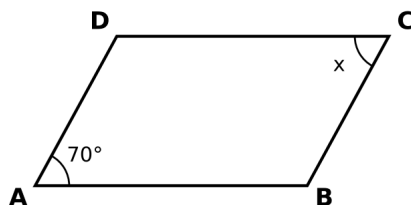
15. A quadrilateral with all sides equal and all angles 90° is a

- A) rhombus B) rectangle C) square D) kite

16. The diagonals of a rhombus intersect each other at an angle of

- A) 60° B) 90° C) 45° D) 120°

17. In the parallelogram ABCD shown, $\angle A = 70^\circ$. The value of x is



- A) 70° B) 110° C) 140° D) 20°

18. A number is divisible by 9 if

- A) its last digit is 9
B) the sum of its digits is divisible by 9
C) it is an odd number
D) its last two digits are divisible by 9

19. The sum of two odd numbers is always

- A) odd B) even C) prime D) a multiple of 4

20. $(a + b)(a - b) =$

- A) $a^2 + b^2$ B) $a^2 - b^2$ C) $(a - b)^2$ D) $a^2 - 2ab + b^2$

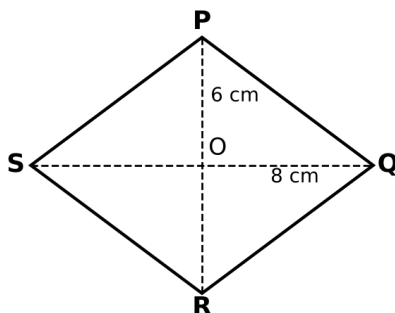
SECTION – B

$4 \times 2 = 8$

21. Find the square root of 576 by prime factorisation.

22. Simplify and write the answer as a number: $(3^5 \times 3^2) \div 3^4$

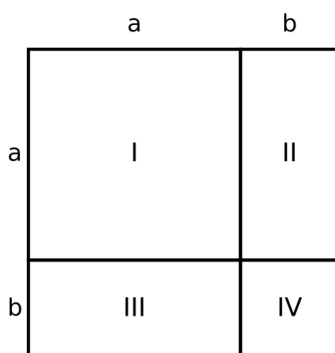
23. In the rhombus PQRS shown, the diagonals meet at O. $OP = 6$ cm and $OQ = 8$ cm. Find the length of side PQ. (Hint: the diagonals of a rhombus meet at right angles.)



24. Divide ₹600 between Ravi and Sita in the ratio 2 : 3.

SECTION – C**5 × 4 = 20**

25. Find the smallest number by which 1323 must be multiplied so that the product is a perfect cube. Also find the cube root of the product.
26. Look at the square of side $(a + b)$ divided into four parts I, II, III and IV.



- (i) Write the area of each part I, II, III and IV.
- (ii) Using the areas, write the identity for $(a + b)^2$.
- (iii) Use the identity to find 103^2 .
27. (i) The distance between the Earth and the Sun is about 14,96,00,000 km. Write it in scientific notation.
- (ii) Light travels about 3,00,000 km in one second. Write this number in scientific notation.
- (iii) Simplify: $(2^4)^3 \div 2^{10}$
- (iv) Which is greater: 2^{10} or 10^3 ? Give a reason.
28. The angles of a quadrilateral are in the ratio 3 : 4 : 5 : 6. Find all four angles.
29. The scale of a map is 1 cm : 25 km.
- (i) The distance between two towns on the map is 6.4 cm. Find the actual distance between them.
- (ii) The actual distance between two cities is 375 km. How far apart will they be on the map?

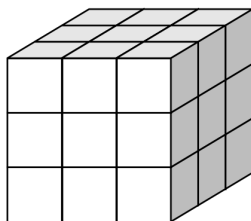
SECTION – D**4 × 8 = 32**

Each question has an internal choice. Answer either (a) or (b).

30. a) (i) Find the square root of 7056 by prime factorisation.
- (ii) Find the least number that must be subtracted from 1300 to get a perfect square. Also find the square root of that perfect square.

(OR)

- b) (i) Look at the cube made of small unit cubes. How many unit cubes are used? How many unit cubes are needed to make a cube of side 5 units?



- (ii) Find the cube root of 13824 by prime factorisation.

31. a) Simplify each of the following:

(i) $(2^5 \times 2^3) \div 2^6$ (ii) $(-1)^{50} + (-1)^{51}$

(iii) $(3^2)^3 \div 3^4$ (iv) $2^0 \times 3^0 \times 4^1$

(OR)

b) A sheet of paper is 0.1 mm thick. Each time it is folded in half, its thickness doubles.

(i) Find the thickness after 1, 2 and 3 folds.

(ii) Write the thickness after 10 folds using a power of 2, and find its value in mm.

(iii) Why do numbers grow so fast when they keep doubling? Explain in two or three sentences.

32. a) (i) In a parallelogram ABCD, $\angle A = (3x + 10)^\circ$ and $\angle B = (2x - 5)^\circ$. Find x and all the angles of the parallelogram.

(ii) Write any four properties of a parallelogram.

(OR)

b) (i) State whether each statement is true or false and give a reason:

(1) Every square is a rhombus. (2) Every rhombus is a square.

(3) Every rectangle is a parallelogram. (4) Every kite is a rhombus.

(ii) In a rectangle PQRS, the diagonals meet at O. If $OP = (2x + 4)$ cm and $OQ = (3x - 1)$ cm, find x and the length of each diagonal.

33. a) Use suitable identities to find:

(i) 98^2 (ii) 102×98 (iii) 51^2 (iv) 47×53

(OR)

b) Solve:

(i) 3 lemons are needed to make 4 glasses of lemonade. How many lemons are needed for 20 glasses?

(ii) A car travels 180 km in 3 hours. At the same speed, how far will it travel in 5 hours?

(iii) The ratio of boys to girls in a class is 5 : 4. If there are 36 students, find the number of boys and girls.

(iv) Are the ratios 8 : 12 and 10 : 15 in proportion? Give a reason.

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