

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 NOT a perfect square?
A) 144 B) 169 C) 200 D) 225
2. The square of an odd number is always
A) even B) odd C) prime D) a multiple of 4
3. $1 + 3 + 5 + 7 + 9 =$
A) 16 B) 25 C) 36 D) 20
4. $\sqrt{81/100} =$
A) 0.09 B) 0.9 C) 9 D) 0.81
5. The cube of 4 is
A) 12 B) 16 C) 64 D) 48
6. $\sqrt[3]{1000} =$
A) 10 B) 100 C) 30 D) 3
7. The smallest number by which 32 must be multiplied to get a perfect cube is
A) 2 B) 4 C) 8 D) 16
8. $(-3)^4 =$
A) -81 B) 81 C) -12 D) 12
9. $(a^m)^n =$
A) a^{m+n} B) a^{mn} C) a^{m-n} D) $a^{m \div n}$
10. $7^0 =$
A) 0 B) 7 C) 1 D) 70
11. 5.2×10^5 in the usual form is
A) 52,000 B) 5,20,000 C) 52,00,000 D) 5,200
12. The Roman numeral MMXXVI stands for
A) 2016 B) 2026 C) 2046 D) 1026
13. Our present number system (Indian / Hindu–Arabic numerals) uses the base
A) 2 B) 10 C) 20 D) 60

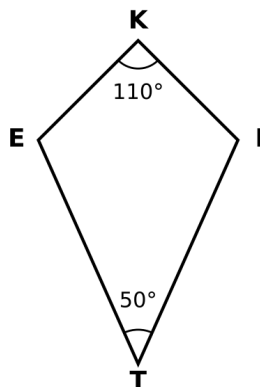
14. Each angle of a rectangle measures

- A) 60° B) 90° C) 120° D) 45°

15. A parallelogram with all sides equal is called a

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

16. In the kite KITE shown, $KI = KE$ and $TI = TE$. $\angle K = 110^\circ$ and $\angle T = 50^\circ$. Then $\angle I =$



- A) 100° B) 110° C) 50° D) 90°

17. Which of the following numbers is divisible by 3?

- A) 1001 B) 2024 C) 3105 D) 7012

18. The sum of an even number and an odd number is always

- A) even B) odd C) zero D) a multiple of 3

19. $(a - b)^2 =$

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

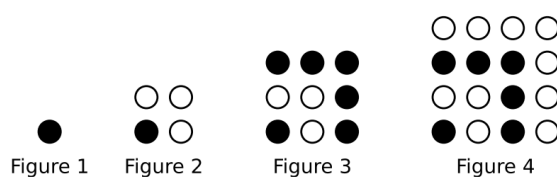
20. The ratio 12 : 18 in its simplest form is

- A) 3 : 2 B) 2 : 3 C) 6 : 9 D) 4 : 5

SECTION – B

$4 \times 2 = 8$

21. Look at the dot pattern.



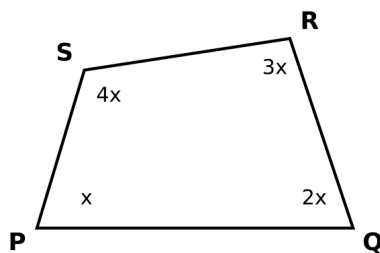
(i) How many dots are there in Figure 4? How many dots were added to Figure 3 to get Figure 4?

(ii) Without adding, write the sum of the first 10 odd numbers.

22. Find the cube root of 3375 by prime factorisation.

23. Simplify: $(5^2 \times 5^4) \div 5^3$

24. The angles of the quadrilateral PQRS are x , $2x$, $3x$ and $4x$ as shown. Find the value of x and all the angles.



SECTION – C

$5 \times 4 = 20$

25. Find the smallest number by which 2400 must be divided so that the quotient is a perfect square. Also find the square root of the quotient.

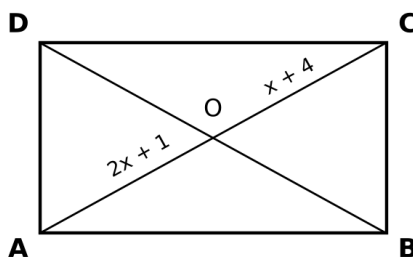
26. (i) Write $3 \times 3 \times 3 \times 3 \times 5 \times 5$ in exponential form.

(ii) Which is greater, 4^3 or 3^4 ? Show your working.

(iii) The mass of the Earth is about 5,970,000,000,000,000,000,000 kg. Write it in scientific notation.

(iv) Simplify: $(5^2)^3 \div 5^5$

27. ABCD is a rectangle and its diagonals meet at O. $OA = (2x + 1)$ cm and $OC = (x + 4)$ cm.



(i) Find the value of x . (ii) Find the lengths of AC and BD. (iii) Which property of a rectangle did you use?

28. (i) Without actually dividing, check whether 5148 is divisible by 4 and by 9. Give reasons.

(ii) Show that the sum of any three consecutive numbers is always divisible by 3.

29. (i) Blue and white paint are mixed in the ratio 2 : 5. If 6 litres of blue paint is used, how much white paint is needed?

(ii) Divide ₹1,800 among A, B and C in the ratio 2 : 3 : 4.

SECTION – D

$4 \times 8 = 32$

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

30. a) (i) Find the square root of 5929 by prime factorisation.

(ii) Find the smallest square number that is divisible by each of 6, 8 and 15.

(OR)

b) (i) Show that 1729 can be written as the sum of two cubes in two different ways.

(ii) Find the cube roots of 2744 and 5832 by prime factorisation.

31. a) Simplify each of the following:

(i) $(-2)^3 \times (-2)^2$ (ii) $(4^3 \times 4^2) \div 4^4$

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

(OR)

b) (i) Write 47 and 1326 in Roman numerals.

(ii) Write the number shown by MCMXLVII in our numerals.

(iii) Give two reasons why our place-value system with zero is easier to use than Roman numerals.

(iv) Write 3,405 in expanded form using powers of 10.

32. a) (i) Copy and complete the table using Yes or No.

Property	Parallelogram	Rectangle	Rhombus	Square
Opposite sides are parallel				
All sides are equal				
Diagonals are equal				
Diagonals meet at right angles				

(ii) In a parallelogram PQRS, $\angle P$ is twice $\angle Q$. Find all the angles of the parallelogram.

(OR)

b) (i) Three angles of a quadrilateral are 75° , 90° and 110° . Find the fourth angle.

(ii) In a rhombus ABCD, $\angle A = 60^\circ$ and the diagonals meet at O. Find $\angle B$, $\angle C$, $\angle D$ and $\angle AOB$.

(iii) Why is every square also a rectangle? Explain.

33. a) Use suitable identities to find:

(i) 105^2 (ii) 99×101 (iii) $(2x + 3)^2$ (iv) $(3a - 2b)(3a + 2b)$

(OR)

b) Solve:

(i) A model of a building is made on the scale 1 : 50. The model is 30 cm tall. Find the actual height in metres.

(ii) The ratio of boys to girls in a class of 48 is 7 : 5. Find the number of boys and girls.

(iii) Check whether x and y are in direct proportion: $x = 2, 4, 6$ and $y = 10, 20, 30$. If yes, find the constant.

(iv) 6 kg of rice costs ₹330. Find the cost of 10 kg.

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