CHAPTER TEST: NUMBER SYSTEM
Mathematics | Class IX (2026/NumSys/09/NCERT/001)
Time: 1.5 Hours **Max. Marks: 33**

GENERAL INSTRUCTIONS

– All questions are compulsory.

– The question paper consists of **four sections: A, B, C, and D**.

– Section A contains **5 Multiple Choice Questions (MCQs)** of **1 mark each**.

– Section B contains **4 Short Answer Questions** of **2 marks each**.

– Section C contains **4 Long Answer Questions** of **4 marks each**.

– Section D contains **4 True or False Questions** of **1 mark each**.

– Use of calculators or any electronic devices is **not permitted**.

– All necessary working steps must be clearly shown for full marks.

– The use of appropriate units and correct mathematical symbols is compulsory.

Section A: Basic Concepts (1 Mark Each)

1. A rational number between $\sqrt{3}$ and $\sqrt{5}$ is:
   (a) $\frac{\sqrt{3} \times \sqrt{5}}{2}$ (b) $\frac{\sqrt{5} - \sqrt{3}}{2}$ (c) $\frac{\sqrt{3} + \sqrt{5}}{2}$ (d) 1.98

2. A rational number between -2 and 6 is given by:
   (a) $-2 > 2 > 6$ (b) $-2 > 2 < 6$ (c) $-2 < 2 < 6$ (d) $-2 < 2 > 6$

3. The product of any two irrational numbers is:
   (a) always an irrational number (b) always an integer (c) always a rational number (d) sometimes rational/irrational

4. An irrational number may be:
   (a) non-terminating (b) non-terminating repeating (c) terminating (d) non-terminating non-repeating

5. For a terminating decimal of a rational number $\frac{p}{q}$, the prime factorisation of q must have only powers of:
   (a) 2 or 4 (b) only 5 (c) 2 or 5 or both (d) 2 and 3

Section B: Short Answer Questions (2 Marks Each)

6. Find the $\frac{p}{q}$ form of $0.\overline{001}$.

7. Evaluate:
   (a) $2^{55} \times 2^{60} - 2^{97} \times 2^{18}$

8. Simplify: $a^{\frac{m}{n}} \times a^{\frac{n}{m}} = ?$

9. Write the ascending order of the magnitude of the surds:
   (a) $\sqrt[3]{2}, \sqrt[6]{3}, \sqrt[9]{4}$
   (b) $\sqrt[4]{6}, \sqrt[8]{12}, \sqrt{4}, \sqrt[16]{24}$

Section C: Long Answer Questions (4 Marks Each)

10. Show that:
    (a) $\frac{x^{a(b-c)}}{x^{b(a-c)}} \div \left(\frac{x^b}{x^a}\right)^c = 1$
    (b) $\frac{x^{(a+b)^2} \cdot x^{(b+c)^2} \cdot x^{(c+a)^2}}{(x^a x^b x^c)^4} = 1$

11. If $\frac{9^n \times 3^2 \times (3^{-\frac{n}{2}})^{-2} - (27)^n}{3^{3m} \times 2^3} = \frac{1}{729}$, prove that $m - n = 2$.

12. If $27^x = \frac{9}{3^x}$, find x.

13. If $4^x - 4^{x-1} = 24$, then find the value of $(2x)^x$

Section D: True or False (1 Mark Each)

Determine whether each of the following statements is true or false for a rational number $\frac{p}{q}$:

1. If $\frac{p}{q}$ is in its lowest form, but $p \neq 0$. So, p and q have no common factor other than 1

2. Every integer cannot be written as a rational number

3. Every real number is either rational or irrational

4. π is an irrational number