QUESTION BANK

EXERCISE - 1

Q.1 Write : **(i)** the smallest whole number **(ii)** the integer other than 1, which is a reciprocal of itself.

(iii) Additive inverse of $\frac{1}{5}$. **(iv)** Multiplicative inverse of $\frac{3}{5}$.

Q.2 What are irrational numbers ? How they differ from rational numbers ? Give examples.

Q.3 Give an example of irrational numbers whose quotient is rational.

Q.4 Suppose a is a rational number. What is the reciprocal of the reciprocal of a ?

Q.5 Write the repeating decimal for each of the following, and use a bar to show the repetend.

(i) $-\frac{4}{3}$ **(ii)** $\frac{11}{12}$ **(iii)** $\frac{7}{13}$

Q.6 Classify the following numbers as rational or irrational : **(i)** $\sqrt{225}$ **(ii)** 7.478478.....

Q.7 Are the square roots of all positive integers irrational? If not, give an example of the square root of a number that is a rational number.

Q.8 Locate $\sqrt{3}$ on the number line.

Q.9 Show that 3.142678 is a rational number. In other words, express 3.142678 in the form p/q, where p and q are integers and $q \neq 0$.

Q.10 Visualise $4.\overline{26}$ on the number line, up to 4 decimal places.

Q.11 Rationalise the denominator of $\frac{1}{2+\sqrt{3}}$ **Q.12** Simplify : (i) $\left(\frac{1}{3^3}\right)^7$ (ii) $7^{\frac{1}{2}} \cdot 8^{\frac{1}{2}}$

Q.13 Simplify each of the following removing radical signs and negative indices they occur :

(i) $\left(\sqrt{4}\right)^{-3/4}$ **(ii)** $\left(\frac{5}{8}\right)^3 \left(\frac{4}{3}\right)^3$ **(iii)** $\left[\frac{\frac{\sqrt{5}}{3}}{\frac{5}{9}}\right]^6$ **(iv)** $\left(\frac{5}{3}\right)^3 \cdot \left(\frac{9}{2}\right)^4$ **(v)** $\frac{2^6 \times 8^2}{4^4}$

Q.14 Which whole number is not a natural number ?

Q.15 Find two irrational numbers between 0.1 and 0.2.

Q.16 Determine, without actually dividing, which of the following rational numbers can be named, (a) by a terminating decimal, (b) by a repeating decimal. (i) $\frac{7}{20}$ (ii) $\frac{1}{6}$ (iii) $\frac{1}{12}$ (iv) $3\frac{47}{160}$

Q.17 Write down a fraction which is equivalent to 0.033636363.....

Q.18 Rationalise the denominators of the following : (i) $\frac{1}{\sqrt{6}+\sqrt{3}}$ (ii) $\frac{3}{\sqrt{8}-\sqrt{5}}$ (iii) $\frac{6}{2\sqrt{3}+3\sqrt{2}}$ (iv) $\frac{35}{7\sqrt{2}-3\sqrt{7}}$

EXERCISE - 2

Show that (a, b, c are +ve integers) [Q.1-Q.4]

Q.1 $\left(\frac{x^b}{x^c}\right)\left(\frac{x^c}{x^a}\right)^b \left(\frac{x^a}{x^b}\right)^c = 1$ **Q.2** $\left(\frac{x^a}{x^b}\right)^{\frac{1}{ab}} \left(\frac{x^b}{x^c}\right)^{\frac{1}{bc}} \left(\frac{x^c}{x^a}\right)^{\frac{1}{ca}} = 1$

Q.3 $(x^{b-c})^a \times (x^{c-a})^b \times (x^{a-b})^c = 1$ **Q.4** $\left(\frac{x^a}{x^b}\right)^{a^2+ab+b^2} + \left(\frac{x^b}{x^c}\right)^{b^2+bc+c^2} + \left(\frac{x^c}{x^a}\right)^{c^2+ac+a^2} = 1$

Q.5 Find two rational numbers between : 0.222332333233332.... and 0.252552555255552....

Q.6 If $\frac{3+\sqrt{5}}{4-2\sqrt{5}} = p + q\sqrt{5}$, where p and q are rational numbers, find the values of p and q.

Q.7 Simplify : $\frac{1}{3-\sqrt{8}} - \frac{1}{\sqrt{8}-\sqrt{7}} + \frac{1}{\sqrt{7}-\sqrt{6}} - \frac{1}{\sqrt{6}-\sqrt{5}} + \frac{1}{\sqrt{5}-2}$

Q.8 Examine whether the following numbers are rational or irrational : **(i)** $(2-\sqrt{3})^2$ **(ii)** $(3+\sqrt{2})(3-\sqrt{2})$

Q.9 Which is greatest : $\sqrt[3]{4}$ or $\sqrt[4]{5}$ or $\sqrt[4]{3}$.

Q.10 Find the rational number that is one seventh of the way from $1\frac{3}{4}$ to $4\frac{3}{8}$.

Q.11 Find four rational numbers between 1/4 and 1/3.

Q.12 In an examination a candidate was asked to find 5/14 of a certain number. He made the mistake of finding 5/4 of it. His answer was 25 more than the correct answer. Find the number.

Q.13 If $\frac{a^n \times 3^2 \times (3^{-n/2})^{-2} - (27)^n}{3^{3m} \times 2^3} = \frac{1}{27}$, show that m = 1 + b.

Q.14 If $x = \sqrt{\frac{3+2\sqrt{2}}{5-2\sqrt{6}}}$, show that $x^2(x-6)^2 = 1$.

Q.15 If $x = \frac{5-\sqrt{21}}{2}$, show that $\left(x^3 + \frac{1}{x^3}\right) - 5\left(x^2 + \frac{1}{x^2}\right) + \left(x + \frac{1}{x}\right) = 0$

Q.16 If $\sqrt[3]{x} + \sqrt[3]{y} + \sqrt[3]{z} = 0$, show that $(x+y+z)^3 = 27xyz$

Q.17 Show that $a = x + \frac{1}{x}$, where $x = \frac{\sqrt{a+2} + \sqrt{a-2}}{\sqrt{a+2} - \sqrt{a-2}}$

Q.18 If $a^x = b^y = c^z$ and $b^2 = ac$ show that $\frac{1}{x} + \frac{1}{z} = \frac{2}{y}$.

Q.19 If $a = \frac{\sqrt{2}+1}{\sqrt{2}-1}$ and $b = \frac{\sqrt{2}-1}{\sqrt{2}+1}$ show that $a^2 + ab + b^2 = 35$.

EXERCISE - 3

Fill in the Blanks :

Q.1 0.578 is ..... number.

Q.2 0.72737475..... ..... number.

Q.3 Irrational number between $\frac{2}{5}$ and $\frac{3}{7}$ is .....

Q.4 Value of a is ..... if $\frac{\sqrt{3}-1}{\sqrt{3}+1} = a + b\sqrt{3}$

Q.5 $125^{-1/3}$ =.....

True/False Statement.

Q.6 Every whole number is a natural number.

Q.7 Every rational number is an integer.

Q.8 Every natural number is a whole number.

Q.9 Every integer is a whole number.

Q.10 Every rational number is a whole number.

EXERCISE - 4

Q.1 $\left(\frac{1}{64}\right)^{0} + (64)^{-1/2} - (-32)^{4/5}$ is equal to –

(A) $-15\frac{7}{8}$ (B) $16\frac{1}{8}$ (C) $-14\frac{7}{8}$ (D) $17\frac{1}{8}$

Q.2 The value of x, when $2^{x+4}.3^{x+1} = 288$.

(A) 1 (B) –1 (C) 0 (D) None

Q.3 Value of $\frac{1}{1+\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{4}} + \frac{1}{\sqrt{4}+\sqrt{5}} + \frac{1}{\sqrt{5}+\sqrt{6}} + \frac{1}{\sqrt{6}+\sqrt{7}} + \frac{1}{\sqrt{7}+\sqrt{8}} + \frac{1}{\sqrt{8}+\sqrt{9}}$

(A) 2 (B) 3 (C) 4 (D) 5

Q.4 When the repeating decimal 0.363636..... is coritten in simple fractional form, the sum of the numerator and denominator is –

(A) 15 (B) 45 (C) 114 (D) 135

Q.5 When simplified the product $\left(1+\frac{1}{2}\right)\left(1+\frac{1}{3}\right)\left(1+\frac{1}{4}\right).....\left(1+\frac{1}{n}\right)$ becomes –

(A) n (B) $\frac{n-1}{2}$ (C) $\frac{n+1}{2}$ (D) $\frac{n}{2}$

Q.6 The number 2.525252 can be written as a function, when reduced to the lowest term, the sum of the numerator and denominator is –

(A) 7 (B) 29 (C) 141 (D) 349

Q.7 If all positive integers are written in a horizontal order starting from 1, then the digit appearing in the 203^{rd} place is –

(A) 0 (B) 1 (C) 3 (D) 2

Q.8 A rational number between $\sqrt{2}$ and $\sqrt{3}$ is –

(A) $\frac{\sqrt{2}+\sqrt{3}}{2}$ (B) $\frac{\sqrt{2}\times\sqrt{3}}{2}$ (C) 1.5 (D) 1.4

Q.9 The value of 0.423 is –

(A) $\frac{423}{1000}$ (B) $\frac{423}{100}$ (C) $\frac{423}{990}$ (D) $\frac{419}{990}$

Q.10 If $a = 2+\sqrt{3}$ and $b = 2-\sqrt{3}$ then $\frac{1}{a^2} - \frac{1}{b^2}$ is equal to –

(A) 14 (B) – 14 (C) $8\sqrt{3}$ (D) $-8\sqrt{3}$

Q.11 Value of x satisfying $\sqrt{x+3} + \sqrt{x-2} = 5$

(A) 6 (B) 7 (C) 8 (D) 9

Q.12 $\sqrt{7-4\sqrt{3}}$ =

(A) $2-\sqrt{3}$ (B) $1-\sqrt{3}$ (C) $2+\sqrt{3}$ (D) $1+\sqrt{3}$

Q.13 If $\sqrt{3} = 1.732$, find the value of $\frac{1}{\sqrt{3}-1}$

(A) 5.689 (B) 1.366 (C) 7.188 (D) 1.867

Q.14 Rationalizing factor of $\sqrt{162}$

(A) $\sqrt{3}$ (B) $\sqrt{2}$ (C) $\sqrt{5}$ (D) $\sqrt{8}$

Q.15 Rationalizing factor of $2+\sqrt{3}$ =

(A) $2-\sqrt{3}$ (B) $\sqrt{3}$ (C) $2+\sqrt{3}$ (D) $3+\sqrt{3}$

Q.16 Rationalizing factor of $1+\sqrt{2}+\sqrt{3}$

(A) $1+\sqrt{2}-\sqrt{3}$ (B) 2 (C) 4 (D) $1+\sqrt{2}+\sqrt{3}$

Q.17 Evaluate $\sqrt[3]{\left(\frac{1}{64}\right)^{-2}}$

(A) 4 (B) 16 (C) 32 (D) 64

Q.18 $\frac{2^{n+3}-2(2^n)}{2^{(2n+2)}}$ when simplified is–

(A) $1-2(2^n)$ (B) $2^{n+3}-\frac{1}{4}$ (C) $1-\frac{1}{4}$ (D) $1-\frac{1}{2}$

Q.19 Find the least number which divided by 8, 12 and 18 leaves as a remainder in each case but when divided by 7, leaves no remainder.

(A) 75 (B) 144 (C) 147 (D) 219

Q.20 From a two digit number N, the number with reversed digits is subtracted. The resulting number is a positive perfect cube. Then–

(A) there are exactly 10 values of N (B) there are exactly 9 values of N
(C) there are exactly 6 values of N (D) no such number is possible.

Q.21 Which of the following statement is not true –

(A) Between two integers, there exist infinite number of rational numbers
(B) Between two rational numbers, there exist infinite number of integers
(C) Between two rational numbers, there exist infinite number of rational numbers
(D) Between two real numbers, there exists infinite number of real numbers

EXERCISE - 5

Match the column– Statements (A, B, C, D) in **column I** have to be matched with statements (p,q, r, s) in **column II**.

Q.1

Column I	**Column II**
(A) Integer	(p) Imaginary number
(B) Zero	(q) Irrational number
(C) natural number	(r) Whole number
(D) Sum of a rational and irrational number	(s) Rational number

Q.2

Column I	**Column II**
(A) $\frac{1}{2+\sqrt{3}}$	(p) Irrational
(B) $64^{1/2}$	(q) $56^{1/2}$
(C) $16^{3/4}$	(r) 8
(D) $7^{1/2}8^{1/2}$	(s) $2-\sqrt{3}$