Number System

QUESTIONS

1. Which of the following is the decimal representation of 1/7

(a) $0.\overline{241857}$ (b) $0.14\overline{2857}$ (c) $0.\overline{142857}$ (d) $0.\overline{148257}$

2. Which of the following equal to $1.\overline{27}$

(a) $\frac{19}{11}$ (b) $\frac{12}{11}$ (c) $\frac{15}{11}$ (d) $\frac{14}{11}$

3. Which of the following statement is not true?

(a) Every integer is a rational number

(b) Every integer is a real number

(c) There can be infinite rational numbers between two rational numbers

(d) Every rational number is a whole number

4. Which of the following is not a rational number

(a) 0 (b) $-\frac{1}{4}$ (c) 23 (d) π

5. Every integer is a ____ number

(a) whole (b) natural (c) rational (d) positive

6. Every ____ number is smaller than 0.

(a) positive (b) rational (c) natural (d) negative

7. If a, a + 2 and a + 4 are prime numbers, then the number of possible solutions for a is

(a) one (b) two (c) three (d) none of these

8. Find the multiplicative inverse of $\left(\frac{3}{8}\right)^{-1}$

(a) $\frac{3}{8}$ (b) $\frac{5}{8}$ (c) 1 (d) 0

9. $0.\overline{8}+0.\overline{4}+0.\overline{5}+0.\overline{7}$ is equal to

(a) $2.\overline{4}$ (b) $2\frac{5}{9}$ (c) $2\frac{2}{3}$ (d) $2\frac{3}{9}$

10. The multiplication $(3+\sqrt{2})(3-\sqrt{2})$ results in a

(a) rational number

(b) irrational number

(c) neither rational nor irrational

(d) imaginary number

11. The rational number for $0.3\overline{51}$ is

(a) $\frac{351}{990}$ (b) $\frac{58}{165}$ (c) $\frac{352}{990}$ (d) $\frac{349}{3990}$

12. **The value of $0.\bar{3}+0.\bar{4}+0.\bar{5}+0.\bar{9}$**

(a) 1.8 (b) $\frac{15}{9}$ (c) $\frac{7}{3}$ (d) 2

13. **What should be subtracted from $\left(\frac{3}{4}-\frac{6}{16}+\frac{5}{24}\right)$ to get $\frac{7}{32}$?**

(a) $\frac{7}{12}$ (b) $\frac{35}{96}$ (c) $\frac{-5}{96}$ (d) $\frac{77}{96}$

14. **Find the sum $\left(\frac{4}{5}+\frac{25}{15}-10\right)+\frac{21}{45}$**

(a) $-\frac{1}{9}$ (b) $1\frac{1}{9}$ (c) $-7\frac{1}{15}$ (d) $4\frac{22}{27}$

15. **The rational number lying between 85 and 90 is**

(a) $\frac{355}{4}$ (b) $\frac{355}{2}$ (c) $\frac{355}{3}$ (d) $\frac{355}{5}$

16. **Which one of the following rational number lies between $\frac{20}{30}$ and $\frac{40}{50}$?**

(a) $\frac{11}{15}$ (b) $\frac{3}{5}$ (c) $\frac{41}{30}$ (d) $\frac{14}{15}$

17. **The real numbers are either rational or irrational. The irrational numbers are the numbers which are non-terminating and non-repeating. Identify the numbers given below as non-terminating and non-repeating.**

(a) $\frac{1}{\sqrt{3}}$ (b) $\frac{4}{5}$ (c) $\frac{5}{2}$ (d) $\frac{\sqrt{36}}{3}$

18. **The value of the given expression $\left(\frac{156}{24}+\left\{\frac{-24}{56}+\frac{26}{112}\right\}\times\frac{112}{44}\right)$ is given by**

(a) $\frac{1}{6}$ (b) $\frac{2}{5}$ (c) $\frac{36}{6}$ (d) 216

19. **What will be the additive inverse of A if A=$\frac{3}{5}-\frac{4}{27}+\frac{5}{18}$**

(a) $\frac{127}{270}$ (b) $\frac{270}{127}$ (c) $\frac{-197}{270}$ (d) $\frac{270}{197}$

20. **The multiplicative identity of the rational number $\frac{455}{1024}$, is**

(a) $\frac{1024}{455}$ (b) $\frac{1}{455}$ (c) $\frac{1}{1024}$ (d) 1

21. The largest rational number among the following rational numbers is:

(a) $\frac{44}{34}$ (b) $\frac{55}{85}$ (c) $\frac{76}{68}$ (d) $\frac{98}{102}$

22. Which one of the following is a natural number?

(a) $\frac{14}{56}$ (b) $\frac{19}{57}$ (c) $\frac{91}{13}$ (d) $\frac{45}{135}$

23. The multiplicative inverse of $\frac{97}{89}$ is

(a) $\frac{97}{89}$ (b) $\frac{89}{97}$ (c) $\frac{1}{97}$ (d) $\frac{1}{89}$

24. The additive identity of the given number $\frac{576}{890}$ is

(a) 1 (b) $\frac{576}{890}$ (c) $\frac{890}{576}$ (d) 0

25. The area of a rectangular room is $45\frac{1}{4}$ m². If breadth is $9\frac{3}{7}$ m, then its length is

(a) $\frac{255}{264}m$ (b) $\frac{1215}{28}m$ (c) $\frac{255}{28}m$ (d) $\frac{1267}{264}m$

26. In a school, $\frac{5}{8}$ of the total students are boys. If there are 360 girls, then the number of students in the school is

(a) 960 (b) 500 (c) 360 (d) 920

27. Arwin earns Rs. 1200 per month, he spends $\frac{1}{4}$ of his income on food, $\frac{13}{10}$ of the 410 remaining money on house rent and $\frac{5}{21}$ of the remaining money on the education of his children. How much money does he save in a month?

(a) Rs. 450 (b) Rs. 420 (c) Rs. 400 (d) Rs. 480

28. Write four rational numbers between $\frac{1}{3}$ and $\frac{1}{2}$

(a) $\frac{5}{2}, \frac{29}{24}, \frac{11}{24}, \frac{21}{28}$ (b) $\frac{7}{12}, \frac{13}{12}, \frac{21}{24}, \frac{9}{24}$

(c) $\frac{5}{12}, \frac{9}{24}, \frac{11}{24}, \frac{21}{48}$ (d) $\frac{7}{24}, \frac{11}{24}, \frac{21}{48}, \frac{13}{24}$

29. Compare $\frac{2}{5}$ and $\frac{1}{2}$

(a) $\frac{2}{5} < \frac{3}{4}$ (b) $\frac{2}{5} > \frac{3}{4}$ (c) $\frac{2}{5} = \frac{3}{4}$ (d) $\frac{2}{5} \leq \frac{3}{4}$

30. **A number of the form p/q is said to be a rational number if**

(a) p and q are integers (b) p and q are integers and $q \neq 0$

(c) p and q are integers and $p \neq 0$ (d) p and q are integers and $p \neq 0$ also $p \neq 0$

31. **The value of** $\frac{1}{\sqrt{6.25}+\sqrt{5.25}}+\frac{1}{\sqrt{4.25}+\sqrt{3.25}}+\frac{1}{\sqrt{5.25}+\sqrt{4.25}}+\frac{1}{\sqrt{3.25}+\sqrt{2.25}}$ **is**

(a) 1.00 (b) 1.25 (c) 1.50 (d) 2.25

32. **The value of** $\sqrt{4\sqrt[3]{16\sqrt{4\sqrt[3]{16\sqrt{4\sqrt[3]{16}}}}}}$ **up to** ∞ **is**

(a) 2 (b) 2^2 (c) 2^3 (d) 2^5

33. **If m =** $\sqrt{3+\sqrt{3+\sqrt{3+.....}}}$ **up to** ∞

n= $\sqrt{3-\sqrt{3-\sqrt{3-.....}}}$ **up to** ∞

Then among the following the relation between m and n holds is

(a) $m-n+1=0$ (b) $m+n-1=0$ (c) $m+n+1=0$ (d) $m-n-1=0$

34. **If x=** $\frac{\sqrt{3}}{2}$**, then the value of** $\sqrt{1+x}+\sqrt{1-x}$ **is**

(a) $\sqrt{3}$ (b) $\frac{\sqrt{3}}{2}$ (c) $2+\sqrt{3}$ (d) $2-\sqrt{3}$

35. **If A=** 2^x**, B=** 4^y **c=** 8^z **where x=** $0.\bar{1}$**,** $y=0.\bar{4}, z=0.\bar{6}$**, then** $A \times B \times C$ **is**

(a) 8 (b) 2 (c) 16 (d) 4

36. **If** $x=2.\bar{3}-0.\bar{9}$**,** $y=2.\bar{5}-0.\bar{5}$**, then** x^2+y^2-2xy **is**

(a) $\frac{1}{4}$ (b) $\frac{1}{3}$ (c) $\frac{1}{2}$ (d) $\frac{1}{5}$

37. $\frac{4^{-3}\times a^{-5}\times b^{-4}}{4^{-5}\times a^{-8}\times b^{3}}$ **=**

(a) $16\frac{a^3}{b^7}$ (b) $8\frac{a^2}{b^{-7}}$ (c) $2\frac{a^{-13}}{b^{-7}}$ (d) $\frac{a^8}{b^{-1}}$

38. **If** $7\sqrt[4]{162}-5\sqrt[4]{32}+\sqrt[4]{1250}$ **is simplified, then the resultant value is**

(a) $6\sqrt[3]{2}$ (b) $6\sqrt[4]{2}$ (c) $6\sqrt[5]{2}$ **(d)** $16\sqrt[4]{2}$

39. **If** $2^{x-1}+2^{x+1}=640$**, the value of x is**

(a) 7 (b) 8 (c) 9 (d) 6

40. **The largest among the numbers** $2^{250}, 3^{150}, 5^{100}$ **and** 4^{200} **is**

(a) 4^{200} (b) 5^{100} (c) 2^{250} (d) 2^{150}

ANSWER - KEY									
1. (c)	**2.** (d)	**3.** (d)	**4.** (d)	**5.** (c)	**6.** (d)	**7.** (a)	**8.** (a)	**9.** (c)	**10.** (a)
11. (b)	**12.** (c)	**13.** (b)	**14.** (c)	**15.** (a)	**16.** (a)	**17.** (a)	**18.** (c)	**19.** (c)	**20.** (d)
21. (a)	**22.** (c)	**23.** (b)	**24.** (d)	**25.** (d)	**26.** (a)	**27.** (d)	**28.** (c)	**29.** (a)	**30.** (b)
31. (a)	**32.** (b)	**33.** (d)	**34.** (a)	**35.** (a)	**36.** (a)	**37.** (a)	**38.** (d)	**39.** (b)	**40.** (a)

Answers and Solutions

1. (c):

$$7\overline{)10}(0.1428571.....$$

$$\begin{array}{r} 7 \\ \hline 30 \\ 28 \\ \hline 20 \\ 14 \\ \hline 60 \\ 56 \\ \hline 40 \\ 35 \\ \hline 50 \\ 49 \\ \hline 10 \\ 7 \\ \hline 30..... \end{array}$$

2. (d) $1.\overline{27} = 1 + \frac{27}{99} = \frac{126}{99} = \frac{14}{11}.$

3. (d) Not Available

4. (c) Not Available

5. (d) Not Available

6. (d) Not Available

7. (a): Only solution is a = 3

$\Rightarrow$ 3, 5, 7 are prime numbers.

After this same of such nos. become multiplied of these very prime nos.

Eg: 5, 7, 9 (9 is a multiple of 3)

11, 13, 15 (15 is a multiple of 3).

8. (a): Let 'a' be multiplicative inverse

Then, $a \times \left(\frac{3}{8}\right)^{-1} = 1$

$\Rightarrow a = \frac{3}{8}.$

9. (c): $\frac{8}{9} + \frac{4}{9} + \frac{5}{9} + \frac{7}{9}$

$= \frac{8+4+5+7}{9} = \frac{24}{9} = \frac{8}{3}$

10. (a): $(3+\sqrt{2})(3-\sqrt{2})$

$= 9 - 2 = 7 =$ rational number.

11. (b): $0.3\overline{51} = 0.3 + 0.0\overline{51}$

$$= 0.3 + \frac{1}{10} \times \left\{0.\overline{51}\right\}$$

$$= 0.3 + \frac{1}{10} \times \frac{51}{99}$$

$$\frac{3}{10} + \frac{51}{990}$$

$$= \frac{297 + 51}{990} = \frac{348}{990} = \frac{116}{330} = \frac{58}{165}.$$

12. (c): $\frac{3}{9} + \frac{4}{9} + \frac{5}{9} + \frac{9}{9}$

$$= \frac{21}{9} = 7/3.$$

13. (b): Let 'x' be subtrahend

$$\therefore \left(\frac{3}{4} - \frac{6}{16} + \frac{5}{24}\right) - x = 7/32$$

$$\Rightarrow \frac{3}{4} - \frac{6}{16} + \frac{5}{24} - 7/32 = x$$

$$\Rightarrow \frac{72 - 36 + 20 - 21}{96} = x$$

$$\Rightarrow \frac{35}{96} = x.$$

14. (c): $\frac{4}{5} + \frac{25}{15} - 10 + \frac{21}{45}$

$$= \frac{36 + 75 - 450 + 21}{45}$$

$$= \frac{-318}{45} = \frac{-106}{15} = -7\frac{1}{15}.$$

14. (a): Value should be between 85 & 90.

15. (a): Not Available

16. (a) Not Available

17. (a): Irreducible square root is an indication of irrational no. Here $\sqrt{3}$ cannot be further reduced whereas $\sqrt{36}$ can be reduced as $\sqrt{6 \times 6} = 6$.

18. (c) $\frac{\cancel{15}6}{\cancel{24}} + \left\{\frac{-\cancel{24}}{\cancel{56}} + \frac{\cancel{26}}{\cancel{112}}\right\} \times \frac{\cancel{112}}{\cancel{44}}$

$$= \frac{13}{2} + \left\{\frac{-3}{7} + \frac{13}{56}\right\} \times \frac{28}{11}$$

$$= \frac{13}{2} + \left\{\frac{-24+13}{56}\right\} \times \frac{28}{11}$$

$$= \frac{13}{2} - \frac{1}{2} = 6 = \frac{36}{6}$$

19. (c) $A = \frac{162-40+75}{270} = \frac{197}{270}$

Additive inverse $= \frac{-197}{270}$.

20. (a): Multiplicative Identity is always 1.

21. (a): Only $\frac{44}{34} > 1$.

22. **(c):** $\frac{91}{13} = \mathbf{7} \in \mathbf{N}$

23. (b): M.I. $= \frac{1}{97/89} = \frac{89}{97}$.

24. (d): A.I. is always 0.

25. (d): length × breadth = area

$\therefore$ length $= \frac{45\frac{1}{4}}{9\frac{3}{7}} = \frac{181}{4} \times \frac{7}{66}$

$= \frac{1267}{264}$.

26. (a): $\frac{5}{8}$ x are boys where x = total students $\Rightarrow \frac{3}{8}x$ are girls.

27. (d): $1200 - \frac{1}{4} \times 1200 = 900$

$900 - \frac{3}{10} \times 900 = 630$

$630 - \frac{5}{21} \times 630 = 480$ Rs /-.(savings)

28. (c): Choose option in which all nos. are $> \frac{1}{3}$ but $< \frac{1}{2}$.

29. (a): You can take LCM & see which has greater numerator $\frac{2}{5} = \frac{8}{20}$ whereas $\frac{3}{4} = \frac{15}{20}$

Or else, $\frac{2}{5} = 0.4$ and $\frac{3}{4} = 0.75$.

30. (b): By definition

31. (a): Rationalizing each term,

$\frac{\sqrt{6.25}-\sqrt{5.25}}{1}+\frac{\sqrt{4.25}-\sqrt{3.25}}{1}+\frac{\sqrt{5.25-\sqrt{4.25}}}{1}+\frac{\sqrt{3.25}-\sqrt{2.25}}{1}=\sqrt{6.25}-\sqrt{2.25}=2.5-1.5=1$

32. (b): Let expression be 'x'.

Squaring, $x^2=4\times\sqrt[3]{16\times\sqrt{4\times\sqrt[3]{}}}$

$x^6=64\times16\times\underbrace{\sqrt{4\times\sqrt[3]{16\times}}}_{x}$.....

$x^6=1024x$

solving $x=4=2^2$.

33. (d): $m^2=m+3$

$n^2=3-n$

Solving for m & n and then

Subtracting m & n

We get $m-n=1$

$\Rightarrow m-n-1=0.$

34. (a): Let $y=\sqrt{1+x}+\sqrt{1-x}$

$y^2=2+2\sqrt{1-x^2}$

$=2\left[1+\sqrt{1-3/4}\right]=3$

$\Rightarrow y=\sqrt{3}$

35. (a): $A\times B\times C=2^x\times\left(2^2\right)^y\times\left(2^3\right)^z$

$=2^{x+2y+3z}$

$\therefore x+2y+3z=\frac{1}{9}+\frac{8}{9}+\frac{18}{9}$

$=\frac{27}{9}=3$

$\therefore A\times B\times C=2^3=8.$

36. (a): $x^2+y^2-2xy=\left(x-y\right)^2$ and solve

37. (a): $\frac{4^{-3}\times a^{-5}\times b^{-4}}{4^{-5}\times a^{-8}\times b^3}$

$=4^2\times a^3\times b^{-7}=\frac{16a^3}{b^7}$.

38. **(d):** $7\times\sqrt[4]{81\times2}-5\times\sqrt[4]{16\times2}+\sqrt[4]{625\times2}$

$=7\times3\times2^{\frac{1}{4}}-5\times2\times2^{\frac{1}{4}}+5\times2^{\frac{1}{4}}$

$= 2^{\frac{1}{4}}\left[21 - 10 + 5\right]$

$= 16 \times \sqrt[4]{2}.$

39. (b): $2^{X-1} + 2^{X+1} = 640$

$= 2^{x-1} + 4 \times 2^{x-1} = 640$

Put, $2^{x-1} = P$

$\Rightarrow 5P = 640 \Rightarrow P = 128$

$2^{x-1} = 128 \Rightarrow x - 1 = 7$

$\Rightarrow x = 8.$

40. (a): Comparing between $\mathbf{2^{250}, 3^{150}, 4^{200}}$, the obvious result (for largest) is 4^{200} .

Now between 5^{100} & 4^{200}.

Taking log,

100 log 5 and 200 log4 have to be compared

Let us write 200 as $100 \times 2.$

$\therefore 200 \log 4 = 100 \times 2 \; log \; 4$

$= 100 \times \log 4^2$

$= 100 \times \log 16$

Now comparing 100 log 5 and 100 × log 16, latter is obviously greater

$\Rightarrow$ 100 log 16 = 200 log 4

$\Rightarrow 4^{200}$ is the greatest.