

2. DECIMAL REPRESENTATION OF RATIONAL NUMBERS ① Class: VIII; MATHEMATICS INTEGRATED; SOLUTIONS.

TEACHING TASK (2025/26)
JEE MAINS

Q1. Let $x = 1.\overline{27}$
Short cut method.

$$x = \frac{\text{(Full number without decimal)} - \text{(Number before repeating start)}}{\text{(999... for repeating digits)} - \text{(00... for non-repeating digits after decimal)}}$$

$$x = \frac{127 - 1}{99} = \frac{126}{99} = \frac{14}{11}$$

Ans. A

Q2 $x = 0.\overline{47}$
 $= \frac{47}{99}$

Ans. B

~~Q3~~ ~~Q4~~

03

$$x = 0.\overline{82} \quad y = 0.\overline{17} \quad A = 0.\overline{7} \quad B = 0.\overline{2}$$

$$x = \frac{82}{99} \quad y = \frac{17}{99} \quad A = \frac{7}{9} \quad B = \frac{2}{9}$$

$$(x+y) + (A+B) = \left(\frac{82}{99} + \frac{17}{99}\right) + \left(\frac{7}{9} + \frac{2}{9}\right)$$

$$= \left(\frac{99}{99}\right) + \left(\frac{9}{9}\right)$$

$$= 1 + 1$$

$$= 2$$

$$\therefore \text{Final Answer} = 2^2 = 4$$

Ans: A

04

$$2.\overline{34} + x = 4.\overline{53}$$

$$\Rightarrow x = 4.\overline{53} - 2.\overline{34}$$

$$= \frac{453-4}{99} - \frac{234-23}{90}$$

$$= \frac{449}{99} - \frac{211}{90}$$

$$= \frac{2169}{990} = \frac{241}{110} = 2.1909090\ldots$$

$$\approx 2.\overline{18} \quad \text{Ans D}$$

05

$$5.\overline{36} - x = 2.\overline{75}$$

$$\Rightarrow x = 5.\overline{36} - 2.\overline{75}$$

$$= \frac{536-53}{90} - \frac{275-27}{90} = \frac{235}{90}$$

$$= 2.611\ldots$$

$$= 2.\overline{61} \quad \text{Ans B}$$

06

$$3.2\overline{7} = \frac{327-32}{90} = \frac{295}{90}$$

(3)

$$7.8\overline{3} = \frac{783-78}{90} = \frac{705}{90}$$

$$\therefore a = \frac{7.8\overline{3}}{3.2\overline{7}} = \frac{705}{295} = \frac{141}{59}$$

Ans. A

07

$$8.4\overline{6} = \frac{846-84}{90} = \frac{762}{90}$$

$$3.4\overline{3} = \frac{343-34}{90} = \frac{309}{90}$$

$$\text{Now } \frac{8.4\overline{6}}{x} = 3.4\overline{3}$$

$$\therefore x = \frac{8.4\overline{6}}{3.4\overline{3}} = \frac{762}{309} = \frac{254}{103}$$

Ans. D

08

$$1.4\overline{34} = \frac{1434-14}{990} = \frac{1420}{990}$$

$$\text{Now, } 1.4\overline{34} \times 100 = \frac{1420}{990} \times 100 = \frac{14200}{99}$$

Ans. D

09

$$2.3\overline{7} = \frac{237-23}{90} = \frac{214}{90}$$

$$3.0\overline{4} = \frac{304-30}{90} = \frac{274}{90}$$

$$\text{Now Ans: } \frac{214}{90} + \frac{274}{90} = \frac{488}{90} = 5.4\overline{2}$$

$$\text{Double the Number} = 10.8\overline{4}$$

Ans. A

$$10 \quad 0.\overline{6} = \frac{6}{9} = \frac{2}{3}$$

(4)

$$\begin{aligned} (8 + 0.\overline{6}) \frac{1}{2} &= \left(8 + \frac{2}{3}\right) \frac{1}{2} \\ &= \left(\frac{26}{3}\right) \times \frac{1}{2} = \frac{13}{3} = 4\frac{1}{3} \quad \text{Ans. D} \end{aligned}$$

$$11 \quad \text{Given } 0.1632$$

$$A) \frac{1}{6} = 0.166\overline{6}$$

Ans. A

$$12 \quad 0.666\ldots = 0.\overline{6} = \frac{2}{3}$$

$$0.777\ldots = 0.\overline{7} = \frac{7}{9}$$

$$\text{product} = \frac{2}{3} \times \frac{7}{9} = \frac{14}{27} = 0.5185\ldots \quad \text{Ans. B}$$

$$13 \quad \frac{1}{7} = 0.\overline{142857}$$

periodicity = 6

Ans. C

$$14 \quad \sqrt{2}$$

Ans. C

$$\begin{aligned} 15 \quad x &= 0.123123123\ldots \\ x &= 0.\overline{123} \\ x &= \frac{123}{999} \end{aligned} \quad \left| \quad \begin{aligned} \frac{1000x}{9} &= \frac{123}{999} \times \frac{1000}{9} \\ &= 13.67 \quad \text{Ans. A} \end{aligned} \right.$$

$$16 \quad 0.777\ldots = 0.\overline{7} = \frac{7}{9}$$

Ans. A

$$17 \quad 0.\overline{142857} = \frac{142857}{999999} = \frac{1}{7}$$

Ans. A

JEE ADVANCED LEVEL

(5)

01 B) $\frac{5}{64} = \frac{5}{2^6} \rightarrow$ Terminating

C) $\frac{13}{125} = \frac{13}{5^3} \rightarrow$ Terminating Ans: B, C

02 A) $\frac{15}{99} \neq \frac{15}{2^m \times 5^n} \rightarrow$ Non Terminating

D) $\frac{23}{60} \neq \frac{23}{2^m \times 5^n} \rightarrow$ Non Terminating Ans: A, D

03 $0.\overline{428571} = \frac{428571}{999999} = \frac{3}{7} = 0.\overline{428571}$ Ans: B

04 $\frac{7}{15} = 0.46666 \dots = 0.467$ (approx) Ans: A, D

05 Assertion: Conceptual (True)

Reason: Conceptual (True)

Ans: A

06 Assertion: Conceptual (True)

Reason: Conceptual (True)

Ans: A

07 Assertion: Conceptual (True)

Reason: Conceptual (True)

Ans: A

08 Statement I: Conceptual (~~False~~) (True)

Statement II: Conceptual (False)

Ans: C

09. Statement I: Conceptual (False)

(6)

Statement II: Conceptual (True)

Ans: D

10 Statement I: $\frac{137}{25} = \frac{137}{5^2} \rightarrow$ Terminating (True)

Statement II: Conceptual (True)

Ans: A

11 Statement I: $\frac{82}{126} = \frac{85}{125} = \frac{85}{5^3} \rightarrow$ Terminating (True)

$= 0.68$

Statement II: Conceptual (True)

Ans: A

12 Conceptual

Ans: D

13 Conceptual

Ans: C

14 $\frac{5}{8} = 0.625$

Ans: A

15 $0.333 \dots$

Ans: C

16 Conceptual

Ans: B

17 $\frac{13}{125} = \frac{13}{5^3} \rightarrow$ Terminating

Ans: C

18 $\frac{15}{99} \neq \frac{15}{2^m \times 5^n} \rightarrow$ Non-Terminating

Ans: A

19 $\frac{5}{13} = 0.384615 \rightarrow$ periodicity = 6

Ans: 6

20 $5.2\overline{3} \rightarrow$ periodicity = 2

Ans: 2

2)

$$\begin{array}{r}
 2 \overline{) 1000} \\
 \underline{2 \overline{) 500}} \\
 2 \overline{) 250} \\
 \underline{5 \overline{) 125}} \\
 5 \overline{) 25} \\
 \underline{5}
 \end{array}$$

$$1000 = 2^3 \times 5^3 = 2^m \times 5^n$$

$$\therefore m = 3$$

Am: 3

⑦

22

$$\frac{25}{1000} = 0.025 \rightarrow \text{three}$$

Am: 3

23

$$a) \frac{1}{3} = 0.333 \dots (R)$$

$$b) \frac{1}{16} = 0.0625 (Q)$$

$$c) \frac{1}{7} = 0.\overline{142825} (S)$$

$$d) \frac{5}{2} = 2.5 (P)$$

Am: R, Q, S, P

24

$$a) 0.1616 \dots \rightarrow \text{Non-terminating repeating decimal (P)}$$

$$b) 0.2 \rightarrow \text{terminating (R)}$$

$$c) 3.\overline{142857} \rightarrow \text{Non-terminating repeating (P)}$$

$$d) 0.101001000 \dots \rightarrow \text{Non-terminating non-repeating (S)}$$

Am: P, R, P, S

LEARNER'S TASK (CUE'S)

01.

Conceptual

Am: D

02

$$\frac{3}{11} = 0.\overline{27} \rightarrow \text{period} = 27$$

Am: B

03

$$\frac{1}{6} = 0.1\overline{6} \rightarrow \text{periodicity} = 1$$

Am: A

$$04. \quad 1.\overline{79} = \frac{179-1}{99} = \frac{178}{99} \quad \text{Ans: B} \quad \textcircled{8}$$

$$05. \quad \frac{9}{11} = 0.\overline{81} \quad \text{Ans: A}$$

$$06. \quad \frac{5}{13} = 0.\overline{384615} \quad \text{Ans: B}$$

$$07. \quad 2.\overline{6} = 2 + 0.\overline{6} \\ = 2 + \frac{2}{3} \quad \text{Ans: C}$$

$$08. \quad \text{A) } \frac{39}{24} = \frac{13}{8} = \frac{13}{2^3} \rightarrow \text{Terminating} \\ \text{B) } \frac{137}{25} = \frac{137}{5^2} \rightarrow \text{Terminating} \quad \text{Ans: D}$$

$$09. \quad \pi = \frac{22}{7} \quad \text{Ans: A}$$

$$10. \quad \frac{1}{7} \quad \text{Ans: B}$$

$$11. \quad \frac{17}{200} = \frac{17}{2^3 \times 5^2} \rightarrow \text{Terminating} \quad \text{Ans: A}$$

$$12. \quad 2.\overline{4} \times 3 = \frac{22}{9} \times 3 = \frac{22}{3} = 7\frac{1}{3} \quad \text{Ans: B}$$

$$13. \quad 0.654 = \frac{654}{1000} \quad \text{Ans: B}$$

JEE MAINS LEVEL

$$01. \quad \text{A) } \sqrt{7} \quad \text{Ans: C}$$

$$02. \quad 5.2\overline{32} \rightarrow \text{period} = 32 \\ \text{periodicity} = 2 \quad \text{Ans: D}$$

$$03 \quad 1.\overline{27} = \frac{127-1}{99} = \frac{126}{99} = \frac{42}{33} = \frac{14}{11} \quad \text{Ans: B} \quad \textcircled{9}$$

$$04 \quad 0.1\overline{23} = \frac{123-12}{900} = \frac{111}{900} \quad \text{Ans: B}$$

$$05 \quad 7 - 3.\overline{3} = 7 - 3\frac{1}{3} = 7 - \frac{10}{3} = \frac{11}{3} = 3\frac{2}{3} \quad \text{Ans: D}$$

$$06 \quad 0.\overline{9} = \frac{9}{9} = 1 \quad \text{Ans: D}$$

$$07 \quad \frac{263}{125} = 2.104 \quad \text{Ans: B}$$

$$08 \quad \frac{13}{125} = \frac{13}{5^3} \rightarrow \text{Terminating} \quad \text{Ans: C}$$

$$09 \quad \frac{23}{60} \neq \frac{23}{2^m \times 5^n} \rightarrow \text{Non-terminating} \quad \text{Ans: D}$$

$$10 \quad 8.9\overline{34} = \frac{8934-89}{990} \\ = \frac{8845}{990} \times 100 = \frac{88450}{99} \quad \text{Ans: A}$$

note: Q no: 11, 12, 13 repeated

$$11 \quad 2.3\overline{4} + x = 4.5\overline{3} \Rightarrow x = 2.1\overline{8} \quad \text{Ans: D}$$

$$12 \quad 5.3\overline{6} - x = 2.7\overline{5} \Rightarrow x = 2.6\overline{1} \quad \text{Ans: B}$$

$$13 \quad \frac{8.4\overline{6}}{x} = 3.4\overline{3} \Rightarrow x = \frac{254}{103} \quad \text{Ans: D}$$

$$14 \quad c) \frac{13}{125} = \frac{13}{5^3} \quad \text{Ans: C}$$

JEE ADVANCED LEVEL

(10)

01 A) $0.6 = \frac{6}{10} = \frac{3}{5}$

Ans. A, D

02 $0.1\bar{6} = \frac{16-1}{90} = \frac{15}{90} = \frac{1}{6}$

Ans. B, C

03 $\frac{3}{5} - \frac{1}{4} = \frac{7}{20} = 0.35 = \frac{35}{100}$

Ans. A, B, D

04 $0.\bar{3} = \frac{3}{9}$

$0.1\bar{8} = \frac{18-1}{90} = \frac{17}{90}$

$\therefore \frac{3}{9} - \frac{17}{90}$
 $= \frac{30-17}{90} = \frac{13}{90} = 0.1\bar{4}$

Ans. B, C

05 $0.2\bar{6} = \frac{26-2}{90} = \frac{24}{90} = \frac{12}{45} = \frac{4}{15}$

$(7 + \frac{4}{15}) \times \frac{1}{2} = \frac{109}{30} = 3.6\bar{3}$

Ans. A, D

06 Assertion: Conceptual (True)

Reason: Conceptual (True)

Ans. A

07 Assertion: Conceptual (True)

Reason: Conceptual (True)

Ans. A

08 Assertion: Conceptual (True)

Reason: Conceptual (True)

Ans. A

~~Ans. A~~

09 Statement I: $\frac{7}{16} = 0.4375$ (True) (11)
Statement II: Conceptual (True) Ans: A

10 Statement I: $\pi = 3.142157142857 \dots$ (True)
Statement II: Conceptual Terminating (True) Ans: A

11 $\sqrt{2}$ Ans: A

12 $A = 2.\overline{37} = \frac{237-23}{90} = \frac{214}{90}$
 $B = 3.\overline{04} = \frac{304-30}{90} = \frac{274}{90}$
 $A+B = \frac{214}{90} + \frac{274}{90} = \frac{488}{90}$
 $\frac{1}{2}(A+B) = \frac{244}{90} = 2.\overline{71}$ Ans: A

13 ~~A+B~~ $B-A = \frac{274}{90} - \frac{214}{90} = \frac{60}{90} = \frac{2}{3}$
 $\frac{1}{2}(B-A) = \frac{1}{3} = 0.\overline{3}$ Ans: B

14 $125 = 5^3 = 2^0 \times 5^3 \rightarrow 0$ Ans: 0

15 $\frac{1}{3} = 0.\overline{3} \rightarrow 3$ Ans: 3

$$16 \quad \frac{45}{1000} = 0.045 \rightarrow 3$$

Am: 3 ⁽¹²⁾

$$17 \quad A) 15.\overline{02} = \frac{1502 - 150}{90} = \frac{1352}{90} (R)$$

$$\begin{array}{r} 1502 \\ - 150 \\ \hline 1352 \end{array}$$

$$B) 1.\overline{3} = \frac{13 - 1}{9} = \frac{12}{9} = \frac{4}{3} (P)$$

$$C) 0.25 = \frac{25}{100} = \frac{1}{4} (Q)$$

$$D) 0.37\overline{5} = \frac{375 - 37}{900} = \frac{338}{900} = \frac{169}{450} (T)$$

$$\begin{array}{r} 375 \\ - 37 \\ \hline 338 \end{array}$$

Am: R, P, Q, T

$$18 \quad A) \frac{2}{100} + \frac{3}{100} = \frac{5}{100} = 0.05 (Q)$$

$$B) 10\frac{1}{10} = \frac{101}{10} = 10.1 (R)$$

$$C) 3\frac{1}{4} = \frac{13}{4} = 3.25 (S)$$

$$D) \frac{6}{25} = \frac{24}{100} = 0.24 (P)$$

Am: Q, R, S, P

$$19 \quad A) \frac{7}{8} = 0.875 ()$$

$$C) \frac{66}{25} = \frac{264}{100} = 2.64$$

$$B) \frac{5}{3} = 1.\overline{6} (P)$$

$$D) \frac{100}{9} = 11.\overline{1} (R)$$

Am: —, P, —, R

$\Rightarrow$ THE END $\Leftarrow$