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**DP SINGH**

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12+ Years teaching experience

For govt. exam like SSC /RAILWAY/ BANK

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This book is specially designed for aspirants preparing for all major Railway examinations. It is a chapter-wise, type-wise, and exam-wise Mathematics Question Bank, prepared according to the latest exam pattern of RRB NTPC (CBT - 1 & 2), RRB Group D (CBT - 1), RRB JE (CBT - 1), RRB ALP & Technician (CBT - 1 & 2), RPF Constable & SI (CBT - 1). The book provides effective practice to help candidates build strong calculation skills, better question understanding and high scores in the exam.

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- Questions are arranged chapter-wise, type-wise and exam-wise, making practice systematic, organized and exam-oriented.
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- Contains 1400+ TCS-based Previous Years' Questions (PYQs) asked in Railway examinations.
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(Complete Information about RRB Exam and Company Helpline No. given for any problem Related to Book and exam)

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			> RRB JE	2		
		21.	Statistics	1. Questions Based on Range		
> RRB NTPC	1					
> RRB ALP	1					
2. Mean of Ungrouped & Grouped Data by Direct Method	> RRB JE			1		
	> RRB Group-D			2		
	> RRB NTPC			5		
	> RRB ALP			2		
3. Median of Ungrouped and Grouped Data	> RRB Group-D			2		
	> RRB NTPC			2		
	> RRB ALP			3		
	> RRB JE			2		
4. Mode of Ungrouped and Grouped Data	> RRB NTPC			2		
	> RRB ALP			3		
5. Relation between Mean, Median and Mode	> RRB Group-D			4		
	> RRB NTPC			3		
	> RRB ALP			1		
6. Questions Based on Variance	> RRB NTPC			1		
	> RRB ALP			1		
7. Questions Based on Standard Deviation	> RRB NTPC			3		
	> RRB JE	1				
8. Questions Based on Co-efficient of Variation	> RRB NTPC	1				
9. Questions Based on Mean Deviation	> RRB NTPC	1				
22.	Data Interpretation	1. Questions Based on Tabulation	> RRB NTPC	10	50 Questions With Solutions	62-67
			> RRB ALP	9		
		2. Questions Based on Line Graph	> RRB Group-D	1		
			> RRB ALP	4		
		3. Questions Based on Bar Graph	> RRB Group-D	2		
			> RRB NTPC	4		
			> RRB ALP	7		
		4. Questions Based on Pie Chart	> RRB NTPC	2		
			> RRB ALP	10		
			> RRB JE	1		

Chapter No.	Chapter Name	Name of Topic	Exam Name (Best Questions Covered till October, 2025)	No. of Ques.	Total Questions	Page No.
23.	Area of Plane Figures	1. Questions Based on Perimeter	> RRB NTPC	1	47 Questions With Solutions	68-70
			> RRB ALP	1		
		2. Finding Area of Triangle by Formula	> RRB NTPC	2		
			> RRB ALP	1		
		3. Finding Area of Triangle by Heron's Formula	> RRB NTPC	1		
		4. Finding Area of Quadrilateral by Dividing it into Two Triangles	> RRB ALP	2		
			> RRB Group-D	2		
		5. Questions Based on Area of Rectangle and Square	> RRB NTPC	3		
			> RRB ALP	3		
			> RRB JE	1		
			> RRB Group-D	1		
		6. Questions Based on Area of Parallelogram	> RPF Constable	1		
			> RRB NTPC	1		
			> RRB ALP	1		
			> RRB Group-D	1		
		7. Questions Based on Area of Rhombus	> RRB Group-D	1		
			> RRB NTPC	3		
			> RRB ALP	6		
		8. Questions Based on Area of the Inner or Circumscribed Path	> RRB Group-D	1		
			> RRB NTPC	2		
> RRB ALP	1					
> RRB JE	1					
9. Questions Based on Area of Circle and Ring	> RRB ALP	1				
10. Questions Based on Embedded Figure	> RRB NTPC	1				
	> RRB JE	1				
11. Questions Based on Similar Triangles	> RPF Technician	1				
12. Miscellaneous	> RPF SI	1				
	> RRB ALP	5				
	> RRB JE	1				

Chapter No.	Chapter Name	Name of Topic	Exam Name (Best Questions Covered till October, 2025)	No. of Ques.	Total Questions	Page No.
24.	Surface Area and Volume	1. Questions Based on Cube & Cuboid	> RRB Group-D	2	<b>65 Questions With Solutions</b>	<b>71-74</b>
			> RRB NTPC	4		
			> RRB ALP	12		
		2. Questions Based on Right Circular Cylinder	> RRB Constable	1		
			> RRB Group-D	2		
			> RRB NTPC	5		
			> RRB JE	2		
		3. Questions Based on Hollow Cylinder	> RPF Constable	1		
			> RRB Group-D	1		
			> RRB NTPC	2		
			> RRB ALP	2		
		4. Questions Based on Right Circular Cone	> RPF SI	2		
			> RRB NTPC	5		
			> RRB ALP	2		
			> RRB JE	5		
		5. Question Based on Frustum	> RRB ALP	1		
		6. Questions Based on Sphere & Hemisphere	> RRB NTPC	5		
> RRB ALP	4					
> RRB JE	3					
7. Questions Based on Polygons	> RPF Constable	2				
	> RRB ALP	1				
8. Miscellaneous	> RRB NTPC	1				
25.	Algebra	1. Questions Based on Identities	> RRB Group-D	13	<b>60 Questions With Solutions</b>	<b>75-77</b>
			> RRB NTPC	22		
			> RRB ALP	12		
			> RRB JE	2		
		2. Questions Based on Minimum and Maximum Values	> RRB Technician	1		
			> RRB NTPC	1		
			> RRB ALP	1		
		3. Factors	> RRB Group-D	1		
			> RRB NTPC	7		

Chapter No.	Chapter Name	Name of Topic	Exam Name (Best Questions Covered till October, 2025)	No. of Ques.	Total Questions	Page No.
26.	<b>Linear Equations in One and Two Variables</b>	1. Questions Based on Linear Pair of Equations	➤ RRB Group-D	2	<b>21 Questions With Solutions</b>	<b>78-79</b>
			➤ RRB NTPC	3		
			➤ RRB ALP	7		
			➤ RRB JE	1		
		2. Relation Between Zeroes & its Coefficient	➤ RRB NTPC	1		
			➤ RRB ALP	2		
		3. Questions Based on Condition of One Solution, No Solution, Infinite Solution	➤ RRB NTPC	1		
			➤ RRB ALP	1		
			➤ RRB JE	3		
27.	<b>Quadratic Equation</b>	1. Questions Based on Quadratic Equation of Nature of Roots	➤ RRB Technician	4	<b>34 Questions With Solutions</b>	<b>80-81</b>
			➤ RRB Group-D	8		
			➤ RRB NTPC	4		
			➤ RRB ALP	5		
			➤ RRB JE	5		
		2. Problems Based on Quadratic Equation	➤ RRB Group-D	3		
			➤ RRB NTPC	2		
			➤ RRB ALP	3		
28.	<b>Line and Angle</b>	1. Questions Based on Two Parallel Lines and Their Transversal	➤ RRB Technician	1	<b>15 Questions With Solutions</b>	<b>82-83</b>
			➤ RRB Group-D	2		
			➤ RRB NTPC	9		
			➤ RRB ALP	1		
		2. Questions Based on Complementary and Supplementary Angles	➤ RRB ALP	2		
29.	<b>Triangles</b>	1. Pythagoras Theorem	➤ RRB Group-D	1	<b>23 Questions With Solutions</b>	<b>84-85</b>
			➤ RRB NTPC	3		
			➤ RRB JE	7		
		2. Exterior Angle Property of Triangle	➤ RRB Group-D	1		
		3. Questions Based on Medians and Centroid	➤ RRB NTPC	2		
		4. Relation Between Medians and Sides of Triangle	➤ RRB ALP	1		
		5. Question Based on Incentre/ Circumcentre of Triangle	➤ RRB NTPC	1		
		6. Basic Proportionality Theorem	➤ RRB JE	2		
		7. Questions Based on Similarity Criterion of Triangles	➤ RRB ALP	2		
			➤ RRB JE	1		

Chapter No.	Chapter Name	Name of Topic	Exam Name (Best Questions Covered till October, 2025)	No. of Ques.	Total Questions	Page No.
		8. Mid-Point Theorem	➤ RRB NTPC	3		
		9. Internal & External Angle Bisector Theorem of Triangle	➤ RRB NTPC	2		
		10. Miscellaneous	➤ RRB NTPC	2		
			➤ RRB ALP	1		
30.	Quadrilateral	1. Questions Based on Angle Sum Property of a Quadrilateral	➤ RRB NTPC	3	13 Questions With Solutions	86
		2. Questions Based Properties of Quadrilaterals	➤ RRB Group-D	1		
			➤ RRB NTPC	9		
31.	Polygon	1. Questions Based on Angles of Polygon	➤ RRB Technician	1	20 Questions With Solutions	87
			➤ RRB Group-D	3		
			➤ RRB NTPC	7		
			➤ RRB ALP	2		
			➤ RRB JE	2		
		2. Number of Diagonals in a Polygon	➤ RRB ALP	4		
		3. Number of a Polygon Sides	➤ RRB ALP	1		
32.	Circle	1. Questions Based on Perpendicular Distance from Centre of Circle Bisects its Chord	➤ RRB NTPC	4	15 Questions With Solutions	88-89
			➤ RRB NTPC	1		
		2. Angle at the Centre of Circle is Twice the Subtended by Circumference	➤ RRB NTPC	1		
		3. Question Based on Tangent to Circle	➤ RRB Group-D	1		
		4. Question Related to Tangent and Alternative Angles	➤ RRB NTPC	1		
			➤ RRB ALP	2		
		5. Two Secants are drawn to Circle from an External Point	➤ RRB NTPC	3		
	➤ RRB ALP	2				
6. Miscellaneous	➤ RRB NTPC	2				
	➤ RRB ALP	1				
33.	Trigonometric Ratios and Identities	1. Questions Based on Trigonometric Ratio	➤ RRB NTPC	7	32 Questions With Solutions	90-91
			➤ RRB ALP	2		
			➤ RRB JE	1		
		2. Sum and Difference of Two Angles of Trigonometric Function	➤ RRB ALP	1		
		3. Product of Sum and Difference of Trigonometric Functions	➤ RRB ALP	1		

Chapter No.	Chapter Name	Name of Topic	Exam Name (Best Questions Covered till October, 2025)	No. of Ques.	Total Questions	Page No.
		4. Question Based on Multiples of Angles of Trigonometric Function	➤ RRB ALP	1		
		5. Questions Based on Values of Trigonometric Ratio	➤ RRB NTPC	1		
			➤ RRB ALP	5		
			➤ RRB JE	1		
		6. Questions Based on Quadrant Theory	➤ RRB NTPC	3		
			➤ RRB JE	1		
		7. Questions Based on Trigonometric Identities	➤ RRB NTPC	3		
			➤ RRB ALP	3		
			➤ RRB JE	1		
		8. Question Based on Maximum and Minimum	➤ RRB ALP	1		
34.	Height and Distance	1. Questions Based on Angle of Elevation & Angle of Depression	➤ RRB Group-D	1	23 Questions With Solutions	92-93
			➤ RRB NTPC	2		
		2. Questions Based on Angle Changing	➤ RRB Group-D	1		
			➤ RRB NTPC	4		
			➤ RRB JE	1		
		3. Two Elevation Angles from Two Points to Top of an Object & Distance Between Two Points is given	➤ RRB ALP	1		
		4. Questions Based on Two Elevation Angles from Opposite Point of an Object	➤ RRB ALP	1		
		5. A point between Two Same High Objects, then Elevation Angles from the Point to both the Objects are Same	➤ RRB Group-D	1		
			➤ RRB NTPC	4		
			➤ RRB ALP	3		
			➤ RRB JE	2		
6. Questions Based on Depression Angles from Top a Building to Top and Bottom of Another Object	➤ RRB NTPC	2				
35.	Co-ordinate Geometry	1. Question Based on Area of Triangle	➤ RRB ALP	1	15 Questions With Solutions	94
		2. Questions Based on Mid Point of Two Points	➤ RRB ALP	2		

Chapter No.	Chapter Name	Name of Topic	Exam Name (Best Questions Covered till October, 2025)	No. of Ques.	Total Questions	Page No.
		3. Questions Based on Slope	➤ RRB NTPC	1		
			➤ RRB ALP	1		
		4. Question Based on Internal Division of Line Segment	➤ RRB Group-D	1		
		5. Questions Based on Equation of Straight Line	➤ RRB NTPC	1		
			➤ RRB ALP	3		
		6. Question Based on Centroid of Triangle	➤ RRB Technician	1		
		7. Questions Based on Quadrilaterals	➤ RRB Technician	3		
		8. Miscellaneous	➤ RRB Technician	1		
36.	Progression	1. Arithmetic Progression	➤ RRB Group-D	2	27 Questions With Solutions	95-96
			➤ RRB NTPC	8		
			➤ RRB JE	3		
		2. Geometric Progression	➤ RRB Group-D	3		
			➤ RRB NTPC	7		
			➤ RRB JE	4		
37.	Probability	1. Basic Concept of Probability	➤ RRB Technician	1	11 Questions With Solutions	97
			➤ RRB NTPC	4		
		2. Questions Based on Multiplication Theorem on Probability	➤ RRB Technician	2		
			➤ RRB Group-D	1		
		3. Miscellaneous		3		
38.	Miscellaneous		➤ RRB Group-D	12	12 Questions With Solutions	98
			➤ RRB NTPC			
			➤ RRB Technician			
<b>Total Questions</b>					<b>1424</b>	

## SOLUTIONS

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8.	Ratio and Proportion	22-25

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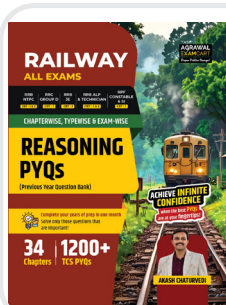
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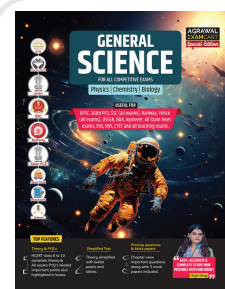
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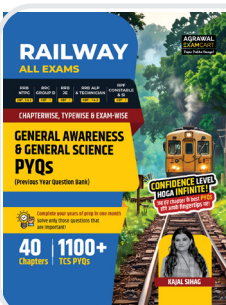
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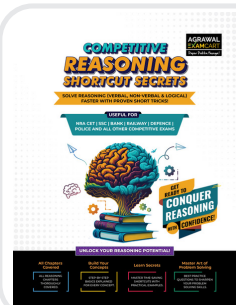
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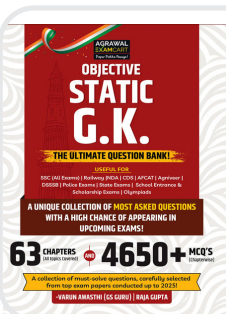
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### STATIC GK (Text Book)



### Objective STATIC G.K. (Question Bank)



# Chapter 1

## Number System

### Type-1 Questions Based on Definitions or Classification

#### RRB Technician

1. Which of the following is a prime number?  
(A) 221 (B) 373  
(C) 161 (D) 437

[RRB Technician Grade-III 20/12/2024  
Shift-2]

2. Which of the following is not a prime number?  
(A) 71 (B) 91  
(C) 61 (D) 31

[RRB Technician Grade-III 24/12/2024  
Shift-2]

3. In which of the following pair of numbers, neither of the two numbers is a prime number, but both the numbers are co-prime?  
(A) (11, 17) (B) (19, 27)  
(C) (21, 35) (D) (8, 25)

[RRB Technician Grade-III 29/12/2024  
Shift-1]

4. What is the number of factors of any prime number?  
(A) 1 (B) 4  
(C) 2 (D) 3

[RRB Technician Grade-III 29/12/2024  
Shift-3]

#### RRB GROUP-D

5. The number of non-square numbers between  $87^2$  and  $88^2$  is :  
(A) 184 (B) 164  
(C) 174 (D) 154

[RRB GROUP-D 16-09-2022 (Shift-1)]

#### RRB ALP

6. The total count of prime numbers less than 50 is :  
(A) 13 (B) 15  
(C) 14 (D) 17

[RRB ALP CBT-1 25/11/2024 Shift-3]

7. Which of the following pairs in NOT a pair of twin primes?  
(A) 71, 73 (B) 131, 133  
(C) 191, 193 (D) 11, 13

[RRB ALP CBT1, 21/08/2018, Shift 2]

8. Which of the following numbers is irrational?

(A)  $\sqrt[3]{64}$  (B)  $\sqrt{64}$   
(C)  $\sqrt[4]{64}$  (D)  $\sqrt[5]{64}$

[RRB ALP CBT1, 30/08/2018, Shift 1]

9. Among the following which is a rational number?

(A)  $\sqrt[3]{32}$  (B)  $\sqrt[3]{32}$   
(C)  $\sqrt[4]{32}$  (D)  $\sqrt[5]{32}$

[RRB ALP CBT1, 31/08/2018, Shift 1]

### Type-2 Place Value & Face Value

#### RRB Technician

10. When multiplying 3.24 by 0.006, how many significant figures should the result have?

(A) 4 (B) 2  
(C) 1 (D) 3

[RRB Technician Grade-I 19/12/2024  
Shift-1]

11. When dividing 0.00456 by 0.12, how many significant figures should the result be reported with?

(A) 3 (B) 1  
(C) 4 (D) 2

[RRB Technician Grade-I 19/12/2024  
Shift-1]

12. When performing the operation  $(1.23456 \times 10^3) + (1.234 \times 10^2)$ , how many significant figures should be reported in the result, assuming no rounding errors?

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

[RRB Technician Grade-I 19/12/2024  
Shift-3]

#### RRB ALP

13. How many significant figures are there in 4.700 m ?

(A) 3 (B) 4  
(C) 2 (D) 1

[RRB ALP CBT-2 06/05/2025, (Shift-1)]

14. The difference between the place values of 9 and 5 in the number 428693745 is:

(A) 90995 (B) 99995  
(C) 89995 (D) 8995

[RRB ALP CBT1, 09/08/2018, Shift 3]

15. The difference between the place values of '4' and '2' in the number 833749502 is :

(A) 49998 (B) 30098  
(C) 39098 (D) 39998

[RRB ALP CBT1, 10/08/2018, Shift 2]

16. What is the difference between the place value and face value of 3 in 273965?

(A) 2997 (B) 2035  
(C) 0 (D) 3962

[RRB ALP CBT1, 31/08/2018, Shift 2]

### Type-3 Dividend = Divisor $\times$ Quotient + Remainder

#### RRB GROUP-D

17. A number, when divided by the sum of 335 and 265, gives three times the difference between 335 and 265 as the quotient and 35 as the remainder. What is the number ?

(A) 128235 (B) 127535  
(C) 126035 (D) 124535

[RRB GROUP-D 22-08-2022 (Shift-I)]

#### RRB JE

18. If 'M' is the smallest perfect square number, which is exactly divisible by 12, 15 and 18, then find the sum of the digits of the quotient obtained, when M is divided by 25.

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

[RRB JE CBT-I 16/12/2024 Shift-3]

19. When a number is divided by a divisor, the remainder is 24. When twice the same number is divided by the same divisor, the remainder is 15. Find the divisor.

(A) 33 (B) 23  
(C) 9 (D) 35

[RRB JE (CBT-1) Exam 27-5-2019 Shift 2]

### Type-4 Questions Based on Divisibility Rule

#### RRB Technician

20. How many numbers between 11 and 90 are divisible by 7?

(A) 11 (B) 13  
(C) 12 (D) 10

[RRB Technician Grade-III 23/12/2024  
Shift-3]

21. What is the largest natural number so that the product of three consecutive even natural numbers is always divisible by it?  
 (A) 48 (B) 96  
 (C) 24 (D) 16

[RRB Technician Grade-III 24/12/2024 Shift-1]

22. If the 4-digit number  $5k21$  is divisible by 9, then what is the value of digit 'k' ?  
 (A) 9 (B) 3  
 (C) 1 (D) 0

[RRB Tech. Grade-III 26/12/2024 Shift-3]

23. What least digit must be assigned to  $k$  so that the 7-digit number  $86325k6$  is divisible by 11?  
 (A) 2 (B) 4  
 (C) 3 (D) 1

[RRB Tech. Grade-III 28/12/2024 Shift-1]

**RPF SI**

24. If the number  $934a6281$  is completely divisible by 3 and  $a$  be the smallest positive integer, then find the value of  $(a-2)(a-1)a(a+1)(a+2)(a+3)(a+4)$ .  
 (A) 4050 (B) 5004  
 (C) 5400 (D) 5040

[RPF SI 03/12/2024 Shift-1]

**RPF Constable**

25. Which of the following statements is NOT correct?  
 (A) A number is divisible by 3 or 9 if the sum of digits is divisible by 3 or 9, respectively.  
 (B) A number is divisible by 6 if the sum of its digits is divisible by 3 and the digit at unit place is an even digit.  
 (C) A number is divisible by 11 if the sum of its digits is divisible by 11.  
 (D) A number is divisible by 5 if the digit at unit place is 5 or 0.

[RPF Constable 02/03/2025 Shift-1]

26. Which of the following numbers is exactly divisible by all prime numbers between 1 and 17?  
 (A) 550540 (B) 510510  
 (C) 818313 (D) 459545

[RPF Constable 09/03/2025 Shift-1]

**RRB GROUP-D**

27. If the 8-digit number  $3x5479y4$  is divisible by 88 and the 8-digit number  $425139z2$  is divisible by 9, then what is the greatest possible value of  $(3x+2y-z)$  ?  
 (A) 33 (B) 37  
 (C) 25 (D) 35

[RRB GROUP-D 09-09-2022 (Shift-III)]

28. If 21022 is divided by both 8 and 5, then which of the following number pairs can not be the last two digits  $a, b$  of number  $21022ab$ ?

- (A)  $a = 8, b = 0$  (B)  $a = 2, b = 0$   
 (C)  $a = 0, b = 0$  (D)  $a = 4, b = 0$

[RRB 02-11-2018 (Shift-III)]

**RRB NTPC**

29. Which of the following numbers is divisible by 39 ?  
 (A) 625092 (B) 622776  
 (C) 622710 (D) 625649

[RRB NTPC Graduate Level II, 13/10/2025, Shift-I]

30. The number 977340 is divisible by :  
 (A) 24 (B) 34  
 (C) 37 (D) 35

[RRB NTPC Graduate Level II, 13/10/2025, Shift-I]

31. What is the number 699138 divisible by ?  
 (A) 99 (B) 117  
 (C) 108 (D) 102

[RRB NTPC Graduate Level II, 13/10/2025, Shift-III]

32. Which of the following numbers is divisible by 93 ?  
 (A) 855786 (B) 856497  
 (C) 856159 (D) 858226

[RRB NTPC Graduate Level II, 13/10/2025, Shift-III]

33. If 11-digit number  $88p554085k6$ ,  $k \neq p$ , is divisible by 72, then what is the value of  $(3k+2p)$ ?  
 (A) 13 (B) 12  
 (C) 23 (D) 7

[RRB NTPC CBT-2 13-06-2022 (Shift-II)]

34. If an 8-digit number 256139A4 is divisible by 11, find the value of A.  
 (A) 9 (B) 8  
 (C) 6 (D) 7

[RRB NTPC CBT-2 10-05-2022 (Shift-II)]

**RRB ALP**

35. Which is the least number that must be subtracted from 5563 to make it exactly divisible by 18 ?  
 (A) 7 (B) 5  
 (C) 1 (D) 3

[RRB ALP CBT-2 06/05/2025, Shift-2]

36. If the number  $x4441$  is divisible by 11, what is the face value of  $x$  ?  
 (A) 2 (B) 5  
 (C) 4 (D) 3

[RRB ALP CBT1, 10/08/2018, Shift 3]

37. If the 8 digit number  $136p5785$  is divisible by 15, then find the least possible value of  $p$ ?  
 (A) 1 (B) 4  
 (C) 2 (D) 3

[RRB ALP CBT1, 13/08/2018, Shift 3]

38. If the number  $x3451$  is divisible by 3, where  $x$  is a digit, what can be the sum of all such values of  $x$ ?  
 (A) 15 (B) 16  
 (C) 11 (D) 14

[RRB ALP CBT1, 20/08/2018, Shift 2]

39. If the number  $x4562$  is divisible by 9, what is the face value of  $x$ ?  
 (A) 1 (B) 2  
 (C) 3 (D) 4

[RRB ALP CBT1, 21/08/2018, Shift 1]

40. Which of the numbers given below is exactly divisible by 12?  
 (A) 43688 (B) 14632  
 (C) 28544 (D) 57816

[RRB ALP CBT1, 29/08/2018, Shift 3]

41. Which of the following number is divisible by 12?  
 (A) 73412 (B) 63412  
 (C) 83412 (D) 93412

[RRB ALP CBT1, 31/08/2018, Shift 2]

**RRB JE**

42. When 268 is added to  $6k8$ , the result is  $9P6$ . What is the least possible value of  $k$  and  $p$  for which  $9p6$  is divisible by 3?  
 (A)  $k = 0; p = 3$  (B)  $k = 3; p = 0$   
 (C)  $k = 6; p = 9$  (D)  $k = 4; p = 6$

[RRB JE CBT-I 18/12/2024 Shift-3]

**Type-5  
Questions Based on Unit Digits**

**RRB NTPC**

43. Find the unit digit of the following :  
 $(1234)^{102} + (1234)^{103}$   
 (A) 2 (B) 4  
 (C) 0 (D) 1

[RRB (NTPC) 28-4-2016 Shift 2]

**RRB JE**

44. If unit digit of  $x^3 = n$  and ' $n$ ' is a prime number, then what are the possible options for the values of  $x$  between 1 to 9?  
 (A) 2, 3, 4, 5 (B) 3, 5, 7, 8  
 (C) 1, 5, 3 (D) 3, 5, 7

[RRB JE (CBT-1) Exam 23-5-2019 Shift 2]

**Type-6  
Remainder Theorem**

**RPF SI**

45. What will be the remainder when  $111^{2024}$  is divided by 112?  
 (A) 3 (B) 1  
 (C) 2 (D) 4

[RPF SI 03/12/2024 Shift-2]

46. What will be the remainder when  $(99^{99} + 99)$  is divisible by 100 ?  
 (A) 98 (B) 96  
 (C) 97 (D) 99

[RPF SI 09/12/2024 Shift-3]

**RPF Constable**

47.  $(73^{53} + 83^{53})$  is divisible by :  
 (A) 150 (B) 156  
 (C) 152 (D) 154  
**[RPF Constable 06/03/2025 Shift-1]**
48.  $97^{83} - 1$  when divided by 96 would leave a remainder.  
 (A) 0 (B) 3  
 (C) 1 (D) 2  
**[RPF Constable 11/03/2025 Shift-1]**

**RRB NTPC**

49. What is remainder when  $2^{20}$  is divided by 3?  
 (A) 2 (B) 3  
 (C) 0 (D) 1  
**[RRB NTPC 03-02-2021 (Shift-III)]**
50. Find the remainder when  $19^{300}$  is divided by 20?  
 (A) 3 (B) 1  
 (C) 4 (D) 2  
**[RRB NTPC 29-01-2021 (Shift-III)]**
51. What is remainder when  $7^{29} + 4$  is divided by 6?  
 (A) 3 (B) 7  
 (C) 5 (D) 1  
**[RRB NTPC 28-01-2021 (Shift-III)]**

**Type-7**  
**Questions Based on Number of Digits**

**RRB NTPC**

52. If  $1^2 + 2^2 + 3^2 + \dots + 14^2 = 1015$ , Then,  $3^2 + 6^2 + 9^2 + \dots + 42^2$  is equal to :  
 (A) 9135 (B) 9325  
 (C) 9235 (D) 9315  
**[RRB NTPC 29-12-2020 (Shift-I)]**

**RRB ALP**

53. 'P' is the smallest positive integer such that every positive integer N greater than 'P' can be written as a sum of two composite numbers. Then 'P' is:  
 (A) 10 (B) 3  
 (C) 11 (D) 6  
**[RRB ALP CBT1, 17/08/2018, Shift 1]**
54. A positive integer, which when added to 1000, given a sum which is greater than 10.06 when it is multiplied by 100. This positive integer is:  
 (A) 1 (B) 7  
 (C) 3 (D) 5  
**[RRB ALP CBT1, 29/08/2018, Shift 1]**
55. In a 3-digit number, the hundreds digit is 4 times the units digit and the tens digit is thrice the units digit, The sum of the digits is 8. What is the tens digit in the number?  
 (A) 6 (B) 3  
 (C) 4 (D) 9  
**[RRB ALP CBT1, 30/08/2018, Shift 3]**

56. Find a two digit number which is exactly times the product of its digits?  
 (A) 24 (B) 12  
 (C) 48 (D) 36  
**[RRB ALP CBT1, 09/08/2018, Shift 1]**

**Type-8**  
**Miscellaneous**

**RRB GROUP-D**

57. Let  $x = 55^{100} + 55^{101} + 55^{102}$ . Which of the following prime number is NOT a factor of  $x$ ?  
 (A) 3 (B) 79  
 (C) 71 (D) 11  
**[RRB GROUP-D 27-09-2022 (Shift-III)]**
58. Seven times a number reduced by 14 is equal to the sum of 5 times the number and 6. Find the number.  
 (A) 5 (B) 20  
 (C) 15 (D) 10  
**[RRB GROUP-D 01-09-2022 (Shift-I)]**
59. Three numbers  $x \leq y \leq z$  which are co-prime to each other are such that the product of the first two numbers is 143 and that of the last two numbers is 195. The sum of the three numbers is \_\_\_\_\_.  
 (A) 45 (B) 29  
 (C) 39 (D) 62  
**[RRB GROUP-D 01-09-2022 (Shift-II)]**

**RRB NTPC**

60. Nandan had some marbles. When he distributed the marbles equally among 32 children, he found that 4 marbles were left. Had he distributed the marbles equally among 41 children and 48 children, he still would have had 13 and 20 marbles, respectively, left with him. But when he distributed them equally among 53 children, no marble was left. The number of marbles that Nandan initially had may lie between \_\_\_\_\_.  
 (A) 7834 and 7854  
 (B) 7794 and 7804  
 (C) 7864 and 7874  
 (D) 7814 and 7824  
**[RRB NTPC Graduate Level, 21/06/2025 (Shift-2)]**

61. A two-digit positive number is such that the product of its digits is 24. When 18 is added to the number, the digits interchange their places. Which smallest positive number should be subtracted from the given number to make it a perfect square?  
 (A) 0 (B) 8  
 (C) 12 (D) 10  
**[RRB NTPC CBT-2 12-06-2022 (Shift-II)]**

62. A two-digit number of 4 times the sum of its digits. If 27 is added to the number, it becomes 7 times the sum of its digits. what is that two-digit number ?  
 (A) 24 (B) 12  
 (C) 48 (D) 36  
**[RRB (NTPC) 2-4-2016 (Shift-I)]**

63. The sum of digit of two digits number is 9. When the positions of the digits are interchanged, the number becomes less than 45. Find the replaced number.  
 (A) 45 (B) 72  
 (C) 68 (D) 27  
**[RRB (NTPC) 2-4-2016 (Shift-II)]**

**RRB ALP**

64. Consider the given question and decide which of the following statements is/are sufficient to answer the question.  
 Is  $X - 5$  even? X is a real number  
**Statements:**  
 (i)  $X - 15$  belongs to integer  
 (ii)  $X - 10$  is an odd integer  
 (A) Statement (i) alone is sufficient while statement (ii) alone is insufficient  
 (B) Neither statement (i) nor (ii) is sufficient  
 (C) Statement (ii) alone is sufficient while statement (i) alone is insufficient  
 (D) Both statement (i) and (ii) are sufficient  
**[RRB ALP CBT1, 09/08/2018, Shift 1]**
65. The sum of numbers from 1 to 100 (inclusive of both) is  
 (A) 5050 (B) 5500  
 (C) 5005 (D) 5505  
**[RRB ALP CBT1, 21/08/2018, Shift 1]**
66. Read the following question and decide which of the given statements is/are sufficient.  
 If X is a natural, is  $X + 6$  odd?  
**Statements:**  
 1.  $X - 15$  is a whole number.  
 2.  $X - 6$  is an odd number.  
 (A) 2 alone is sufficient while 1 alone is not sufficient to answer the question.  
 (B) Both 1 and 2 together are sufficient to answer the question.  
 (C) Either 1 or 2 is sufficient to answer the question.  
 (D) 1 alone is sufficient while 2 alone is not sufficient to answer the question.  
**[RRB ALP CBT1, 31/08/2018, Shift 3]**

**RRB JE**

67.  $(2^{25} + 2^{26} + 2^{27} + 2^{28})$  is a multiple of which of the following numbers?  
 (A) 11 (B) 7  
 (C) 15 (D) 9  
**[RRB JE (CBT-1) Exam 02-6-2019 Shift 2]**



# Chapter 1

## Number System

1. (B) Rule for finding prime numbers :  $6k \pm 1$

Option (B),

$$373 = 6k + 1 = 372 + 1 = 6 \times 62 + 1$$

Therefore, 373 is a prime number.

2. (B) Option (A),

$$71 = 6k - 1 = 72 - 1 = 6 \times 12 - 1$$

71 is a prime number

Option (B),

$$91 = 6k - 1 = 92 - 1 = 15.33 \times 6 - 1$$

91 is not a prime number.

3. (D) **Co-prime numbers** : Two numbers are co-prime when their highest common factor (HCF) is 1.

Option (A),

11 and 17 are both prime numbers.

Option (B),

19 is a prime number, but 27 is not a prime number.

$$(27 = 3 \times 9)$$

The HCF of 19 and 27 is 1, so they are co-prime.

Option (C),

21 and 35 are both not prime numbers.

$$21 = 3 \times 7$$

$$\text{And, } 35 = 5 \times 7$$

The HCF of 21 and 35 is 7, so they are not co-prime.

Option (D),

8 and 25 are both not prime numbers.

$$8 = 2 \times 2 \times 2$$

$$\text{And, } 25 = 5 \times 5$$

The HCF of 8 and 25 is 1, therefore they are coprime.

Thus, only the pair (8, 25) is such that both numbers are not prime, but they are coprime.

4. (C) Any prime number has two factors.

5. (C) We know that two consecutive numbers are  $x$  and  $x + 1$ . Then the number of non prime numbers among those numbers is always  $2x$ .

$$\text{If } 87 = n$$

$$\text{and } 88 = 87 + 1 = n + 1$$

$$\begin{aligned} \text{Then } 2n &= 2 \times 87 \\ &= 174 \end{aligned}$$

Hence, option (C) is correct.

6. (B) Prime numbers less than 50 : 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, and 47

The total number of prime numbers less than 50 is 15.

7. (B) **Prime number** : All numbers greater than 1 which are not divisible by anything other than themselves and 1 are called prime number.

**Twin Prime Numbers**—Two Prime number whose difference is 2. They are called twin Prime numbers. Hence, 131, 133 are twin prime numbers.

$$\begin{aligned} 8. (D) \quad \sqrt[4]{64} &= \sqrt[4]{2 \times 2 \times 2 \times 2 \times 2 \times 2} \\ &= 2\sqrt[4]{4} \end{aligned}$$

$\sqrt[4]{64}$  It is a irrational number.

$$\begin{aligned} 9. (B) \quad \sqrt[5]{32} &= \sqrt[5]{2 \times 2 \times 2 \times 2 \times 2} \\ &= 2 \end{aligned}$$

This is a rational number.

10. (C) Significant figures are the digits that contribute to the precision of the overall value of a number.

- The reliable digits and the first uncertain digit are considered the significant figures of a number.

- For example, in 43.5, 4 and 3 are reliable digits and the digit 5 is uncertain.

- The rules to be followed in determining or representing significant figures are as follows:

- ❖ All non-zero digits are significant.

- ❖ Zeros between two non-zero digits are significant.

- ❖ Trailing zeros to the right of the decimal point are significant.

- ❖ Trailing zeros in a whole number with a decimal point are significant.

- ❖ Trailing zeros in a whole number without a decimal point are not significant.

- ❖ The choice of different units of conversion does not change the number of significant figures or digits in a measurement.

3.24 has 3 significant figures and 0.006 has 1 significant figure.

Therefore, the result will have 1 significant figure.

11. (D) The number of significant figures in  $0.00456 = 3$

And the number of significant figures in  $0.12 = 2$

When we divide two numbers, the result should have the same number of significant figures as the number with the fewest significant figures.

Since 0.12 has two significant figures,

The result should also have two significant figures.

12. (A) In  $1.234 \times 10^3$ , the number of significant figures after the decimal point = 3

Whereas in  $1.23456 \times 10^2$  the number of significant figures = 5

$$1.23456 \times 10^3 = 1234.56$$

$$1.234 \times 10^2 = 123.4$$

$$1234.56 + 123.4 = 1357.96$$

Therefore, the result should have 5 significant figures.

13. (B) In 4.700 meters, the digits 4, 7, 0 and 0 are all significant because they are after the decimal point and the last non-zero digit is after 7.

Therefore, 4.700 meters has a total of 4 significant figures.

14. (C) 428693745

$$\text{Place value of 9} = 90000$$

$$\text{Place value of 5} = 5$$

Difference between place values.

$$= 90000 - 5 = 89995$$

15. (D) Place value of 4 and 2 in 8 3 3 7 4 9 5 0 2 in 40000 and 2

$$\begin{aligned} \text{Difference} &= 40000 - 2 \\ &= 39998 \end{aligned}$$

16. (A) Place value of 3 in 273965 = 3000  
And face value of = 3  
Required difference = (Place value - Face value) = 3000 - 3 = 2997

17. (C) Divisor = 335 + 265 = 600  
Quotient = 3(335 - 265)  
= 3 × (70) = 210  
Dividend = Divisor × Quotient + Remainder  
Dividend = 600 × 210 + 35  
Dividend = 126000 + 35  
Dividend = 126035  
Hence, option (C) is correct.

18. (D) Least Common Multiple of 12, 15 and 18  
12 = 2 × 2 × 3  
15 = 3 × 5  
18 = 2 × 3 × 3  
LCM of 12, 15 and 18 = 2<sup>2</sup> × 3<sup>2</sup> × 5  
= 4 × 9 × 5 = 180

180 is not a perfect square.  
To make it a perfect square, we need to multiply by 5 :  
M = 180 × 5 = 900  
900 is a perfect square.  
Dividing M by 25,

$$\begin{array}{r} 25 \overline{)900} \text{ (36)} \\ \underline{75} \\ 150 \\ \underline{150} \\ \times \end{array}$$

$$\begin{aligned} \text{Sum of the digits of the quotient} \\ &= 3 + 6 = 9 \end{aligned}$$

19. (A) Let, Number = x  
And, divisor = y  
Then,  $y \times 1 + 24 = x$  ... (1)  
When twice of number is divided by y.  
Then  $y \times 1 + 15 = 2x$  ... (2)  
Putting the value of x in eq<sup>n</sup> (1)  
 $y + 15 = 2(y + 24)$   
 $y + 15 = 2y + 48$   
 $y = 33$

20. (A) Numbers divisible by 7 between 11 and 90 - 14, 21, 28, 35, 42, 49, 56, 63, 70, 77 and 84  
There are 11 numbers divisible by 7 between 11 and 90.

21. (A) Let, the three consecutive even natural numbers be  
= 2n, 2n + 2 and 2n + 4

Where n is a natural number.  
The product of three consecutive even natural numbers  
= 8n(n + 1)(n + 2)  
n(n + 1)(n + 2) is always divisible by 6 because it is the product of three consecutive natural numbers.  
Therefore, it will be divisible by 8 × 6 = 48.

22. (C) The 4-digit number is 5k21,  
The sum of the digits of the 4-digit number = 5 + k + 2 + 1 = 8 + k  
For 5k21 to be divisible by 9, the value of k should be 1.  
Sum of the digits = 5 + k + 2 + 1  
= 8 + k = 8 + 1 = 9  
Therefore, option (C) is correct.

23. (C) 7-digit number 86325k6,  
**Divisibility rule of 11** : The difference between the sum of the digits at odd places and the sum of the digits at even places of a number should be 0 or a multiple of 11.

$$\begin{aligned} \text{Divisible by 11} \\ &= (8 + 3 + 5 + 6) - (6 + 2 + k) \\ &= 22 - 8 - k = 14 - k \\ \text{By putting the value of } k \text{ as 3,} \\ &= 14 - k = 14 - 3 = 11 \end{aligned}$$

Therefore, the minimum digit for k should be 3 so that the 7-digit number 86325k6 is divisible by 11.

24. (D) The number is 934a6281 which is completely divisible by 3.  
Sum of the digits of the number = 9 + 3 + 4 + a + 6 + 2 + 8 + 1 = 33 + a  
By putting the smallest positive integer for a as 0,  
= 33 + 3 = 36  
Then The value of (a - 2)(a - 1)a(a + 1)(a + 2)(a + 3)(a + 4) = (3 - 2)(3 - 1)3(3 + 1)(3 + 2)(3 + 3)(3 + 4)  
= 1 × 2 × 3 × 4 × 5 × 6 × 7 = 5040

25. (C) **Statement (A)** : If the sum of the digits of a number is divisible by 3, then the number will be divisible by 3. Similarly, if the sum of the digits is divisible by 9, then the number will be divisible by 9.  
Therefore, statement (A) is correct.  
**Statement (B)** : If the sum of the digits of a number is divisible by 3 and its unit digit is even, then the number will be divisible by 6.

Therefore, statement (B) is correct.  
**Statement (C)** : It is not necessary that if the sum of the digits is divisible by 11, then the number is divisible by 11.

Therefore, statement (C) is incorrect.  
**Statement (D)** : If the unit digit of a number is 5 or 0, then the number will be divisible by 5.  
Therefore, statement (D) is correct.

26. (B) Prime numbers between 1 and 17 = 2, 3, 5, 7, 11, and 13  
Least Common Multiple of all the numbers = 30030  
Any multiple of 2310 will be divisible by all the prime numbers between 1 and 17.

In option (C),  
510510 = 30030 × 17  
510510 is a multiple of 30030  
The number completely divisible by all the prime numbers between 1 and 17 is 510510.

27. (A) Number 3x5479y4  
**Divisible by 88** : If a number is exactly divisible by 8 and 11 then that number will also exactly divisible by 88.  
**Divisible by 8** : Last three digits of number, exactly divisible by 8.

$$\begin{array}{r} 8 \overline{)9y4} \text{ (123)} \\ \underline{8} \\ 18 \\ \underline{16} \\ 24 \\ \underline{24} \\ \times \end{array}$$

value of y = 8

$$\begin{array}{|c|c|c|c|c|c|} \hline & & & & & \\ \hline \text{Divisible by 11} & 3x & 5 & 4 & 7 & 9 & 8 & 4 \\ \hline & & & & & & & \\ \hline \end{array}$$

$$\begin{aligned} \text{Difference} &= (3 + 5 + 7 + 8) - (x + 4 \\ &\quad + 9 + 4) \\ &= 23 - (17 - x) \end{aligned}$$

number on Putting 6 as value of x 425139z2  
**Divisible by 9** : Sum of the all digits of number exactly divisible by 9.  
Sum of digits. = 4 + 2 + 5 + 1 + 3 + 9 + z + 2  
= 26 + z  
If the value of z is set to 1 then that number will exactly divisible by 9.

$$\begin{aligned} \text{Then, } 3x + 2y - z &= 3 \times 6 + 2 \times 8 - 1 \\ &= 18 + 16 - 1 \\ &= 34 - 1 \\ &= 33 \end{aligned}$$

Hence, option (A) is correct.

28. (B) Rule of divisibility of 8, if a number is divisible by 8 then last three digits of number divisible by 8.

Rule of divisibility of 5, if  $a$  the last digit of number is 0 or 5. Then that number divisible by 5.

If we put  $a = 2$  and  $b = 0$ ,

Number will be 2102220 which is not divisible by 8.

29. (A) From option

$$625092 \div 39 = 16028 \text{ (remainder} \\ = 0)$$

From option (B),

$$622776 \div 39 = 15968.615 \text{ (remainder} \\ \neq 0)$$

From option (C),

$$622710 \div 39 = 15967.95 \text{ (remainder} \\ \neq 0)$$

From option (D),

$$625649 \div 39 = 16037.15 \text{ (remainder} \\ \neq 0)$$

Hence, Option (A) is correct.

30. (D) From option (A),

$$977340 \div 24 = 40722.5 \text{ (not divisible)}$$

From option (B),

$$977340 \div 34 = 28745.588 \text{ (not} \\ \text{divisible)}$$

From option (C),

$$977340 \div 37 = 26415.675 \text{ (not} \\ \text{divisible)}$$

From option (D),

$$977340 \div 35 = 27924 \text{ (divisible)}$$

Hence, Option (D) is correct.

31. (A)  $699138 \div 99 = 7062$  (remainder = 0)

$$699138 \div 117 = 5976.23 \text{ (remainder} \\ \neq 0)$$

$$699138 \div 108 = 6473.5 \text{ (remainder} \\ \neq 0)$$

$$699138 \div 102 = 6854.29 \text{ (remainder} \\ \neq 0)$$

Therefore, option (A) is correct.

32. (A)  $855786 \div 93 = 9,202$  (remainder = 0)

$$856497 \div 93 = 9,209.64 \text{ (remainder} \\ \neq 0)$$

$$856159 \div 93 = 9,206.01 \text{ (remainder} \\ \neq 0)$$

$$858226 \div 93 = 9,228.23 \text{ (remainder} \\ \neq 0)$$

Therefore, option (A) is correct.

33. (A) Number 88P554085K6

**Divisible by 72** : If number is completely divisible by both 3 and 8. Then the number will also completely divisible by 72.

**Divisible by 8** : Last three digits of number divisible by 8.

$$= \frac{5K6}{8}$$

Both 3 and 7 will be possible value of K.

**Divisible by 3** : Sum of the digits of number is divisible by 3 or multiple of 3.

$$\begin{aligned} \text{Sum of digits} &= 8 + 8 + P + 5 + 5 \\ &\quad + 4 + 0 + 8 + 5 + K + 6 \\ &= 49 + P + K \end{aligned}$$

on Putting value of K

$$\begin{aligned} &= 49 + P + 3 \\ &= 52 + P \end{aligned}$$

21 and 7 will be possible values of P.

But  $K \neq P$

7 will not be the value of K and P.

$\therefore$  Then  $P = 2$  and  $K = 3$

$$\begin{aligned} \text{Hence } (3K + 2P) &= (3 \times 3 + 2 \times 2) \\ &= 9 + 4 \\ &= 13 \end{aligned}$$

34. (B) Number 256139A4

**Divisible by 11** : The difference between the sum of odd digits and the sum of even digits is exactly divisible by 11.

Difference,

$$\begin{aligned} (2 + 6 + 3 + A) &= (5 + 1 + 9 + 4) \\ (11 + A) &= (19) \\ A &= 19 - 11 \end{aligned}$$

$$A = 8$$

Hence, 8 is value of A.

35. (C) 18)5563(309

$$\underline{54}$$

$$163$$

$$\underline{162}$$

$$1$$

The smallest number obtained by subtracting 1 from it will be exactly divisible by 18.

36. (D)  $x4441$

Divisible by 11

$$(x + 4 + 1) - (4 + 4)$$

$$x - 3$$

If the value of  $x$  is set to 3, then number will exactly divisible by 11.

37. (A)  $136p5785$ , to be exactly by 15, must be divisible by 5 and 3 as well. To

be divisible by 15, the sum of all the digits of the number must also be exactly divisible by it.

$$1 + 3 + 6 + p + 5 + 7 + 8 + 5 \\ = 35 + p$$

Now,  $(35 + p)$ , the will be divided

When  $p = 1, 4, 7, \dots$

$\therefore$  Minimum value = 1

38. (A) Given, number =  $x3451$

The sum of the digits of a number divisible by 3 must also be divisible by 3.

$$x + 3 + 4 + 5 + 1 = x + 13$$

Possible value of  $x = 2, 5, 8$

$$\begin{aligned} \text{Sum of Possible values} &= 2 + 5 + 8 \\ &= 15 \end{aligned}$$

39. (A)  $x + 4 + 5 + 6 + 2 = x + 17$

Putting  $x = 1$ , The number will divisible by 9.

Hence, 1 will be the value of  $x$ .

40. (D) If a number is divisible by 3 and 4 then that number will be divisible by 12.

Hence, Number 57816, is exactly divisible by 12.

41. (C) A number divisible by 12 is one that is also divisible by 3 and 4.

Hence, Number 83412, is also divisible by 12.

$$\begin{array}{r} 6k8 \\ + 268 \\ \hline 9p6 \end{array}$$

$$k = 3, p = 0$$

Dividing 906 by 3,

$$\begin{array}{r} 3 \overline{)906} \quad (302 \\ \underline{9} \phantom{0} \\ 06 \\ \underline{06} \\ \hline 0 \end{array}$$

43. (C) Unit digit of  $\left[ (1234)^{102} + (1234)^{103} \right]$

$$= \text{Unit digit of } 4^{102} + 4^{103}$$

$$= \text{Unit digit of } (4^4 \times 25)^2 + (4^4 \times 25)^3$$

$$= 6 + 4 = 10$$

44. (B) According to question,

Prime numbers from 1 to 9 are 2, 3, 5, 7. Then  $x = 1, 2, 3, 5, 7$

$$x^3 = n$$

$$2^3 = 8$$

$$3^3 = 27$$

$$5^3 = 125$$

$$7^3 = 343$$

$$8^3 = 512$$

On adding numbers between 1 to 9, the unit digit will be a prime number,

then the number will be 3, 5, 7, 8.

Hence, 3, 5, 7, 8 are possible numbers.

45. (B) If  $n$  is a number.

Then the remainder when  $(a+1)^n$  is divided by  $a$  is always 1.

$$(111)^{2024} = \frac{[(112-1)^{2024}]}{112} = 1$$

46. (A)  $\frac{(99^{99} + 99)}{100}$

$$= \frac{(99^{99})}{100} + \frac{99}{100} = \frac{[(100-1)^{99}]}{100} + 99$$

$$= (-1)^{99} + 99 = -1 + 99 = 98$$

47. (B) If  $n$  is an odd number, then the remainder in  $\frac{(a^n + b^n)}{(a+b)}$  will always be zero.

$(73^{53} + 83^{53})$  will be divisible by  $(73 + 83 = 156)$

48. (A)  $\frac{(97^{83} - 1)}{96} = \frac{(97^{83})}{96} - \frac{1}{96}$

$$= \frac{[(96+1)^{83}]}{96} - 1 = 1 - 1 = 0$$

49. (D)  $\log \frac{x}{(2+2^{20})} = \frac{(3-1)^{20}}{3}$

$$\frac{2^{2n}}{3} = \frac{(3-1)^{20}}{3}$$

$$= 3^{20} + \dots \dots (-1)^{20}$$

Except last term  $(-1)^{20}$  all terms are multiple of 3.

As,  $(3-1)^{20} = 3 \times P + (-1)^{20}$

As, remainder =  $(-1)^{20}$

$$\therefore = 1$$

50. (B)  $\frac{19^{300}}{20} = \frac{(20-1)^{300}}{20}$

$$= 20^{300} + \dots \dots (-1)^{300}$$

Except last term  $(-1)^{300}$ , all terms are multiple of 20.

So,

$$(20-1)^{300} = 20 \times P + (-1)^{300}$$

$$\text{Hence, Remainder} = (-1)^{300} = 1$$

51. (C)  $\frac{7^{29} + 4}{6}$

$$\frac{(6+1)^{29}}{6} + \frac{4}{6}$$

$$= (6^{29} + \dots \dots + (1)^{29}) + 4$$

Except last term  $(1)^{29}$  all terms are multiple of 6.

$$\text{So, } (6+1)^{29} = 6 \times P + (1)^{29} + 4$$

$$\text{Hence, Remainder} = (1)^{29} + 4 = 5$$

52. (A) If  $1^2 + 2^2 + 3^2 + \dots + 14^2 = 1015$

...(i)

$$3^2 + 6^2 + 9^2 + \dots + 42^2 = ?$$

On Multiplying by 9 on both sides in eq<sup>n</sup> (i)

$$9(1^2 + 2^2 + 3^2 + \dots + 14^2) = 1015 \times 9$$

$$3^2[1^2 + 2^2 + 3^2 + \dots + 14^2] = 9135$$

$$3^2 + 6^2 + 9^2 + \dots + 42^2 = 9135$$

53. (C) By Option (C),

$$P = 11$$

$$P + 1 = 11 + 1 = 12$$

$$12 = (1 + 11), (2 + 10), (3 + 9), (4 + 8), (6 + 6)$$

$(4 + 8), (6 + 6)$  is the pairs of divider number.

$$\text{Hence, } P = 11$$

54. (B)  $1000 + x > 10.06 \times 100$

$$1000 + x > 1006$$

$$x > 1006 - 1000$$

$$x > 6$$

Hence, the positive integers will be 7 as per option.

55. (B) Let, number =  $xyz$

According to question,

$$x = 4z \quad \dots(1)$$

$$y = 3z \quad \dots(2)$$

$$x + y + z = 8 \quad \dots(3)$$

on solving eq<sup>n</sup>(1) and (2)

$$z = \frac{y}{3}$$

$$x = 4z \Rightarrow 4 \times \frac{y}{3}$$

$$x = \frac{4y}{3}$$

Now, putting value of  $x$  and  $z$  in eq<sup>n</sup>

(3)

$$x + y + z = 8$$

$$\frac{4y}{3} + y + \frac{y}{3} = 8$$

$$\frac{4y + 3y + y}{3} = 8$$

$$8y = 8 \times 3$$

$$y = \frac{8 \times 3}{8}$$

$$y = 3$$

Hence, 3 is at tens place.

56. (A) Number of two digits =  $(10x + y)$

According to question  $10x + y = 3xy$

According to option (A), if value of  $x$  is 2 and value of  $y$  is 4.

$$\text{Number} = 10 \times 2 + 4 = 24$$

Hence, that number of two digits = 24

57. (C)  $x = 55^{100} + 55^{101} + 55^{102}$

$$= 55^{100}[1 + 55 + 55^2]$$

$$= 55^{100}[1 + 55 + 3025]$$

$$= 55^{100}[3081]$$

$$= 5^{100} \times 11^{100} \times 3 \times 13 \times 79$$

71 is not a factor of  $x$ .

58. (D)  $7x - 14 = 5x + 6$

$$7x - 5x = 6 + 14$$

$$2x = 20$$

$$x = 10$$

59. (C)  $a \times b = 143$

$$= 11 \times 13$$

$$b \times c = 195$$

$$= 13 \times 15$$

$$b = 13, a = 11 \text{ and } c = 15$$

Sum of three numbers.

$$= 13 + 11 + 15$$

$$= 39$$

Hence, Option (C) is correct.

60. (A) When the marbles are divided by 32, the remainder = 4

When the marbles are divided by 41, the remainder = 13

When the marbles are divided by 48, the remainder = 20

When the marbles are divided by 53, the remainder = 0

$$N \equiv 4 \pmod{32},$$

$$N \equiv 13 \pmod{41},$$

$$N \equiv 20 \pmod{48},$$

$$N \equiv 0 \pmod{53}$$

$$32 - 4 = 41 - 13$$

$$= 48 - 20 = 28$$

$\Rightarrow N + 28$ , is a multiple of 32, 41, 48.

Therefore,

$$N + 28 = \text{LCM}(32, 41, 48) \times k$$

$$32 = 2^5$$

$$41 = 41^1$$

$$48 = 2^4 \times 3$$

$\Rightarrow \text{LCM of } 32, 41, 48$

$$= 25 \times 3 \times 41$$

$$= 32 \times 3 \times 41$$

$$= 3936$$

$$\Rightarrow N + 28 = 3936 \times k$$

$$\Rightarrow N = 3936 \times k - 28$$

Also, N is a multiple of 53  
 $\Rightarrow 3936 \times k - 28 \equiv 0 \pmod{53}$   
 $\Rightarrow (3936 \pmod{53}) \times k \equiv 28 \pmod{53}$   
 $3936 = 53 \times 74 + 14$   
 $\Rightarrow 3936 \equiv 14 \pmod{53}$   
 $\Rightarrow 14k \equiv 28 \pmod{53}$   
 $\Rightarrow k \equiv 2 \pmod{53}$   
 Smallest  $k = 2$   
 $\Rightarrow N = 3936 \times 2 - 28$   
 $\Rightarrow N = 7872 - 28 = 7844$   
 Then,  
 $\Rightarrow 7844 \div 32,$   
 Remainder 4  
 $\Rightarrow 7844 \div 41,$   
 Remainder 13  
 $\Rightarrow 7844 \div 48,$   
 Remainder 20  
 $\Rightarrow 7844 \div 53,$   
 Remainder 0  
 $\Rightarrow N = 7844$   
 $\therefore$  The value of 7844 lies between 7834 and 7854.

61. (D) Let, unit digit =  $x$   
 Tens place =  $y$   
 $xy = 24 \quad \dots(i)$   
 Then Number =  $10y + x$   
 If the digits are interchanged then  
 obtained new number box =  $10x + y$   
 $10x + y = 10y + x + 18$   
 $9x = 9y + 18$   
 $x = y$   
 $x - y = 2 \quad \dots(ii)$   
 $(x - y)^2 = (2)^2$   
 $(x - y)^2 + 4xy = 4 + 4xy$   
 $(x + y)^2 = 2^2 + 4 \times 24$   
 $(x + y)^2 = 4 + 96$   
 $x + y = 10 \quad \dots(iii)$   
 $x - y = 2 \quad \dots(ii)$   
 $(+)$   
 $2x = 12$   
 $x = 6$   
 And  $y = 4$   
 Number =  $10y + x$

$= 10 \times y + 6$   
 $= 46$   
 Nearest Perfect Square number less than 46  
 $= 36$   
 Difference of two numbers  
 $= 46 - 36$   
 $= 10$

62. (D) Let, Unit digit =  $x$   
 Tens digit =  $y$   
 $\therefore$  Number of two digits =  $10y + x$   
 By First condition of question.  
 $10y + x = 4(x + y)$   
 $\Rightarrow 4x - x = 10y - 4y$   
 $\Rightarrow 3x = 6y$   
 $\Rightarrow x = 2y \quad \dots(i)$   
 By Second Condition  
 $(10y + x) + 27 = 7(x + y)$   
 $\Rightarrow 10y + x + 27 = 7x + 7y$   
 $\Rightarrow 7x - x = 10y - 7y + 27$   
 $\Rightarrow 6x = 3y + 27$   
 By using eq<sup>n</sup> (i)  
 $\Rightarrow 6 \times 2y = 3y + 27$   
 $\Rightarrow 12y = 3y + 27$   
 $\Rightarrow 9y = 27$   
 $\Rightarrow y = 3$   
 Putting Value of  $y$  in eq<sup>n</sup> (i)  
 $x = 2 \times 3 = 6$   
 Hence, Number.

( $10y + x$ ) = ( $10 \times 3 + 6$ )  
 $= (30 + 6) = 36$   
 63. (D) Let, Two digits number = ( $10y + x$ )  
 According to question  
 $x + y = 9 \quad \dots(i)$   
 Again ( $10y + x$ ) - 45 = ( $10x + y$ )  
 $\Rightarrow 9y - 9x = 45$   
 $\Rightarrow y - x = 5 \quad \dots(ii)$   
 on adding eq<sup>n</sup> (i) and eq<sup>n</sup> (ii)  
 $2y = 14$   
 $\Rightarrow y = \frac{14}{2} = 7$

on putting the value of in eq<sup>n</sup> (i)  
 $x + 7 = 9$   
 $x = 9 - 7 = 2$

$\therefore$  Changed number =  $10x + y$   
 $= (10 \times 2 + 7)$   
 $= 20 + 7$   
 $= 27$

64. (C) Statement (i):  $X - 15 =$  integer  
 Since, integer - integer = even or odd.  
 $x$  is also integer  
 Statement (ii):  $x - 10 =$  odd integer  
 $\therefore$  odd - odd = even  
 $x - 5 =$  Even  
 Hence, only statement (ii) is enough but statement (i) is not enough.  
 65. (A) Sum of all number from 1 to 100.  
 $= \frac{n(n+1)}{2}$   
 $= \frac{100 \times 101}{2}$   
 $= 5050$

66. (B)  $X$  is a natural number.  
*i.e.* in natural number 1, 2, 3, 4, ...  
 By statement (1)  
 $X - 15$  is whole number.  
 Whole number = (1, 3, 5, 7, 9, ...  $\infty$ )  
 Value of  $X$  will be more than 6  
 $X = (7, 9, 11, 13, \dots \infty)$   
 By statement (1) and (2)  
 Value of  $X$  will be = (17, 19, 21, 23, ...)  
 $X + 6 = 17 + 6 = 23$  is odd number  
 Hence, statement (1) and (2) both are enough.

67. (C)  $2^{25} + 2^{26} + 2^{27} + 2^{28}$   
 $2^{25} [1 + 2^1 + 2^2 + 2^3]$   
 $= 2^{25} [1 + 2 + 4 + 8]$   
 $= 2^{25} \times [15]$   
 15 is multiple of  $2^{25}$ . Hence, option (C) is correct answer.

□□