

SSC MATHS

Chapterwise – Topicwise
SOLVED PAPERS

7100+
TCS MCQs

Coverage of all Questions asked
in SSC Exams till December 2022

CGL (Tier I & II)
CPO (SI/ASI)
CHSL (10+2)
MTS, FCI
Constable (GD) etc.

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Contents

1. Number System	1-23	7. Ratio and Proportion	107-137
Types of Number		Properties and Rule of Ratio and Proportion	
Divisibility and Remainder		Divide of Sum	
Word Problems Based on Numbers		Word Problems Based on Ratio	
Unit's Digit		Coins/Notes	
Miscellaneous			
2. Fraction	24-34	8. Average	138-167
Simple Fractions		Average of Numbers	
Decimal Fractions		Included/Excluded/Correct average ... in a Group	
Comparison of Fractions		Average of Weight, Age and Marks	
Word Problems Based on Fractions		Average Salary/Expenditure/ Temperature/Runs ...	
3. Square-Square Root and Cube-Cube Root	35-48	9. Problems Based on Ages	168-176
Square		Ratio	
Square-Root		Average and Linear Equations	
Cube			
Cube-Root		10. Percentage	177-221
Miscellaneous		Basic Concept of Percentage	
		Increase/Decrease in Quantity	
		Marks/Votes to get in Examination/Election	
		Increase/Decrease in the Cost/Consumption of Items	
4. Indices and Surds	49-67	Income-Expenditure and Savings	
Indices		Number of Persons/Days in Examination and any Place	
Surds		Percentage Change of Value After n yr and Before n yr	
Comparison of Indices and Surds		Miscellaneous	
5. HCF and LCM	68-84	11. Profit and Loss	222-264
HCF		Basic Formulae and Item Loss/Over Head Charges	
LCM		Profit/Loss on Selling Price/Cost Price	
Relation of Two Numbers and their HCF and LCM		When Cost Price and Selling Price Given/Asked in Ratio	
6. Simplification	85-106	When an Article is Sold or Bought at Less/More (at any price), for Real Price	
'BODMAS' Rule			
Algebraic Formulae			

When to Bought x Items for ₹ m to Sold y Items for ₹ n		
When the Article was Sold Many Times		
Profit/Loss is Equal to Selling/Cost Price of x Articles		
When Cost/Selling Price of x -Articles is Equal to Cost/Selling Price of y -Articles		
Two Articles Bought/Sold at same Cost/Selling Price		
Part of an Item/Two Items Bought/Sold at Different Cost/Selling Price		
False Weight		
When Profit Percent Equal (Numerically) to Cost Price		
12. Discount	265-296	
Simple Discount		
Successive Discounts		
13. Partnership	297-303	
Distribution of Profit/Share of Profits		
Find the Ratio of Profits		
14. Mixture and Alligation	304-315	
The Ratio of Quantities in a Mixture		
The Percentage of Quantity in the Mixture		
The Weight/Capacity of Quantity in a Mixture		
Profit and Loss		
Replacement of Mixtures n Times		
15. Simple Interest	316-335	
Simple Interest		
If Amounts/Rates are Different		
Sum of Money Becomes n Times Itself After Sometime		
If know Amount at Various times/Rates Installment		
Miscellaneous		
16. Compound Interest	336-363	
When the Rate is Compounded Annually		
When the Rate is Half-yearly/ Quarterly/ n -Monthly		
Both CI and SI		
When the Amount be n Time for t years		
Installment		
17. Time and Work	364-408	
Basic Concept of Time and Work		
Efficiency of Person		
When a Person Include/Leave to Work between During the Work		
Work-Time Formula and Unitary Method		
When work of m Persons of a Type is Equal to n		
Persons of Second types		
Work and Wages		
18. Pipes and Cisterns	409-420	
Basic Concept		
When any Pipe is Closed/Open in between Work period		
When Pipes are Opened/Closed Alternately		
Capacity and Leak in Cistern		
19. Speed, Time and Distance	421-449	
Simple Motion of any Person/Object		
Average Speed		
To more Changed of Normal Speed		
Relative Motion of Two Persons/Objects		
Miscellaneous		

20. Problems Based on Trains 450-460

When the Train Crosses one/more Stationary Objects
When the Train Crosses one/more Moving Objects

21. Boats and Streams 461-472

Swimmer (a Person)
Boat/Steamer

22. Algebra 473-525

The Properties of Algebraic Expressions
Find the Value of Expressions
Algebraic Equations

23. Geometry 526-617

Lines and Angles
Triangles
Quadrilateral and Polygon
Circle and Cyclic Quadrilateral

24. Coordinate Geometry 618-625

Cartesian Coordinate
Straight Line

25. Area and Perimeter 626-671

Area and Perimeter of Triangles
Area and Perimeter of Quadrilaterals
Area and Perimeter of Circle
Two or More Figure
Percentage Changed in Area and Perimeter

26. Surface Area and Volume 672-727

Area/Volume of Cube and Cuboid
Volume and Surface Area of Cylinder

Volume and Surface Area of Cone and its Frustum
Volume and Surface Area of Sphere and Hemisphere
Prism and Pyramid
Combined Figures

27. Trigonometry 728-793

Trigonometric Ratios and Trigonometric Identities
Find the Value of Trigonometric Expression
To Solve the Trigonometric Equations
Height and Distance

28. Statistics 794-797

Mean
Median
Mode
Mean, Median and Mode
Miscellaneous

29. Data Interpretation 798-899

Table
Line Graph
Bar Graph
Pie-Chart
Mixed Graph

30. Miscellaneous 900-904

Progressions
Probability
Permutation and combination
Circle
Properties of Triangle

CHAPTERWISE TREND ANALYSIS

SSC EXAMS

Held in 2022 - 2020

S. No.	Topic	SSC CGL Tier I 2022 (Dec./22)	SSC CPO 2022 (Nov./22)	SSC CGL Tier II 2021 (Aug./22)	SSC MTS 2022 (June/22)	SSC(10+2) 2021(May/22)	SSC CGL Tier I 2021(Apr./22)
1.	Number System	1	3	4	-	-	1
2.	Fraction	-	-	2	-	-	-
3.	Square-Square Root and Cube-Cube Root	-	-	2	-	-	1
4.	Indices and Surds	-	-	3	-	-	-
5.	HCF and LCM	1	4	-	1	-	-
6.	Simplification	-	2	2	2	2	2
7.	Ratio and Proportion	-	1	1	1	1	-
8.	Average	-	-	2	2	-	1
9.	Problem Based on Ages	1	-	-	-	1	-
10.	Percentage	1	3	6	2	2	1
11.	Profit and Loss	1	2	5	2	1	1
12.	Discount	1	2	3	1	2	1
13.	Partnership	-	-	2	1	-	1
14.	Mixture and Alligation	-	-	2	1	-	-
15.	Simple Interest	1	-	2	-	-	1
16.	Compound Interest	-	1	2	2	1	-
17.	Time and Work	1	2	4	2	1	1
18.	Pipes and Cisterns	-	-	-	-	-	-
19.	Speed, Time and Distance	2	6	2	1	2	1
20.	Problems Based on Trains	-	-	2	-	-	-
21.	Boats and Streams	-	-	-	1	1	-
22.	Algebra	3	3	8	-	2	1
23.	Geometry	3	1	11	-	1	3
24.	Coordinate Geometry	-	-	1	-	-	-
25.	Area and Perimeter	-	1	3	1	1	2
26.	Surface Area and Volume	2	6	11	2	2	-
27.	Trigonometry	3	4	11	-	1	3
28.	Statistics	-	-	-	-	-	-
29.	Data Interpretation	4	9	7	3	3	4
30.	Miscellaneous	-	-	2	-	1	-
Total		25	50	100	25	25	25

S. No.	Topic	SSC CGL Tier II 2020 (Jan./22)	SSC MTS 2021 (Nov./21)	SSC CGL Tier I 2020 (Aug./21)	SSC(10+2) 2020 Tier I (Aug./21)	SSC CPO 2020 (Nov./20)	SSC CGL Tier II 2019 (Nov./20)
1.	Number System	3	-	1	1	2	4
2.	Fraction	5	-	1	-	2	3
3.	Square-Square Root and Cube-Cube Root	1	-	-	-	-	1
4.	Indices and Surds	2	-	-	-	-	2
5.	HCF and LCM	1	1	-	-	2	-
6.	Simplification	4	2	1	1	3	4
7.	Ratio and Proportion	2	3	1	-	-	4
8.	Average	3	1	1	1	-	2
9.	Problem Based on Ages	-	1	-	-	-	1
10.	Percentage	5	1	-	2	3	5
11.	Profit and Loss	4	2	1	1	1	5
12.	Discount	3	1	1	1	2	2
13.	Partnership	2	-	-	-	1	2
14.	Mixture and Alligation	2	-	-	-	-	2
15.	Simple Interest	4	1	-	1	1	1
16.	Compound Interest	-	1	1	-	-	3
17.	Time and Work	2	1	-	1	2	3
18.	Pipes and Cisterns	2	1	1	-	2	1
19.	Speed, Time and Distance	3	2	-	1	1	3
20.	Problems Based on Trains	-	-	-	-	-	1
21.	Boats and Streams	-	-	1	-	1	-
22.	Algebra	6	-	3	3	5	6
23.	Geometry	13	-	4	3	2	13
24.	Coordinate Geometry	1	-	-	-	-	1
25.	Area and Perimeter	2	2	-	2	1	1
26.	Surface Area and Volume	12	1	1	-	4	12
27.	Trigonometry	11	-	3	3	4	11
28.	Statistics	-	1	-	-	-	-
29.	Data Interpretation	7	3	4	4	9	7
30.	Miscellaneous	-	-	-	-	-	-
	Total	100	25	25	25	50	100

Number System

A system in which we study different types of numbers, their relationship and rules govern in them is called **number system**.

In the Hindu-Arabic system, we use the symbols 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9. These symbols are called **digits**. Out of these ten digits, 0 is called an **insignificant digit**, whereas the others are called **significant digits**.

Numerals

A mathematical symbol representing a number in a systematic manner is called a numeral represented by a set of digits.

How to Write a Number?

To write a number, we put digits from right to left at the places designated as unit's, ten's, hundred's, thousand's, ten thousand's, lakh's, ten lakh's, crore's, ten crore's.

Let us see how the number 308761436 is denoted

Ten crore's	Crore's	Ten lakh's	Lakh's	Ten thousand's	Thousand's	Hundred's	Ten's	Unit's
10^8 ↓	10^7 ↓	10^6 ↓	10^5 ↓	10^4 ↓	10^3 ↓	10^2 ↓	10^1 ↓	10^0 ↓
3 ↓	0 ↓	8 ↓	7 ↓	6 ↓	1 ↓	4 ↓	3 ↓	6 ↓

It is read as 'Thirty crore eighty seven lakh sixty one thousand four hundred thirty six'.

Face and Place Values of the Digits in a Number

Face Value

In a numeral, the face value of a digit is the value of the digit itself irrespective of its place in the numeral.

e.g., In the numeral 486729, the face value of 8 is 8, the face value of 7 is 7, the face value of 6 is 6, the face value of 4 is 4 and so on.

Place (Local) Value

In a numeral, the place value of a digit changes according to the change of its place.

In a number,

Place value of unit's digit = (Digit at one's place) $\times 10^0$

Place value of ten's digit = (Digit at ten's place) $\times 10^1$

Place value of hundred's digit

= (Digit at hundred's place) $\times 10^2$ and so on.

The place value of number is also called the local value of the number.

e.g., In the number 28397,

Place value of 8 = $8 \times 10^3 = 8000$

Types of Numbers

There are various types of numbers as follow

1. Natural Numbers

Natural numbers are counting numbers and these are denoted by N ,

i.e. $N = \{1, 2, 3, \dots\}$.

- All natural numbers are positive.
- 1 is the smallest natural number.

2. Whole Numbers

All natural numbers and zero form the set of whole numbers and these are denoted by W ,

i.e. $W = \{0, 1, 2, 3, \dots\}$.

- Zero is the smallest whole number.

3. Integers

Whole numbers and negative of natural numbers form the set of integers and these are denoted by I ,

i.e. $I = \{\dots, -4, -3, -2, -1, 0, 1, 2, 3, 4, \dots\}$.

4. Even Numbers

A counting number, which is divisible by 2, is called an even number.

e.g., 2, 4, 6, 8, 10, 12, ... etc.

- The unit's place of every even number will be 0, 2, 4, 6 or 8.

5. Odd Numbers

A counting number, which is not divisible by 2, is known as an odd number.

e.g., 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, ... etc.

- The unit's place of every odd number will be 1, 3, 5, 7 or 9.

6. Prime Numbers

A counting number is called a prime number, when it is exactly divisible by only 1 and itself.

e.g., 2, 3, 5, 7, 11, 13, ... etc.

- 2 is the only even number which is prime.
- There are 15 prime numbers between 1 and 50, and 10 prime numbers between 50 and 100.

How to test a number is prime or not?

If P = Given number, then

- find the whole number x such that $x > \sqrt{P}$.
- take all the prime numbers less than or equal to x .
- if none of these divides P exactly, then P is prime; otherwise P is non-prime.

e.g., Let $P = 193$, clearly $14 > \sqrt{193}$

Prime numbers upto 14 are 2, 3, 5, 7, 11, 13.

No one of these divides 193 exactly.

7. Composite Numbers

Composite numbers are non-prime natural numbers. They must have atleast one factor apart from 1 and itself.

e.g., 4, 6, 8, 9, etc.

- Composite numbers can be both odd and even.
- 1 is neither a prime number nor a composite number.

8. Coprimes

Two natural numbers are said to be coprimes, if their common divisor is 1.

e.g., (7, 9), (15, 16), etc.

- Coprime numbers may or may not be prime.
- Every pair of consecutive natural numbers is coprime.

9. Rational Numbers

A number that can be expressed in the form of p/q , is called a rational number, where p, q are integers and $q \neq 0$.

e.g., $\frac{3}{5}, \frac{7}{9}, \frac{8}{9}, \frac{13}{15}$, etc.

- A rational number between a and $b = \frac{a+b}{2}$

10. Irrational Numbers

The numbers that cannot be expressed in the form of p/q , are called irrational numbers, where p, q are integers and $q \neq 0$.

e.g., $\sqrt{2}, \sqrt{3}, \sqrt{7}, \sqrt{11}$, etc.

11. Real Numbers

Real numbers include both rational and irrational numbers. They are denoted by R .

e.g., $\frac{7}{9}, \sqrt{2}, \sqrt{5}, \pi, \frac{8}{9}$, etc.

Division Formula

Division is repeated subtraction. If D and d are two numbers, then D/d is called the operation of division, where D is the **dividend** and d is the **divisor**. A number which tells how many times a divisor (d) exists in dividend (D) is called the **quotient** (Q).

If dividend (D) is not a multiple of divisor (d), then D is not exactly divisible by d and in this case, **remainder** (R) is obtained.

Let us see the following operation of division

Let $D = 17$ and $d = 3$, then $\frac{D}{d} = \frac{17}{3} = 5\frac{2}{3}$

Here, 5 = Quotient (Q), 3 = Divisor (d)

and 2 = Remainder (R)

We see that, $17 = (3 \times 5) + 2$

Hence, we can write a formula

$$\text{Dividend} = (\text{Divisor} \times \text{Quotient}) + \text{Remainder}$$

Divisibility Tests

There are following rules to test the divisibility by different numbers

Divisibility by 2 When the last digit of a number is either 0 or even, then the number is divisible by 2.

e.g., 12, 86, 472, 520, 1000 etc., are divisible by 2.

Divisibility by 3 When the sum of the digits of a number is divisible by 3, then the number is divisible by 3.

e.g., 1233, Sum of digits = $1 + 2 + 3 + 3 = 9$, which is divisible by 3, so 1233 must be divisible by 3.

Divisibility by 4 When the number made by last two digits of a number is divisible by 4, then that particular number is divisible by 4. Apart from this, the number having two or more zeros at the end, is also divisible by 4.

e.g., 6428 is divisible by 4 as the number made by its last two digits, i.e. 28 is divisible by 4.

Divisibility by 5 Numbers having 0 or 5 at the end are divisible by 5.

e.g., 45, 4350, 135, 14850 etc., are divisible by 5 as they have 0 or 5 at the end.

Divisibility by 6 When a number is divisible by both 3 and 2, then that particular number is divisible by 6 also.

e.g., 18, 36, 720, 1440 etc., are divisible by 6 as they are divisible by both 3 and 2.

Divisibility by 7 A number is divisible by 7 when the difference between twice the digit at ones place and the number formed by other digits is either zero or a multiple of 7.

e.g., 658 is divisible by 7, because

$$65 - 2 \times 8 = 65 - 16 = 49.$$

As 49 is divisible by 7, so the number 658 is also divisible by 7. This process can be repeat.

Divisibility by 8 When the number made by last three digits of a number is divisible by 8, then the number is also divisible by 8. Apart from this, if the last three or more digits of a number are zero, then the number is divisible by 8.

e.g., 2256 As 256 (the last three digits of 2256) is divisible by 8, therefore 2256 is also divisible by 8.

Divisibility by 9 When the sum of all the digits of a number is divisible by 9, then the number is also divisible by 9.

e.g., 936819, Sum of digits = $9 + 3 + 6 + 8 + 1 + 9 = 36$, which is divisible by 9. Therefore, 936819 is also divisible by 9.

Divisibility by 10 When a number ends with zero, then it is divisible by 10.

e.g., 20, 40, 150, 123450, 478970 etc., are divisible by 10, as they all end with zero.

Divisibility by 11 When the sum of digits at odd and even places are equal (or difference is zero) or differ by a number divisible by 11, then the number is also divisible by 11.

e.g., 2865423 Let us see

Sum of digits at odd places (A) = $2 + 6 + 4 + 3 = 15$

Sum of digits at even places (B) = $8 + 5 + 2 = 15$

$\therefore A - B = 0$

Hence, 2865423 is divisible by 11.

Divisibility by 12 A number which is divisible by both 4 and 3, is also divisible by 12.

e.g., 2244 is divisible by both 3 and 4. Therefore, it is divisible by 12 also.

Divisibility by 14 A number which is divisible by both 7 and 2, is also divisible by 14.

e.g., 1232 is divisible by both 7 and 2. Therefore, it is divisible by 14 also.

Divisibility by 15 A number which is divisible by both 5 and 3, is also divisible by 15.

e.g., 1275 is divisible by both 5 and 3. Therefore, it is divisible by 15 also.

Divisibility by 16 A number is divisible by 16, when the number made by its last 4 digits is divisible by 16.

e.g., 126304 is divisible by 16 as the number made by its last 4 digits, i.e. 6304 is divisible by 16.

Divisibility by 18 A number is divisible by 18, when it is even and divisible by 9.

e.g., 936198 is divisible by 18 as it is even and divisible by 9.

Divisibility by 25 A number is divisible by 25, when its last 2 digits are either zero or divisible by 25.

e.g., 500, 1275, 13550 are divisible by 25 as last 2 digits of these numbers are either zero or divisible by 25.

- $(x^m - a^m)$ is divisible by $(x - a)$ for all values of m .
- $(x^m - a^m)$ is divisible by $(x + a)$ for even values of m .
- $(x^m + a^m)$ is divisible by $(x + a)$ for odd values of m .

Unit's Digit of an Expression

Given expression can be of following two types

1. When expression is Given in the Form of Product of Numbers

To find the unit's digit in the product of two or more numbers, we take unit's digit of every numbers and then multiply them. Then, the unit's digit of the resultant product is the unit's digit of the product of given expression.

e.g., Unit digit of $207 \times 781 \times 39 \times 94$

Taking unit's digit of every number and then multiplying them

$$= 7 \times 1 \times 9 \times 4 = 7 \times 36$$

Again, taking unit's digits and then multiplying $= 7 \times 6 = 42$

$\therefore$ Unit's digit for $207 \times 781 \times 39 \times 94$ is 2.

2. When expression is Given in the Form of Index

Suppose that the number is of the form a^b , where a and b are natural numbers.

1. If unit's digit of a is 0, 1, 5, or 6, then the resultant unit's digit of a^b remains same.

i.e., Unit's digit of $a^b = \text{unit's digit of } a$

e.g.,

$$(i) \text{ Unit's digit of } (576)^{1151} = 6$$

$$(ii) \text{ Unit's digit of } (155)^{120} = 5$$

(iii) Unit's digit of $(191)^{19} = 1$

(iv) Unit's digit of $(100)^{52} = 0$

2. If unit's digit of a is 4 or 9.

Unit's digit of $(4)^1 = 4, (4)^2 = 6, (4)^3 = 4, (4)^4 = 6$

Here, cyclicity of units digit '4' is two.

For, unit's digit of $a = 4$,

Resultant unit's digit of $a^b = 4$, for $b = \text{odd}$

$= 6$ for $b = \text{even}$

e.g., Unit's digit in $4^{102} = 6$

Unit's digit of $(9)^1 = 9, (9)^2 = 1, (9)^3 = 9, (9)^4 = 1$

Here, cyclicity of unit's digit '9' is two.

For unit's digit of $a = 9$

Resultant unit's digit of $a^b = 9$, for $b = \text{odd}$

$= 1$, for $b = \text{even}$

e.g., unit's, digit in $9^{105} = 9$

3. If unit's digit of a is 2, 3, 7 or 8.

Unit's digit of $(2)^1 = 2, (2)^2 = 4, (2)^3 = 8,$

$(2)^4 = 6, (2)^5 = 2$

Unit's digit of $(3)^1 = 3, (3)^2 = 9, (3)^3 = 7,$

$(3)^4 = 1, (3)^5 = 3$

Unit's digit of $(7)^1 = 7, (7)^2 = 9, (7)^3 = 3,$

$(7)^4 = 1, (7)^5 = 7$

Unit's digit of $(8)^1 = 8, (8)^2 = 4, (8)^3 = 2,$

$(8)^4 = 6, (8)^5 = 8$

Here, cyclicity of each 2, 3, 7 and 8 is four

Case I b is multiple of 4.

For unit digits of $a = 2$ or 8.

Resultant unit's digit of $a^b = 6$

e.g., unit's digit of $(152)^{392} = (152)^{4 \times 98} = 6$

Unit's digit of $(408)^{756} = (408)^{4 \times 189} = 6$

For unit's digits of $a = 3$ or 7

Resultant unit's digit of $a^b = 1$

e.g., unit's digit of $(4137)^{756} = (4137)^{4 \times 189} = 1$

Unit's digit of $(223)^{100} = (223)^{4 \times 25} = 1$

Case II b is not a multiple of 4.

Let r be the remainder, when b is divided by 4 i.e.,

$b = 4q + r$

For unit digit of $a = 2, 3, 7$ or 8.

$\therefore$ Resultant unit's digit of $a^b = \text{Unit's digit of } a^r$.

e.g., unit's digit of $7^{105} = 7^{4 \times 26 + 1} = 7^1 = 7$

Important Formulae

1. Sum of first n natural numbers $= \frac{n(n+1)}{2}$

2. Sum of first n odd numbers $= n^2$

3. Sum of first n even numbers $= n(n+1)$

4. Sum of squares of first n natural numbers
 $= \frac{n(n+1)(2n+1)}{6}$

5. Sum of cubes of first n natural numbers $= \left[\frac{n(n+1)}{2} \right]^2$

Questions Asked in SSC Exams

TYPE 1 Questions Based on Types of Numbers

1. The sum of the odd divisors of 216 is

[SSC CPO 2022]

- (a) 16 (b) 14
(c) 40 (d) 600

- ② (c) Factors of 216 = 1, 2, 3, 4, 6, 8, 9, 12, 18, 24, 27, 36, 54, 72, 108 and 216.

Sum of odd divisors

$$= 1 + 3 + 9 + 27 = 40$$

2. How many numbers are there from 400 to 700 in which the digit 6 occurs exactly twice?

[SSC CGL (Mains) 2022]

- (a) 19 (b) 18
(c) 21 (d) 20

- ② (d) The numbers from 400 to 700 in which the digit 6 occurs exactly twice are

466, 566, 606, 616, 626, 636, 646, 656, 660, 661, 662, 663, 664, 665, 667, 668, 669, 676, 686, 696

∴ Required number of the numbers = 20

3. How many composite numbers are there from 53 to 97?

[SSC CGL (Mains) 2022]

- (a) 36 (b) 38
(c) 37 (d) 35

- ② (d) The numbers are there from 53 to 97
 $= 97 - 53 + 1 = 45$

The prime numbers are there from 53 to 97,

$$(53, 59, 61, 67, 71, 73, 79, 83, 89, 97) = 10$$

∴ The composite numbers are there from 53 to 97 = $45 - 10 = 35$

4. x, y and z are distinct prime numbers, where $x < y < z$. If $x + y + z = 70$, then what is the value of z ?

[SSC CGL (Mains) 2022]

- (a) 29 (b) 43
(c) 31 (d) 37

- ② (d) x, y and z are distinct prime numbers, where $x < y < z$ and $x + y + z = 70$

$$\text{If } x = 2, \text{ then } y + z = 70 - 2 = 68$$

$$\text{If } y = 31, \text{ then } z = 68 - 31 = 37$$

$$\text{Here, } x + y + z = 2 + 31 + 37 = 70$$

$$\therefore z = 37$$

5. The sum of all possible three-digit numbers formed by digits 3, 0 and 7, using each digit only once is

[SSC CPO 2018]

- (a) 2010 (b) 1990
(c) 2220 (d) 2110

- ② (d) All possible three digit numbers formed by digits 3, 0 and 7

$$= 307, 370, 703 \text{ and } 730$$

[∵ excluding 037 and 073 because here digit '0' is not useful]

$$\therefore \text{Required sum} = 307 + 370 + 703 + 730 = 2110$$

6. A rational number between $\frac{3}{4}$ and $\frac{3}{8}$ is

[SSC CGL 2013]

- (a) $\frac{7}{3}$ (b) $\frac{16}{9}$ (c) $\frac{9}{16}$ (d) $\frac{1}{7}$

- ② (c) Rational number between

$$\frac{3}{4} \text{ and } \frac{3}{8} = \frac{\frac{3}{4} + \frac{3}{8}}{2} = \frac{9}{16}$$

7. The sum of all those prime numbers which are not greater than 17 is

[SSC Constable (GD) 2012]

- (a) 59 (b) 58 (c) 41 (d) 42

- ② (b) Prime numbers till 17 are 2, 3, 5, 7, 11, 13, 17.

∴ Required sum

$$= 2 + 3 + 5 + 7 + 11 + 13 + 17 = 58$$

8. The sum of a natural number and its square equals the product of the first three prime numbers. The number is

[SSC Constable (GD) 2012]

- (a) 2 (b) 3 (c) 5 (d) 6

- ② (c) Let the required number be x .

First three prime number = 2, 3 and 5.

According to the question,

$$x^2 + x = 2 \times 3 \times 5$$

$$\Rightarrow x^2 + x - 30 = 0$$

$$\Rightarrow x^2 + 6x - 5x - 30 = 0$$

$$\Rightarrow x(x + 6) - 5(x + 6) = 0$$

$$\Rightarrow (x - 5)(x + 6) = 0$$

$$\therefore x = 5 \quad [\because x \neq -6]$$

9. If multiplied a natural number by 18 and another by 21 and added the products. Which one of the following could be the sum?

[SSC CGL 2011]

- (a) 2007 (b) 2008 (c) 2006 (d) 2002

- ② (a) Let the natural numbers be x and y .

$$\therefore \text{Required sum} = 18x + 21y \\ = 3(6x + 7y)$$

Hence, the sum is divisible by 3.

Out of the given options, only 2007 is completely divisible by 3.

10. If a and b are odd numbers, then which of the following is even?

[SSC CGL 2011]

- (a) $a + b + ab$ (b) $a + b - 1$
(c) $a + b + 1$ (d) $a + b + 2ab$

- ② (d) The sum of two odd numbers is always even and their product multiplied by 2 is also even.

$$\therefore a + b + 2ab = \text{Even} + \text{Even} = \text{Even}$$

11. The rational number between $\frac{1}{2}$ and $\frac{3}{5}$ is

[SSC CPO 2008]

- (a) $\frac{2}{5}$ (b) $\frac{4}{7}$ (c) $\frac{2}{3}$ (d) $\frac{1}{3}$

- ② (b) Required number between $\frac{1}{2}$ and $\frac{3}{5}$.

$$\Rightarrow \frac{\frac{1}{2} + \frac{3}{5}}{2} \Rightarrow \frac{5 + 6}{20} = \frac{11}{20} \approx \frac{4}{7}$$

12. How many natural numbers divisible by 7 are there between 3 and 200?

[SSC CPO 2003]

- (a) 27 (b) 28 (c) 29 (d) 36

- ② (b) Number of natural numbers divisible by 7 from 0 to 3 = 0

Number of natural numbers divisible by 7 to 199

$$= \frac{199}{7} = 28 \frac{3}{7} = 28$$

$$\therefore \text{Required number of natural numbers} \\ = 28 - 0 = 28$$

TYPE 2 Questions Based on Divisibility and Remainder

1. Which of the following pairs of non-zero values of p and q make 6-digit number $674pq0$ divisible by both 3 and 11? [SSC CGL (Pre) 2022]

(a) $p = 4$ and $q = 2$ (b) $p = 5$ and $q = 2$
(c) $p = 5$ and $q = 4$ (d) $p = 2$ and $q = 2$

- ② (b) 6-digit number - $674pq0$

∴ This number is divisible by 3.

∴ The sum of its digits will be divisible by 3.

⇒ $6 + 7 + 4 + p + q + 0$, is divisible by 3.

⇒ $17 + p + q$, is divisible by 3.

⇒ $p + q = 1, 4, 7$... (i)

∴ The number is also divisible by 11, then

Sum of odd places - Sum of even places = 0 or divisible by 11.

⇒ $(6 + 4 + q) - (7 + p + 0) = 0$ or divisible by 11

⇒ $10 + q - 7 - p = 0$ or divisible by 11

⇒ $3 + q - p = 0$ or divisible by 11

If $3 + q - p = 0$

⇒ $q - p = -3$

⇒ $p - q = 3$... (ii)

From Eq. (i), $p + q = 7$... (iii)

[∵ $p + q \geq 4$]

To solve Eqs. (ii) and (iii), $p = 5, q = 2$

Hence, $p = 5$ and $q = 2$.

2. A four-digit pin, say $abcd$, of a lock has different non-zero digits. The digits satisfy $b = 2a, c = 2b, d = 2c$. The pin is divisible by _____. [SSC CGL (Pre) 2022]

(a) 2, 3, 11 (b) 2, 3, 7
(c) 2, 3, 5 (d) 2, 3, 13

- ② (d) Pin number of four-digits = $abcd$

Here, $b = 2a, c = 2b, d = 2c$

∴ $c = 4a, d = 8a$

∴ Pin-number of four-digits

$$= (a)(2a)(4a)(8a) = 64a^4$$

The greatest four-digits number which is divisible by 64 = 9984 = 64×156

Remain factors of number = 156

$$= 2 \times 2 \times 3 \times 13$$

Hence, the number is divisible by 2, 3 and 13.

3. If the nine-digit number $3422213AB$ is divisible by 99, then what is the value of $2A + B$? [SSC CGL (Pre) 2022]

(a) 11 (b) 12
(c) 10 (d) 13

- ② (a) Nine-digit number = $3422213AB$

This number is divisible by 99, then this number will be divisible by 9 and 11.

∴ The number is divisible by 9, then the sum of digits of number will be divisible by 9.

$$\Rightarrow 3 + 4 + 2 + 2 + 2 + 1 + 3 + A + B$$

will be divisible by 9

⇒ $17 + A + B$, will be divisible by 9

∴ The possible value of $A+B = 1, 10$... (i)

∴ The number is divisible by 11, then the difference of the sum of digits of odd places and the sum of digits of even places will be 0 or divisible by 11.

$$\Rightarrow (3 + 2 + 2 + 3 + B) - (4 + 2 + 1 + A) = 0 \text{ or divisible by 11.}$$

$$\Rightarrow 10 + B - 7 - A = 0 \text{ or divisible by 11}$$

$$\Rightarrow 3 + B - A = 0 \text{ or divisible by 11}$$

$$\text{If } 3 + B - A = 0 \Rightarrow A - B = 3$$

(The values of A and B will be not possible)

$$\text{If } 3 + B - A = 11$$

$$\Rightarrow B - A = 8 \quad \dots \text{(ii)}$$

From relation Eq. (i),

$$A + B = 10 \quad \dots \text{(iii)}$$

From Eqs. (ii) and (iii), $B = 9, A = 1$

$$\therefore 2A + B = 2 \times 1 + 9 = 11$$

4. What are the values of R and M , respectively, if the given number is perfectly divisible by 16 and 11?

$34R05030M6$ [SSC CPO 2022]

(a) 4 and 6 (b) 7 and 5
(c) 5 and 5 (d) 5 and 7

- ② (c) Given number is $34R05030M6$.

When the number is divisible by 16.

Then the number formed by last 4 digit is divisible by 16.

$$\therefore M = 1, 3, 5, 7, 9$$

When the number is divisible by 11, then the difference of odd place digits and even places digits is 0 or divisible by 11.

$$\therefore (4 + 0 + 0 + 0 + 6)$$

$$+ (3 + R + 5 + 3 + M) \text{ is divisible by 11.}$$

$$\Rightarrow (11 + R + M) - (10) \text{ is divisible by 11.}$$

Put $M = 5$

$$\Rightarrow (11 + 5 + R - 10) \text{ is divisible by 11.}$$

$$\Rightarrow R = 5 \text{ (only possible)}$$

5. If a 4 digit number $x58y$ is exactly divisible by 9, then the least value of $(x + y)$ is [SSC CPO 2022]

(a) 4 (b) 5 (c) 3 (d) 2

- ② (b) Given, number $x58y$.

For divisible by 9.

$$\therefore (x + 5 + 8 + y) \text{ is divisible by 9.}$$

$$\Rightarrow 18 + x + y \text{ is divisible by 9.}$$

For the least value of $(x + y) = 5$

$$\left[\because \frac{13 + 5}{9} = 2 \right]$$

6. If the 9-digit number $97x4562y8$ is divisible by 88, what is the value of $(x^2 - y^2)$ for the smallest value of y , given that x and y are natural numbers? [SSC CPO 2022]

(a) 64 (b) 68 (c) 76 (d) 80

- ② (d) A number to be divisible by 88, must be divisible by 8 and 11.

The number $97x4562y8$ to be divisible by 8, the number formed by last three digit of number must be divisible by 8.

So, $2y8$ is divisible by 8, if $y = 4$ (∵ $y \leq 9$)

Also, the number $97x4562y8$ will be divisible by 11 only if difference of sum of odd and even places digits is multiple of 11 or 0.

Now, $(9 + x + 5 + 2 + 8)$

$$- (7 + 4 + 6 + y) = 11$$

$$\Rightarrow 24 + x - 17 - y = 11$$

$$\Rightarrow x = 11 - 7 + y \quad (\because y = 4)$$

$$= 8$$

$$\text{Now, } (x^2 + y^2) = (8^2 + 4^2) = 64 + 16 = 80$$

7. Find the least value of p so that $246p48$ is divisible by 8. [SSC CPO 2022]

(a) 2 (b) 1
(c) 4 (d) 0

- ② (d) The number $246p48$ will be divisible by 8 only if the number formed by last three digits of number is divisible by 8.

i.e. $P48$ is divisible by 8.

∴ Possible value of $P = 0, 2, 4, 8$

So, the required least value = 0

8. What is the remainder, when 8127 is divided by 8? [SSC (10 + 2) 2022]

(a) 7 (b) 5
(c) 4 (d) 6

- ② (a) $8127/1015$

$$\frac{8}{12}$$

$$\frac{8}{47}$$

$$\frac{40}{7}$$

$$7 = \text{Remainder}$$

∴ Required remainder = 7