FOURTH EDITION

Quantitative Aptitude

for Competitive Examinations

Useful for Bank PO/Clerk - IBPS, SBI, RBI, SSC-CGL and other Competitive Examinations

P Pearson

Dinesh Khattar

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The Pearson Guide to

Quantitative Aptitude

For Competitive Examinations

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(Fourth Edition)

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Pearson

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PREFACE TO THE FOURTH EDITION

Since the publication of last edition of this book, I have received immense support from readers, and a lot of inputs on how this book could be improved. With the aid of all this information, it gives me immense pleasure to present a completely updated fourth edition of the book.

Following are noteworthy inclusion in this edition:

1. The book is updated with latest previous years' questions asked in various competitive examination with explanatory answers.
2. Alternated solutions have been given for teaching multiple approaches to learner.
3. Solution to each and every question in the book.

In order to provide a more focused approach, the obsolete previous years' questions have been deleted in every chapter, however the basic structure of the book has been kept intact. In preparing this fourth edition, I am greatly indebted to many teachers at various coaching centers as wells students throughout the country who made constructive criticism and extended valuable suggestions for the improvement of the book. Any suggestions to ensure further improvement of the book will be greatly acknowledged.

I am extremely thankful to editorial team of Pearson Education for all the hard work they had put in this book and made possible the publishing of this book in timely and precious manner.

DINESH KHATTAR

PREFACE TO THE FIRST EDITION

With so many books available in the market on quantitative aptitude for students appearing in different competitive examinations, the publication of yet another volume on the subject requires some explanation. It has been my experience that the average student needs the treatment of theory in a manner easily understandable to him. An effort, therefore, has been made, in this book to put across concepts in a lucid and unambiguous manner. The book aims at helping students enhance their knowledge of quantitative aptitude and equipping them with the skills that will enable them to succeed in any competitive examination.

The book is noteworthy in the following aspects:

1. Each chapter contains concise definitions and explanations of basic/fundamental principles, which are further augmented with illustrative examples to enable students to learn and recall fast.
2. Each chapter has a separate section on short-cut methods covering all kinds of questions asked in competitive examinations. In addition, each short-cut method is explained with the help of illustrative examples.
3. Completely worked-out solutions to a large range of problems have been included in the text. The number of questions in each chapter has been kept sufficiently large to provide rigorous practice.
4. A large number of problems that have been asked in the competitive examinations in recent times are included in every chapter with explanatory answers.
5. Practice exercises covering all the topics in each chapter are provided for self-assessment and to facilitate understanding of the pattern and the type of questions asked in the examinations.

Every care has been taken to minimise typographical as well as factual errors. However, it is possible that a few errors might have managed to dodge the vigilant eye. I will be grateful to the readers for bringing these errors to my notice as also for their valuable suggestions. It is earnestly hoped that the book will help the students grasp the subject and help them in obtaining a commendable score in the examination.

In preparing this edition, my deepest appreciation goes to many teachers at various coaching centres as well as students throughout the editorial who made constructive criticism and extended valuable suggestions. I am also extremely thankful to Pearson editorial team, for their unfailing cooperation.

I am deeply indebted to my parents without whose encouragement this dream could not have been translated into reality. And last, but not the least, it was the cherubic smiles of my daughters Nikita and Nishita that inspired me to treat my work as worship.

DINESH KHATTAR

ACKNOWLEDGEMENT

I would like to express my gratitude to my father to whom I owe all my achievements. Whatever I have achieved in life is because of the dreams and wishes which he has always nurtured about me.

COMPETITIVE EXAMINATIONS: AN OVERVIEW

SSC COMPETITIVE EXAMINATIONS

SCHEME OF THE EXAMINATION FOR COMBINED GRADUATE LEVEL EXAMINATIONS

The Scheme of the Examination will be conducted in three tiers as indicated below:

- *1st Tier-I* Written Examination (Objective Multiple Choice Type)
- *2nd Tier-II* Main Written Examination (Objective Multiple Choice Type)
- *3rd Tier-III* Personality Test/Interview or Skill Test, where applicable Candidates opting for post of Sub-Inspector in CPOs will be required to undergo Physical Endurance Test (PET)/Medical Examination at any convenient time after declaration of result of Tier-I.

COMBINED GRADUATE LEVEL (TIER-I) EXAMINATION

Tier-I of the Combined Graduate level Examination would be common for all categories of posts and will be held in one session. Total duration of the examination = 2 hours.

Part	Subject	Maximum Marks/Questions
I.	General Intelligence and Reasoning	50
II.	General Awareness	50
III.	Numerical Aptitude	50
IV.	English Comprehension	50

Syllabus of Numerical Aptitude: The questions are designed to test the ability of appropriate use of numbers and number sense of the candidate. It will test sense of order among numbers, ability to translate from one name to another, sense or order of magnitude, estimation or prediction of the outcome of computation, selection of an appropriate operation for the solution of real life problems and knowledge of alternative computation procedures to find answers. The questions would also be based on arithmetical concepts and relationship between numbers and not on complicated arithmetical computation (The standard of the questions will be of 10 + 2 level).

COMBINED GRADUATE LEVEL (TIER-II) EXAMINATION

Tier-II of the Combined Graduate Level Examination is an objective multiple-choice and is conducted over two days during a weekend. It will consist of three different papers/subjects and depending upon the category of posts applied for, the candidate will be required to appear in one, two or three papers, as the case may be.

For the post of Assistants, Inspector of Income Tax/Inspector (Central Excise, Inspector (PO), Inspector (Examiner), Sub Inspector in CBI, Inspector of Posts, Assistant Enforcement Officer, Divisional Accountants, Accountants, Auditors, Tax Assistants, UDCS, the examination will consist of two papers as under:

Part	Subject	Maximum Marks/Questions	Duration For General Candidates	Duration For Vh Candidates
I	Arithmetical Ability	200/100	2 Hours	2 Hours and 40 Minutes
II	English Language and Comprehension	200	2 Hours	2 Hours and 40 Minutes

For the post of Statistical Investigators GR.II & Compilers, the examination will consist of three papers as under:

Part	Subject	Maximum Marks/Questions	Duration For General Candidates	Duration For Vh Candidates
I	Arithmetical Ability	200/100	2 Hours	2 Hours and 40 Minutes
II	English Language and Comprehension	200/200	2 Hours	2 Hours and 40 Minutes
III	Commerce/Mathematics Statistics/Economics	200/200	2 Hours	2 Hours and 40 Minutes

For The post of Sub-Inspector in Central Police Organisations, the examination will consist of one Paper as under:

Paper	Subject	Maximum Marks/Questions	Duration For General Candidates
I	English Language and Comprehension	200/200	2 Hours

Syllabus For Tier-I (Paper-I): Arithmetic Ability—This paper will include questions on problems relating to Number Systems, Computation of Whole Numbers, Decimals and Fractions and relationship between Numbers, Fundamental Arithmetical Operations, Percentage, Ratio and Proportion, Average, Interest, Profit and Loss, Discount, Use of Table and Graphs, Mensuration, Time and Distance, Ratio and Time, etc.

CLERKS' GRADE EXAMINATION

Clerks Grade Examination is conducted by the Staff Selection Commission for recruitment to the posts of clerks for the following groups of services/offices:

Group X

- Indian Foreign Service (B) Grade VI
- Railway Board Secretarial Clerical Service Grade II
- Central Secretariat Clerical Service—Lower Division Grade
- Armed Forces Headquarters Clerical Service—Lower Division Grade
- Ministry of Parliamentary Affairs
- President's Secretariat

Group Y

- Equivalent/comparable posts in Subordinate offices of Government of India located throughout India.
- Offices of the Controller and Auditor General of India, Accountants General (Audit) and Accountants General (Accounts and Estt.) in various states.
- Controller General of Defence Accounts.

- Central Vigilance Commission.
- Equivalent/comparable posts in other Departments and Attached Offices of Government of India not mentioned in group 'X'.
- Equivalent/comparable posts in the offices of public sector undertakings, autonomous bodies, like Employees State Insurance Corporation
- Delhi Administration
- Municipal Corporation of Delhi and New Delhi Municipal Corporation
- University of Delhi

Age

18 to 25 years on the 1st August of the year of examination. Upper age limit relaxable for SC/ST etc.

Educational Qualifications

Matriculation or equivalent.

Examination

Plan of the Examination: The examination shall consist of two parts. Part I-Written Examination and Part II-Typewriting Test for those candidates who attain such minimum standards in the written test as may be fixed by the commission in their discretion.

Examination Subjects: The subjects of written examination, the time allowed and the maximum marks for each subject will be as follows:

S.No	Subject	Duration	Max. Marks
1	General Intelligence and Clerical Aptitude		50
2	English Language	2 Hours	50
3	Numerical Aptitude		50
4	General Awareness		50

Notes

(i) The questions in all the four tests will be Objective-Multiple Choice Type.
(ii) Candidates will be required to qualify in each of the tests separately.

Syllabus of Numerical Aptitude Test: Questions will be designed to test the ability of arithmetical computation of whole numbers, decimals and fractions and relationship between numbers. The questions would be based on arithmetical concepts and relationship between numbers and not on complicated arithmetical computation.

L.I.C/G.I.C. COMPETITIVE EXAMINATIONS

L.I.C. OFFICERS' EXAMINATION

A competitive examination for the recruitment of the Assistant Administrative Officers etc, in Life Insurance Corporation (LIC) it is held once a year, generally in the month of June. The blank application form and particulars are published in the Employment News, usually the second week of May every year.

Age

21 to 28 years on the 1st April of the year of examination. Upper age limit is relaxable for SC/ST, confirmed L.I.C. employees, etc.

Educational Qualifications

Bachelor's/Master's Degree from a recognised Indian or Foreign University with a minimum of 50% marks (relaxable in the case of SC/ST candidates to 40%) in aggregate in either of the degrees.

Examination

Plan of the Examination: The examination comprises (*i*) written examination and (*ii*) interview of candidates who qualify in the written test.

Examination Subjects: The written examination consists of the following papers:

Paper I (Objective)

1. Reasoning Ability (Bilingual)
2. General Knowledge and Current Affairs (Bilingual)
3. Numerical Ability (Bilingual): The purpose of this test is to ascertain how quick you are in working at numerical calculations
4. English Language with special emphasis on grammar and vocabulary

Paper II (Descriptive)

1. Test on Essay (can be written in Hindi or English)
2. Precise and Comprehension in English

LIC DEVELOPMENT OFFICERS' EXAMINATION

A competitive examination for the recruitment of Assistant Development Officers' in the Life Insurance Corporation is held once a year, generally in the month of September. The blank application forms and particulars are published in the Employment News, generally in the month of July and the last date for submission of applications is generally the first week of August.

Age

The applicants should have completed the age of 21 years on the 1st July of the year of examination.

Educational Qualifications

Candidates must hold a bachelor's degree in arts, science, commerce, agriculture or law of an Indian or foreign university or an equivalent qualification.

Examination

Plan of the Examination: The examination comprises (*i*) written examination (*ii*) interview of such candidates, who qualify in the written test.

Examination Subjects: The written test will consist of (*i*) test of reasoning and numerical ability and (*ii*) general English/Hindi and general knowledge. The test papers will be set bilingual and the candidates will have choice to write answers either in English or in Hindi.

G.I.C. ASSISTANTS' EXAMINATION

This examination is held once a year, generally in the month of August. The blank application and particulars are published in the Employment News, usually in the month of March. The last date for the submission of applications is usually first week of April every year.

Age

18 to 28 years on 1 June of the year of examination.

Educational Qualifications

Pass in higher secondary with 60% marks or graduate of a recognised university.

Examination

Plan of the Examination: The examination comprises (*i*) written examination and (*ii*) interview of candidates qualifying the written test.

Examination Subjects: (*i*) The written test will be objective type, consisting of test of reasoning, numerical ability, clerical aptitude, English language and general knowledge. (*ii*) There will also be a descriptive test on essay, letter and precise writing in English. Objective tests except English will be bilingual, i.e., both in English and Hindi.

BANKING SERVICES EXAMINATIONS

Banking has emerged as one of the most challenging sectors in the country. Openings are available at various levels, from bank clerical to probationary officers (PO). Recruitment for the public sector banks is done through the Banking Service Recruitment Boards (BSRBs). The advertisements for recruitment appear in newspapers as well as the *Employment News*. Recruitment is done on the basis of a written test, which consists of (*a*) test of reasoning, (*b*) quantitative aptitude, (*c*) general awareness, (*d*) English language and (*e*) descriptive test.

The test is qualifying in nature and the marks obtained are not added in the final merit list. It is held on Sundays. Except for the descriptive portion, all other sections contain objective-type questions. In the reasoning test, there are verbal and non-verbal sections. In English, the test is aimed at judging the overall comprehension and understanding of the language. The descriptive paper can be answered in English or Hindi. It judges the written expression of the candidates. All sections must be qualified.

RESERVE BANK OF INDIA

STAFF OFFICERS' GRADE-A EXAMINATION

Selection for this class I post is made on all-India basis by Reserve Bank of India Services Board, Hong Kong Building, 6th Floor, M.G. Road, P.O. Box 10009, Hutatma Chow, Mumbai 400 001. Set up in July 1968, the Board functions on the lines of the UPSC and conducts various examinations for recruitment of officers grade. There is reservation of posts for SC/ST categories.

Age

21–26 years

Educational Qualifications

Bachelor's/Master's Degree (50%) or Chartered/Cost Accountant with Bachelor's Degree or Degree in Management.

Examination

Subjects: Written test consists of

  (i) *Paper I* (Objective Type)—Test of reasoning, test of quantitative aptitude, test of English language, general awareness.
 (ii) *Paper II* (Descriptive Type)—English essay, precise writing/comprehension.
(iii) *Paper III* (Descriptive Type)—Economic and social problems. Those who qualify the written test are called for interview.

STAFF OFFICER GRADE B EXAMINATION

Age

21–28 years (maximum 26 years for degree holders). Relaxable by 5 years for SC/ST and Ex-Servicemen, and by 3 years for OBC candidates.

Educational Qualifications

Min 60% marks (50% for SC/ST candidates) in bachelor's degree as well as in 10th and 12th Standard.

Examination

Subjects: Written test consists of

(*i*) *Phase 1: Paper I* (Objective Type)—Test of Reasoning, Quantitative Aptitude, General Awareness and English Language. Phase 2: *Paper I—*English (writing skills); *Paper II—Economic* and Social Issues*; Paper III (optional)—*Finance and Management/ Economics/ Statistics.

> **Note**

Written test is followed by interview which carries 50 marks.

STATE BANK GROUP

PROBATIONARY OFFICERS' EXAMINATION

This examination is held by Central Recruitment Board (State Bank Group) Madhuli, Second Floor, H/2 Shiv Nagar Estate, Dr. Annie Besant Road, Worli, Mumbai 400 018 for recruitment of Probationary Officers in State Bank of India and its associates banks, namely, State Bank of Bikaner and Jaipur, State Bank of Hyderabad, State Bank of Indore, State Bank of Mysore, State Bank of Patiala, State Bank of Saurashtra and State Bank of Travancore. There is reservation of posts for SC/ST, Ex-Servicemen, OBC, etc.

Age

18–26 years, relaxable for SC/ST, OBC and Ex-Servicemen

Educational Qualifications

Degree

Examination

Subjects: Written test consists of

(*i*) *Paper I* (Objective Type)—Test of Reasoning Ability, Quantitative Aptitude, English Comprehension, General Awareness.
(*ii*) *Paper II* (Descriptive Type)—Essay, letter writing or precise writing in English.

> **Note**

Those who qualify the written test are called for interview.

CLERICAL CADRE EXAMINATION (REGIONAL RECRUITMENT BOARD)

This examination is generally held annually to recruit the clerical cadre in State Bank of India and its associate banks. There is resonation of posts for SC/ST, Ex-Servicemen and OBC, etc.

Age

18–26 years, relaxable for various categories as per rules.

Educational Qualifications

Degree

Examination

Subjects: Written test consists of

 (*i*) *Paper I*—General Awareness, Reasoning Ability, English Language, Numerical Ability
(*ii*) *Paper II*—Essay writing, Letter writing, Precise writing

NATIONALIZED BANKS

In nationalized banks, the recruitment is made through competitive test held by Banking Service Recruitment Board.

PROBATIONARY OFFICERS EXAMINATION

There are 15 Banking Service Recruitment Boards in the country. These Boards recruit probationary officers and clerical cadre for the nationalised banks. There is reservation of posits for SC/ST, Ex-Servicemen, etc.

Age

21–28 years, relaxable for SC/ST, OBC and Ex-Servicemen

Educational Qualifications

Degree

Examination

Subjects: Written test consists of

 (i) *Paper I* (Objective Type)—Test of reasoning ability, quantitative aptitude, English comprehension, general awareness.
(ii) *Paper II* (Descriptive Type)—Essay (in English or regional language), letter writing or precise writing in English.

CLERICAL CADRE EXAMINATION

Age

18–26 years, relaxable for certain categories as per rules.

Educational Qualifications

For Clerks, Typists—Degree or 10 + 2 (50%) or diploma in banking (50%) or matriculation (60%).
For Stenographers—matriculation.
Relaxation in percentage of marks in qualifying examination for SC/ST, Ex-Servicemen and physically handicapped.

Examination

Subjects: Written examination (200 marks)

 (i) *Paper I* (Objective Type)—Reasoning Ability, English language, Numerical Ability, Clerical Aptitude
(ii) *Paper II* (Descriptive Type)—Three out of four questions of short essay or exposition type on a given proposition, situation to be answered in Hindi or English.

For the posts of typists and stenographers, proficiency in typing and shorthand with the following minimum speed is required:

 (i) English typing speed 30 wpm
 (ii) English shorthand speed 80 wpm
(iii) Hindi typing speed 25 wpm
(iv) Hindi shorthand speed 60 wpm

Proficiency test for typist/stenographer is held if they qualify the written test. Those ranking high in the written examination are called for an interview (100 marks). Final selection is on the basis of candidate's performance in written tests and interview taken together. Probationary period is six months.

NATIONAL BANK FOR AGRICULTURE AND RURAL DEVELOPMENT (NABARD)

DEVELOPMENT OFFICER GRADE B EXAMINATION

Age

24–32 years, relaxable for certain categories as per rules

Educational Qualifications

Master's Degree in economics/agricultural economics (50%), Ph.D is desirable

Examination

Subjects: Written test consists of

Preliminary examination (objective type): General Awareness, English Language, Quantitative Aptitude, Reasoning Ability.

Main examination:
  (i) *Paper I*—General English and General Awareness
 (ii) *Paper II*—Economic and Social Problems
(iii) *Paper III*—Economics/Agricultural Economics

ASSISTANT DEVELOPMENT OFFICER GRADE 'A' EXAMINATION

Age

21–26 years. Relaxable for certain categories as per rules.

Educational Qualifications

Bachelor's Degree/Master's Degree (50%)

Examination

Subjects: Written test consists of

Preliminary Examination (Objective Type)—General Awareness, English Language, Quantitative Aptitude, Reasoning Ability.

Main Examination:
  (i) *Paper I*—General English and General Awareness.
 (ii) *Paper II*—Economic and Social Problems.

INTRODUCTION

In Hindu Arabic System, we use ten symbols 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 called *digits* to represent any number. This is the *decimal system* where we use the numbers 0 to 9. 0 is called *insignificant digit* whereas 1, 2, 3, 4, 5, 6, 7, 8, 9 are called *significant digits*.

A group of figures, denoting a number is called a *numeral*. For a given numeral, we start from extreme right as Unit's place, Ten's place, Hundred's place and so on.

Illustration 1: We represent the number 309872546 as shown below:

Ten Crore 10^8	Crores 10^7	Ten Lakhs (million) 10^6	Lakhs 10^5	Ten Thousand 10^4	Thousand 10^3	Hundred 10^2	Ten's 10^1	Units 10^0
3	0	9	8	7	2	5	4	6

We read it as

'Thirty crores, ninety-eight lakhs, seventy-two thousands five hundred and forty-six.'

In this numeral:

The place value of 6 is $6 \times 1 = 6$

The place value of 4 is $4 \times 10 = 40$

The place value of 5 is $5 \times 100 = 500$

The place value of 2 is $2 \times 1000 = 2000$ and so on.

The face value of a digit in a number is the value itself wherever it may be.

Thus, the face value of 7 in the above numeral is 7. The face value of 6 in the above numeral is 6 and so on.

NUMBER SYSTEM

Natural Numbers

Counting numbers 1, 2, 3, 4, 5, ... are known as *natural numbers*.

The set of all natural numbers can be represented by

$$N = \{1, 2, 3, 4, 5, ...\}$$

Whole Numbers

If we include 0 among the natural numbers, then the numbers 0, 1, 2, 3, 4, 5, ... are called *whole numbers*.

The set of whole numbers can be represented by

$$W = \{0, 1, 2, 3, 4, 5, ...\}$$

Clearly, every natural number is a whole number but 0 is a whole number which is not a natural number.

Integers

All counting numbers and their negatives including zero are known as *integers*.

The set of integers can be represented by

$$Z \text{ or } I = \{..., -4, -3, -2, -1, 0, 1, 2, 3, 4, ...\}$$

Positive Integers

The set $I^+ = \{1, 2, 3, 4, ...\}$ is the set of all *positive integers*. Clearly, positive integers and natural numbers are synonyms.

Negative Integers

The set $I^- = \{-1, -2, -3, ...\}$ is the set of all *negative integers*. 0 is neither positive nor negative.

Non-negative Integers

The set $\{0, 1, 2, 3, ...\}$ is the set of all *non-negative integers*.

Rational Numbers

The numbers of the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$, are known as *rational numbers*, e.g., $\frac{4}{7}$, $\frac{3}{2}$, $-\frac{5}{8}$, $\frac{0}{1}$, $-\frac{2}{3}$, etc.

The set of all rational numbers is denoted by Q.

That is, $Q = \{x{:}x = \dfrac{p}{q};\ p,\ q \in I,\ q \neq 0\}$

Since every natural number 'a' can be written as $\dfrac{a}{1}$, every natural number is a rational number. Since 0 can be written as $\dfrac{0}{1}$ and every non-zero integer 'a' can be written as $\dfrac{a}{1}$, every integer is a rational number.

Every rational number has a peculiar characteristic that when expressed in decimal form is expressible either in terminating decimals or in non-terminating repeating decimals.

For example, $\dfrac{1}{5} = 0.2,\ \dfrac{1}{3} = 0.333...,\ \dfrac{22}{7} = 3.1428714287,$ $\dfrac{8}{44} = 0.181818\ ...,$ etc.

The recurring decimals have been given a short notation as

$$0.333... = 0.\overline{3}$$
$$4.1555... = 4.0\overline{5}$$
$$0.323232... = 0.\overline{32}$$

Irrational Numbers

Those numbers which when expressed in decimal form are neither terminating nor repeating decimals are known as *irrational numbers*, e.g., $\sqrt{2}, \sqrt{3}, \sqrt{5}, \pi$, etc.

Note that the exact value of π is not $\dfrac{22}{7} \cdot \dfrac{22}{7}$ is rational while π is irrational number. $\dfrac{22}{7}$ is approximate value of π. Similarly, 3.14 is not an exact value of it.

Real Numbers

The rational and irrational numbers combined together to form *real numbers*, e.g., $\dfrac{13}{21}, \dfrac{2}{5}, -\dfrac{3}{7}, \sqrt{3}, 4+\sqrt{2}$, etc. are real numbers.

The set of all real numbers is denoted by R.

Note that the sum, difference or product of a rational and irrational number is irrational, e.g., $3+\sqrt{2},\ 4-\sqrt{3},$ $\dfrac{2}{5}-\sqrt{5}, 4\sqrt{3}, -7\sqrt{5}$ are all irrational.

Even Numbers

All those numbers which are exactly divisible by 2 are called *even numbers*, e.g., 2, 6, 8, 10, etc., are even numbers.

Odd Numbers

All those numbers which are not exactly divisible by 2 are called *odd numbers*, e.g., 1, 3, 5, 7, etc., are odd numbers.

Prime Numbers

A natural number other than 1, is a *prime number* if it is divisible by 1 and itself only.

For example, each of the numbers 2, 3, 5, 7, etc., are prime numbers.

Composite Numbers

Natural numbers greater than 1 which are not prime, are known as composite numbers.

For example, each of the numbers 4, 6, 8, 9, 12, etc., are composite numbers.

Notes

1. The number 1 is neither a prime number nor a composite number.
2. 2 is the only even number which is prime.
3. Prime numbers up to 100 are:
   2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97, i.e., 25 prime numbers between 1 and 100.
4. Two numbers which have only 1 as the common factor are called *co-primes* or *relatively prime* to each other, e.g., 3 and 5 are co-primes.

Note that the numbers which are relatively prime need not necessarily be prime numbers, e.g., 16 and 17 are relatively prime, although 16 is not a prime number.

BASIC FORMULAE

ADDITION AND SUBTRACTION

Addition and Subtraction is best illustrated with the help of following example:

Illustration 1: $54321 - (9876 + 8967 + 7689) = ?$

Step 1   Add Ist column:
$6 + 7 + 9 = 22$
To obtain 1 at unit's place add 9 to make 31. In the answer, write 9 at unit's place and carry over 3.

$$\begin{array}{r} 5\,4\,3\,2\,1 \\ 9\,8\,7\,6 \\ 8\,9\,6\,7 \\ 7\,6\,8\,9 \\ \hline 2\,7\,7\,8\,9 \end{array}$$

Step 2   Add 2nd column:

$3 + 7 + 6 + 8 = 24$

To obtain 2 at ten's place, add 8 to make 32. In the answer, write 8 at ten's place and carry over 3.

Step 3   Add 3rd column:

$3 + 8 + 9 + 6 = 26$

To obtain 3 at hundred's place, add 7 to make 33. In the answer, write 7 at hundred's place and carry over 3.

Step 4   Add 4th column:

$3 + 9 + 8 + 7 = 27$

To obtain 4 at thousand's place, add 7 to make 34. In the answer, write 7 at thousand's place and carry over 3.

Step 5   5th column:
To obtain 5 at ten-thousand's place add 2 to it to make 5. In the answer, write 2 at the ten-thousand's place.

$\therefore$ $54321 - (9876 + 8967 + 7689)$
   $= 27789.$

MULTIPLICATION

01   Multiplication of a given number by 9, 99, 999, etc., that is by $10^n - 1$

Method: Put as many zeros to the right of the multiplicant as there are nines in the multiplier and from the result subtract the multiplicant and get the answer.

Illustration 2:   Multiply:
   (a)   3893 by 99
   (b)   4327 by 999
   (c)   5863 by 9999

Solution: (a) $3893 \times 99 = 389300 - 3893 = 385407$
   (b) $4327 \times 999 = 4327000 - 4327 = 4322673$
   (c) $5863 \times 9999 = 58630000 - 5863 = 58624137$

02   Multiplication of a given number by 11, 101, 1001, etc., that is, by $10^n + 1$.

Method: Place n zeros to the right of the multiplicant and then add the multiplicant to the number so obtained.

Illustration 3:   Multiply:
   (a) 4782×11
   (b) 9836×101
   (c) 6538×1001

Solution: (a) $4782 \times 11 = 47820 + 4782 = 52602$
   (b) $9836 \times 101 = 983600 + 9836 = 993436$
   (c) $6538 \times 1001 = 6538000 + 6538 = 6544538$

03   Multiplication of a given number by 15, 25, 35, etc.

Method: Double the multiplier and then multiply the multiplicant by this new number and finally divide the product by 2.

Illustrations 4:   Multiply:
   (a) 7054×15
   (b) 3897×25
   (c) 4563×35

Solution: (a) $7054 \times 15 = \dfrac{1}{2}(7054 \times 30)$

$$= \dfrac{1}{2}(211620) = 105810$$

   (b) $3897 \times 25 = \dfrac{1}{2}(3897 \times 50) = \dfrac{1}{2}(194850)$
   $= 97425$

   (c) $4536 \times 35 = \dfrac{1}{2}(4563 \times 70) = \dfrac{1}{2}(319410)$
   $= 159705$

04   Multiplication of a given number by 5, 25, 125, 625, etc., that is, by a number which is some power of 5.

Method: Place as many zeros to the right of the multiplicant as is the power of 5 in the multiplier, then divide the number so obtained by 2 raised to the same power as is the power of 5.

Illustration 5:   Multiply:
   (a) 3982×5
   (b) 4739×25
   (c) 7894×125
   (d) 4863×625

Solution: (a) $3982 \times 2 = \dfrac{39820}{2} = 19910$

(b) $4739 \times 25 = \dfrac{473900}{2^2} = \dfrac{473900}{4} = 118475$

(c) $7894 \times 125 = \dfrac{7894000}{2^3} = \dfrac{7894000}{8}$
$= 986750$

(d) $4863 \times 625 = \dfrac{48630000}{2^4} = \dfrac{48630000}{16}$
$= 3039375$

Distributive Laws

For any three numbers a, b, c, we have

(a) $a \times b + a \times c = a \times (b + c)$

(b) $a \times b - a \times c = a \times (b - c)$

Illustration 6: $438 \times 637 + 438 \times 367 = ?$

Solution: $438 \times 637 + 438 \times 367 = 438 \times (637 + 367)$
$= 430 \times 1000$
$= 438000$

Illustration 7: $674 \times 832 - 674 \times 632 = ?$

Solution: $674 \times 832 - 674 \times 632$
$= 674 \times (832 - 632)$
$= 674 \times 200 = 134800$

SQUARES

01 To square any number ending with 5.

Method: $(A5)^2 = A(A + 1)/25$

Illustration 8:

(a) $(25)^2 = 2(2 + 1)/25 = 6/25 = 625$

(b) $(45)^2 = 4(4 + 1)/25 = 20/25 = 2025$

(c) $(85)^2 = 8(8 + 1)/25 = 72/25 = 7225$

02 To square a number in which every digit is one.

Method: Count the number of digits in the given number and start writing numbers in ascending order from one to this number and then in descending order up to one.

Illustration 9:

(a) $11^2 = 121$

(b) $111^2 = 12321$

(c) $1111^2 = 1234321$

(d) $222^2 = 2^2(111)^2 = 4(12321) = 49284$

(e) $3333^2 = 3^2(1111)^2 = 9(1234321) = 11108889$

03 To square a number which is nearer to $10x$.

Method: Use the formula:
$$x^2 = (x^2 - y^2) + y^2 = (x + y)(x - y) + y^2$$

Illustration 10:

(a) $(97)^2 = (97 + 3)(97 - 3) + 3^2$
$= 9400 + 9 = 9409$

(b) $(102)^2 = (102 - 2)(102 + 2) + 2^2$
$= 10400 + 4 = 10404$

(c) $(994)^2 = (994 + 6)(994 - 6) + 6^2$
$= 988000 + 36 = 988036$

(d) $(1005)^2 = (1005 - 5)(1005 + 5) + 5^2$
$= 1010000 + 25 = 1010025$

DIVISION

Division is repeated subtraction.

For example, when we divide 63289 by 43, it means 43 can be repeatedly subtracted 1471 times from 63289 and the remainder 36 is left.

$$
\begin{array}{r}
1471 \leftarrow \text{Quotient} \\
\text{Divisor} \to 43\overline{)\,63289} \quad \leftarrow \text{Dividend} \\
\underline{43} \\
202 \\
\underline{172} \\
308 \\
\underline{301} \\
79 \\
\underline{43} \\
\underline{36} \quad \leftarrow \text{Remainder}
\end{array}
$$

Dividend = (Divisor × Quotient) + Remainder

or, $\text{Divisor} = \dfrac{\text{Dividend} - \text{Remainder}}{\text{Quotient}}$

Illustration 11: On dividing 7865321 by a certain number, the quotient is 33612 and the remainder is 113. Find the divisor.

Solution: $\text{Divisor} = \dfrac{\text{Dividend} - \text{Remainder}}{\text{Quotient}}$

$= \dfrac{7865321 - 113}{33612} = \dfrac{7865208}{33612} = 234$

Illustration 12: A number when divided by 315 leaves remainder 46 and the value of quotient is 7. Find the number.

Solution: Number = (Divisor × Quotient) + Remainder
$= (315 \times 7) + 46 = 2205 + 46 = 2251$

Illustration 13: Find the least number of 5 digits which is exactly divisible by 632.

Solution: The least number of 5 digits is 10000. Dividing this number by 632, the remainder is 520. So, the required number = 10000 + (632 + 520) = 10112.

```
           15
    632) 10000
          632
         3680
         3160
          520
```

Illustration 14: Find the greatest number of 5 digits which is exactly divisible by 463.

Solution: The greatest number of 5 digits is 99999. Dividing this number by 463, the remainder is 454. So, the required number = 99999 – 454 = 99545.

```
          215
    463) 99999
          926
          739
          463
         2769
         2315
          454
```

Illustration 15: Find the number nearest to 13700 which is exactly divisible by 235.

Solution: On dividing the number 13700 by 235, the remainder is 70. Therefore, the nearest number to 13700, which is exactly divisible by 235 = 13700 – 70 = 13630.

```
           58
    235) 13700
         1175
         1950
         1880
           70
```

TESTS OF DIVISIBILITY

1. **Divisibility by 2**   A number is divisible by 2 if the unit's digit is zero or divisible by 2.

    For example, 4, 12, 30, 18, 102, etc., are all divisible by 2.

2. **Divisibility by 3**   A number is divisible by 3 if the sum of digits in the number is divisible by 3.

    For example, the number 3792 is divisible by 3 since 3 + 7 + 9 + 2 = 21, which is divisible by 3.

3. **Divisibility by 4**   A number is divisible by 4 if the number formed by the last two digits (ten's digit and unit's digit) is divisible by 4 or are both zero.

    For example, the number 2616 is divisible by 4 since 16 is divisible by 4.

4. **Divisibility by 5**   A number is divisible by 5 if the unit's digit in the number is 0 or 5.

    For example, 13520, 7805, 640, 745, etc., are all divisible by 5.

5. **Divisibility by 6**   A number is divisible by 6 if the number is even and sum of its digits is divisible by 3.

    For example, the number 4518 is divisible by 6 since it is even and sum of its digits 4 + 5 + 1 + 8 = 18 is divisible by 3.

6. **Divisibility by 7**   The unit digit of the given number is doubled and then it is subtracted from the number obtained after omitting the unit digit. If the remainder is divisible by 7, then the given number is also divisible by 7.

    For example, consider the number 448. On doubling the unit digit 8 of 448 we get 16. Then, 44 – 16 = 28.
    Since 28 is divisible by 7, 448 is divisible by 7.

7. **Divisibility by 8**   A number is divisible by 8, if the number formed by the last 3 digits is divisible by 8.

    For example, the number 41784 is divisible by 8 as the number formed by last three digits, i.e., 784 is divisible by 8.

8. **Divisibility by 9**   A number is divisible by 9 if the sum of its digits is divisible by 9.

    For example, the number 19044 is divisible by 9 as the sum of its digits 1 + 9 + 0 + 4 + 4 = 18 is divisible by 9.

9. **Divisibility by 10**   A number is divisible by 10, if it ends in zero.

    For example, the last digit of 580 is zero, therefore, 580 is divisible by 10.

10. **Divisibility by 11**   A number is divisible by 11 if the difference of the sum of the digits at odd places and sum of the digits at even places is either zero or divisible by 11.

    For example, in the number 38797, the sum of the digits at odd places is 3 + 7 + 7 = 17 and the sum of the digits at even places is 8 + 9 = 17. The difference is 17 – 17 = 0, so the number is divisible by 11.

11. **Divisibility by 12**   A number is divisible by 12 if it is divisible by 3 and 4.

12. **Divisibility by 18**   An even number satisfying the divisibility test of 9 is divisible by 18.

13. **Divisibility by 25**   A number is divisible by 25 if the number formed by the last two digits is divisible by 25 or the last two digits are zero.

    For example, the number 13675 is divisible by 25 as the number formed by the last two digits is 75 which is divisible by 25.

14. **Divisibility by 88**   A number is divisible by 88 if it is divisible by 11 and 8.
15. **Divisibility by 125**   A number is divisible by 125 if the number formed by the last three digits is divisible by 125 or the last three digits are zero.

    For example, the number 5250 is divisible by 125 as 250 is divisible by 125.

SHORT-CUT METHODS

01 **Test to find whether a given number is a prime**

Step 1 Select a least positive integer n such that n^2 > given number.

Step 2 Test the divisibility of given number by every prime number less than n.

Step 3 The given number is prime only if it is not divisible by any of these primes.

Illustration 16:   Investigate, whether 571 is a prime number

Solution: Since $(23)^2 = 529 < 571$ and $(24)^2 = 576 > 571$

$\therefore \qquad\qquad n = 24$

Prime numbers less than 24 are 2, 3, 5, 7, 11, 13, 17, 19, 23. Since 24 is divisible by 2, 571 is not a prime number.

Illustration 17:   Investigate whether 923 is a prime number.

Solution: Since $(30)^2 = 900 < 923$ and $(31)^2 = 961 > 923$

$\therefore \qquad\qquad n = 31$

Prime numbers less than 31 are 2, 3, 5, 7, 11, 13, 17, 19, 23, 29. Since 923 is not divisible by any of these primes, therefore, 923 is a prime number.

02 The least number, which when divided by d_1, d_2 and d_3 leaves the remainders r_1, r_2 and r_3 respectively such that $(d_1 - r_1) = (d_2 - r_2) = (d_3 - r_3)$, is = (L.C.M. of d_1, d_2 and d_3) − $(d_1 - r_1)$ or $(d_2 - r_2)$ or $(d_3 - r_3)$.

Illustration 18:   Find the least number which when divided by 9, 10 and 15 leaves the remainders 4, 5 and 10, respectively.

Solution: Here, $9 - 4 = 10 - 5 = 15 - 10 = 5$

Also, L.C.M. (9, 10, 15) = 90,

$\therefore$ the required least number = $90 - 5 = 85$.

03 A number on being divided by d_1 and d_2 successively leaves the remainders r_1 and r_2, respectively. If the number is divided by $d_1 \times d_2$, then the remainder is = $(d_1 \times r_2 + r_1)$.

Illustration 19:   A number on being divided by 10 and 11 successively leaves the remainders 5 and 7, respectively. Find the remainder when the same number is divided by 110.

Solution: The required remainder

$= d_1 \times r_2 + r_1 = 10 \times 7 + 5 = 75.$

04 To find the number of numbers divisible by a certain integer.

    The method is best illustrated with the help of following example.

Illustration 20:   How many numbers up to 532 are divisible by 15?

Solution: We divide 532 by 15

$$\frac{532}{15} = 35 \times 15 + 7$$

The quotient obtained is the required number of numbers. Thus, there are 35 such numbers.

Illustration 21:   How many numbers up to 300 are divisible by 5 and 7 together?

Solution: L.C.M. of 5 and 7 = 35

We divide 300 by 35

$$300 = \underline{8} \times 35 + 20$$

Thus, there are 8 such numbers.

05 Two numbers when divided by a certain divisor give remainders r_1 and r_2. When their sum is divided by the same divisor, the remainder is r_3. The divisor is given by $r_1 + r_2 - r_3$.

Illustration 22: Two numbers when divided by a certain divisor give remainders 473 and 298, respectively. When their sum is divided by the same divisor, the remainder is 236. Find the divisor.

Solution: The required divisor

$$= 437 + 298 - 236 = 499.$$

EXERCISE-I

1. $7372 \times 7372 + 7372 \times 628 = ?$
   (a) 58976000   (b) 58967000
   (c) 5897600   (d) None of these

2. $9999 + 8888 + 777 + ? = 19700$
   (a) 36   (b) 16
   (c) 64   (d) 26

3. $60\ ?\ 6 \times 111 = 666666$
   (a) 0   (b) 2
   (c) 1   (d) 6

4. $3149 \times 1\ ?\ 5 = 425115$
   (a) 3   (b) 2
   (c) 4   (d) 6

5. If the two digits of the age of Mr Manoj are reversed then the new age so obtained is the age of his wife. $\dfrac{1}{11}$ of the sum of their ages is equal to the difference between their ages. If Mr Manoj is older than his wife then find the difference between their ages.
   (a) Cannot be determined
   (b) 8 years
   (c) 10 years
   (d) 9 years
   (e) 7 years

6. If in a long division sum, the dividend is 380606 and the successive remainders from the first to the last are 434, 125 and 413, then divisor is:
   (a) 451   (b) 843
   (c) 4215   (d) 3372

7. If $\dfrac{x}{y} = \dfrac{3}{4}$, then the value of $\left(\dfrac{6}{7} + \dfrac{y-x}{y+x} \right)$ equals:
   (a) $\dfrac{5}{7}$ (b) $1\dfrac{1}{7}$
   (c) 1   (d) 2

8. The largest natural number by which the product of three consecutive even natural numbers is always divisible, is:
   (a) 16   (b) 24
   (c) 48   (d) 96

9. Which number should replace both the '*'s in $\left(\dfrac{*}{21} \right) \times \left(\dfrac{*}{189} \right) = 1$?
   (a) 21   (b) 63
   (c) 3969   (c) 147

10. In a division sum, the divisor is 12 times the quotient and 5 times the remainder. If the remainder be 48, then the dividend is:
    (a) 240   (b) 576
    (c) 4800   (d) 4848

11. What least number must be subtracted from 1294 so that the remainder when divided by 9, 11, 13 will leave in each case the same remainder 6?
    (a) 0   (b) 1
    (c) 2   (d) 3

12. 24 is divided into two parts such that 7 times the first part added to 5 times the second part makes 146. The first part is:
    (a) 11   (b) 13
    (c) 16   (d) 17

13. $\dfrac{1}{4}$ of a number subtracted from $\dfrac{1}{3}$ of the same number gives 12. The number is:
    (a) 144   (b) 120
    (c) 72   (d) 63

14. $\dfrac{4}{3}$ of a certain number is 64. Half of that number is:
    (a) 32   (b) 40
    (c) 80   (d) 16

15. A fraction becomes 4 when 1 is added to both the numerator and denominator; and it becomes 7 when 1 is subtracted from both the numerator and denominator. The numerator of the given fraction is:
    (a) 2   (b) 3
    (c) 7   (d) 15

16. Three numbers are in the ratio 3:4:5. The sum of the largest and the smallest equals the sum of the third and is 52. The smallest number is:

(a) 20   (b) 27
(c) 39   (d) 52

17. The sum of three numbers is 68. If the ratio between first and second is 2:3 and that between second and third is 5:3, then the second number is:
(a) 30   (b) 20
(c) 58   (d) 48

18. If 1 is added to the denominator of a fraction, the fraction becomes $\frac{1}{2}$. If 1 is added to the numerator, the fraction becomes 1. The fraction is:
(a) $\frac{4}{7}$ (b) $\frac{5}{9}$

(c) $\frac{2}{3}$ (c) $\frac{10}{11}$

19. $\frac{4}{5}$ of a number exceeds its $\frac{2}{3}$ by 8. The number is:
(a) 30   (b) 60
(c) 90   (d) None of these

20. What is the sum of all prime numbers from 60 to 80?
(a) 361   (b) 341
(c) 351   (d) 349

21. The quotient arising from the division of 24446 by a certain divisor is 79 and the remainder is 35, what is the divisor?
(a) 39   (b) 309
(c) 390   (d) 3009

22. In a division sum, the quotient is 120, the divisor 456 and the remainder 333, find the dividend.
(a) 5533   (b) 50553
(c) 56053   (d) 55053

23. The quotient arising from a division of a number by 62 is 463 and the remainder is 60, what is the number?
(a) 28666   (b) 28766
(c) 28576   (d) 28676

24. A number when divided by 221 gives a remainder 43. What remainder will be obtained by dividing the same number by 17?
(a) 11   (b) 8
(c) 9   (d) 13

25. Which one of the following is the largest prime number of three digits?

(a) 997   (b) 999
(c) 991   (d) 993

26. When a certain number is multiplied by 7, the product consists entirely of fives; find the least value of such a number.
(a) 79365   (b) 78365
(c) 77365   (d) 79265

27. In a division sum, the divisor is 10 times the quotient and five times the remainder. What is the dividend, if the remainder is 46?
(a) 5636   (b) 5536
(c) 5336   (d) 5436

28. Which one of the following is the least number of four digits divisible by 71?
(a) 1006   (b) 1065
(c) 1094   (d) 1056

29. How many numbers up to 100 are divisible by 7?
(a) 14   (b) 107
(c) 93   (d) 100

30. How many numbers up to 500 are divisible by 23?
(a) 23   (b) 27
(c) 21   (d) 19

31. How many numbers up to 200 are divisible 2 and 3 both?
(a) 35   (b) 33
(c) 29   (d) 27

32. How many numbers between 100 and 300 are divisible by 11?
(a) 11   (b) 10
(c) 12   (d) 18

33. How many numbers between 150 and 500 are divisible by 2, 3 and 7 together?
(a) 9   (b) 8
(c) 10   (d) 11

34. The number of five figures to be added to a number of four fives to obtain the least number of six figures exactly divisible by 357 is:
(a) 94762   (b) 94802
(c) 94485   (d) None of these

35. The nearest figure to 58701 which is divisible by 567 is:
(a) 58968   (b) 58434
(c) 58401   (d) None of these

36. The digits indicated by * in 3422213 ** so that this number is divisible by 99 are:

(a) 1, 9   (b) 3, 7
(c) 4, 6   (d) 5, 5

37. The least value to be given to * so that the number 5 * 3457 is divisible by 11 is:
(a) 2   (b) 3
(c) 0   (d) 4

38. The nearest whole number to one million which is divisible by 537 is:
(a) 1000106   (b) 999894
(c) 1000437   (d) 999563

39. The smallest number between 400 and 500 which is divisible by 9 is:
(a) 414   (b) 405
(c) 423   (d) None of these

40. Which one of the following is the greatest number of five digits divisible by 231?
(a) 99792   (b) 99892
(c) 99692   (d) 99972

41. Find the number nearest to 16386 which is exactly divisible by 425.
(a) 16575   (b) 16375
(c) 16050   (d) 16450

42. Find the least number which must be subtracted from 9269 so that resulting number is exactly divisible by 73?
(a) 17   (b) 57
(c) 71   (d) 63

43. Find the least number which must be added to 15463 so that the resulting number is exactly divisible by 107?
(a) 52   (b) 71
(c) 55   (d) 19

44. What is the number just more than 5000 which is exactly divisible by 73?
(a) 5001   (b) 5009
(c) 5037   (d) 5027

45. The sum of two numbers is 100 and their difference is 37. The difference of their squares is:
(a) 37   (b) 100
(c) 63   (d) 3700

46. The number of times 79 be subtracted from 50000, so that the remainder be 43759; is:
(a) 69   (b) 79
(c) 59   (d) None of these

47. The ratio between two numbers is 3:4 and their sum is 420. The greater of the two numbers is:
(a) 175   (b) 200
(c) 240   (d) 315

48. The difference between the squares of two consecutive numbers is 35. The numbers are:
(a) 14, 15   (b) 15, 16
(c) 17, 18   (d) 18, 19

49. Three-fourths of one-fifth of a number is 60. The number is:
(a) 300   (b) 400
(c) 450   (d) 1200

50. The sum of squares of two numbers is 80 and the square of their difference is 36. The product of the two numbers is:
(a) 22   (b) 44
(c) 58   (d) 116

51. A number when divided by 357 gives a remainder 37. By dividing the same number by 17, the remainder would be:
(a) 3   (b) 4
(c) 2   (d) None of these

52. The product of two numbers is 120. The sum of their squares is 289. The sum of the two numbers is:
(a) 20   (b) 23
(c) 169   (d) None of these

53. Three numbers are in the ratio 4:5:6 and their average is 25. The largest number is:
(a) 42   (b) 36
(c) 30   (d) 32

54. A number exceeds 20% of itself by 40. The number is:
(a) 50   (b) 60
(c) 80   (d) 320

55. If 16% of 40% of a number is 8, the number is:
(a) 200   (b) 225
(c) 125   (d) 320

56. 4767 exactly divides *** 341, the missing digits are:
(a) 468   (b) 586
(c) 363   (d) None of these

57. A number when divided by a certain divisor left remainder 241, when twice the number was divided by the same divisor, the remainder was 112. Find the divisor.
(a) 370   (b) 365
(c) 380   (d) 456

58. Two numbers when divided by a certain divisor give remainders 43 and 37 respectively, when their sum is divided by the same divisor, the remainder is 13. Find the divisor.
(a) 71   (b) 67
(c) 57   (d) 77

59. Two numbers are such that the ratio between them is 3:5; but if each is increased by 10, the ratio between them becomes 5:7. The numbers are:
(a) 3, 5   (b) 7, 9
(c) 13, 22   (d) 15, 25

60. Divide 50 into two parts so that the sum of their reciprocals is 1/12.
(a) 20, 30   (b) 24, 26
(c) 28, 22   (d) 36, 14

61. The sum of seven numbers is 235. The average of the first three is 23 and that of last three is 42. The fourth number is:
(a) 40   (b) 126
(c) 69   (d) 195

62. The sum of squares of two numbers is 68 and the squares of their difference is 36. The product of the two numbers is:
(a) 16   (b) 32
(c) 58   (d) 104

63. What is the least value of K so that the number $6735K1$ is divisible by 9?
(a) 5   (b) 7
(c) 4   (d) 3

64. For what value of K, the number $7236K2$ is divisible by 8?
(a) 7   (b) 5
(c) 4   (d) 9

65. Find the least values of x and y so that the number $5x423y$ is divisible by 88.
(a) 8, 2   (b) 7, 3
(c) 9, 4   (d) 6, 5

66. 24 is divided into two parts such that 7 times the first part added to 5 times the second part makes 146. The first part is:
(a) 13   (b) 15
(c) 17   (d) 19

67. Sum of three numbers is 132. First number is twice the second and third number is one-third of the first. Find the second number.
(a) 18   (b) 36
(c) 20   (d) 16

68. What least number must be added to 7231 so that the resulting number is exactly divisible by 5 and 9 together?
(a) 20   (b) 18
(c) 14   (d) 16

69. Find a number nearest to 9231 which is exactly divisible by 3 as well as by 11.
(a) 9240   (b) 9340
(c) 9540   (d) 9440

70. Find a nearest number to 12199 which is exactly divisible by the product of the first four prime numbers.
(a) 12181   (b) 12179
(c) 11281   (d) 11279

71. The sum of squares of two numbers is 90 and the squares of their difference is 46. The product of the two numbers is:
(a) 22   (b) 24
(c) 26   (d) 28

72. If 40% of a number is 360, what will be 15% of that number?
(a) $20\dfrac{1}{4}$ (b) $20\dfrac{1}{2}$
(c) $22\dfrac{1}{4}$ (d) $22\dfrac{1}{2}$

73. The sum of the digits of a two-digit number is 8. If the digits are reversed the number is increased by 54. Find the number.
(a) 17   (b) 19
(c) 21   (d) 23

EXERCISE-2
(BASED ON MEMORY)

1. N is the largest two digit number, which when divided by 3, 4 and 6 leaves the remainder 1, 2 and 4 respectively, What is the remainder when N is divided by 5?
(a) 4   (b) 2
(c) 0   (d) 1
[SSC CGL Tier-II CBE, 2018]

2. A and B are positive integers. If $A + B + AB = 65$ then What is the difference between A and B (A, B ≤ 15)?
(a) 3   (b) 4
(c) 5   (d) 6
[SSC CGL Tier-II CBE, 2018]

3. Which one is the largest among the fractions

$\left(\dfrac{5}{113}\right), \left(\dfrac{7}{120}\right), \left(\dfrac{13}{145}\right)$ and $\left(\dfrac{17}{160}\right)$?

  (a) $\dfrac{5}{113}$ (b) $\dfrac{7}{120}$

  (c) $\dfrac{13}{145}$ (d) $\dfrac{17}{160}$

[SSC CGL Tier-I CBE, 2018]

4. On dividing a number by 38, we get 90 as quotient and 19 as remainder. What is the number?

  (a) 3401   (b) 3382
  (c) 3458   (d) 3439

[SSC CHSL (10 + 2) Tier-I CBE, 2017]

5. $(90 + 92 + 93 + ...+ 110)$ is equal to

  (a) 4020   (b) 2010
  (c) 6030   (d) 8040

[SSC CGL Tier-I CBE, 2017]

6. If the number 583-437 is completely divisible by 9, then the smallest whole number in the place of the blank digit will be

  (a) 4   (b) 5
  (c) 3   (d) 6

[SSC CHSL (10 + 2) Tier-I CBE, 2017]

7. The least number of five digits exactly divisible by 88 is:

  (a) 10032   (b) 10132
  (c) 10088   (d) 10023

[SSC Matric Level MTS, 2017]

8. If 34N is divisible by 11, then what is the value of N?

  (a) 1   (b) 3
  (c) 4   (d) 9

[SSC CAPFs ASI and Delhi Police SI, 2017]

9. How many positive factors of 36 are there?

  (a) 4   (b) 6
  (c) 9   (d) 12

[SSC CAPFs ASI and Delhi Police SI, 2017]

10. A boy added all natural numbers from 1 to 12, however he added one number twice due to which the sum became 80. What is the number which he added twice?

  (a) 3   (b) 2
  (c) 7   (d) 8

[SSC CAPFs ASI and Delhi Police SI, 2017]

11. How many numbers are there between 1 and 200 which are divisible by 3 but not by 7?

  (a) 38   (b) 45
  (c) 57   (d) 66

[SSC CHSL (10 + 2) Tier-I CBE, 2017]

12. What least number be subtracted from 3401, so that the sum is completely divisible by 11?

  (a) 3   (b) 1
  (c) 2   (d) 0

[SSC CGL Tier-I CBE, 2017]

13. What is the remainder when 2468 is divided by 37?

  (a) 26   (b) 36
  (c) 18   (d) 14

[SSC CHSL (10 + 2) Tier-I CBE, 2017]

14. If 432 PI is completely divisible by 9, then what is the value of *P*?

  (a) 7   (b) 8
  (c) 7   (d) 2

[SSC Multi-Tasking Start, 2017]

15. For what value of M. 34 M is divisible by 12?

  (a) 2   (b) 0
  (c) 8   (d) 6

[SSC Delhi police Constable, 2017]

16. How many positive factors of 160 are there?

  (a) 6   (b) 8
  (c) 5   (d) 12

[SSC Multi-Tasking Staff, 2017]

17. Which fraction among $\dfrac{2}{3}, \dfrac{4}{5}$ and $\dfrac{7}{11}$ is the largest?

  (a) $\dfrac{2}{3}$ (b) $\dfrac{4}{5}$

  (c) $\dfrac{7}{11}$ (d) All are equal

[SSC Multi-Tasking Staff, 2017]

18. Which fraction among $\dfrac{3}{7}, \dfrac{5}{11}$ and $\dfrac{6}{13}$ is largest ?

  (a) $\dfrac{3}{7}$ (b) $\dfrac{5}{11}$

  (c) $\dfrac{6}{13}$ (d) All are equal

[SSC Multi-Tasking Staff, 2017]