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Campus Recruitment Procedure

Every student chooses an educational institute on the basis of three important factors-

A. What would be the quality of education imparted?

B. How would the education benefit the student academically or otherwise?

C. The potential jobs that would be offered on the campus to the students who pass out of the institute.

The last factor is apparently the most important criteria that would be evaluated by the students in choosing a particular academic institution.

The campus recruitment procedure has become one of the most popular avenues to recruit people into companies.

Companies hire engineering graduates into roles that range from software application development, delivery roles, software/ hardware testing, research and development, application maintenance network security and support etc. Management graduates are hired for roles in business development, IT consulting, business analysis, customer relationship management, HR roles, sales, marketing, finance etc.

Before a student braces himself to face the arduous task of appearing for the campus selection procedure, there are a few points that he has to bear in mind –

1. Interact with senior students who have been hired into different organizations. Taking a cue from the seniors would effectively help a student to know the areas that would require extensive preparation and the ones that wouldn't.

Interact with the faculty and understand how the technical interviews could be facilitated.

2. Map your strengths to the profile of the job. This is extremely important because there may be scenarios in which a student may have more than one offer at hand. Understanding the profile of the job and the opportunities for growth within the organization, besides the CTC offered would benefit the students to narrow down their choices.
3. Study and understand the philosophy, culture and values of the companies that recruit college graduates.

Campus Recruitment Procedure:

Most colleges that offer campus recruitment facilitate the recruitment through a special department known as the placement department. The placement department is steered by a placement officer who oversees the entire recruitment process.

The various stages that are involved in a typical campus recruitment program are as follows-

- Pre-placement talk
- Aptitude tests
- Group discussion
- Technical Interview
- HR Interview.

1. Pre Placement Talk:

The pre-placement talk is a presentation that is given by the recruiting company's HR and recruiting team. Various aspects of the company such as its profile, history, milestone achievements, organizational goals, its vision, mission, the job profile, products, services, product lines, customers, locations, branches, organizational chart, senior management etc. The role of the job offered as well as its description along with the selection criteria, CTC, designation etc. are also explained in detail. Generally the pre-placement talk is presented by a senior member of the delivery or the HR team.

The general format of the selection process remains the same across companies that hire campus graduates. Minor variation may be present. Selection happens in the following stages.

2. Aptitude Test:

Aptitude test is conducted to evaluate how effectively a student could respond to a task or a situation and their communication skills. In short, this area tests a candidate's problem solving ability. The areas that are normally tested are numerical or quantitative ability, logical reasoning, verbal ability and data sufficiency.

a. Quantitative Aptitude:

Numerical ability entails multiple choice questions that are from the topics mostly covered in high school along with some advanced topics. The various topics from which questions may be asked are Number theory, Averages, Ratio and proportion, Time and Distance, Percentages, mixtures and allegation, permutations, combinations, probability etc. The purpose of this test is to assess the problem solving ability of a candidate under constraints in time. This area can be effectively countered if a student prepares sufficiently beforehand.

b. Verbal Ability:

This area tests the communication skills, reading ability and also the grammatical knowledge of a candidate. The type of questions that may be asked in verbal ability include grammar based questions (sentence correction/ error identification), vocabulary based questions (para jumbles, synonyms, antonyms, fill in the blanks, cloze passages), idioms and phrases, reading comprehension and occasionally descriptive writing (essays, formal/informal letters, analytical/ issue writing section). It is mandatory for a candidate to have basic rules of English in place before he or she appears for the campus placement process.

c. Analytical and Logical Reasoning:

This section tests the logical reasoning and the analytical ability of a candidate. The questions are generally given in the form of puzzles and a set of questions follow the puzzle. It is required by a candidate to rationally approach the puzzle by interpreting the logic. Verbal based reasoning questions such as cause and effect, assertion and reasons may also be asked.

d. Data Interpretation and Data Sufficiency:

Data is presented in various forms such as bar graphs, pie charts and data should be interpreted accordingly. In data sufficiency, a problem is presented with some data and a candidate has to determine if the given amount of data is sufficient for problem solving.

The aptitude round cannot be underestimated because it is a process of eliminating candidates who do not have enough problem solving abilities, reasoning skills or acceptable levels of communication. While a few companies may lay more emphasis on communication and numerical abilities, a few others may stress upon analytical abilities. Regardless of how well a candidate fares academically, he or she should prepare sufficiently for the aptitude test as this stage in an inevitable phase of any campus selection process.

3. Group Discussion:

Those selected in the aptitude test will be called for group discussion. Group discussion is a process of selection rather than a process of elimination. The recruiting team will evaluate certain personality traits like confidence, communicating with the team, participation, ability to present one's views in a clear and concise manner, interpersonal skills, leadership skills etc. These are the traits that the employers would want to see in their potential employees. The main intention of group discussion is to assess the behavior of a candidate in a group. In the GD round, there are usually a minimum of 5 and a maximum of 10 candidates. The topic of the discussion is normally related current topics, hypothetical situations, problematic situations, abstract topics etc. Students who are confident, have a clear thought process and are able to articulate their thoughts lead the group discussion. Hence, students need to be positive, confident and dynamic in their attitude in this round. They should also develop effective listening skills that would enable them to listen and understand others perspective. Students are advised to keep abreast of current affairs and are expected to familiarize themselves with the popular topics in news. They are advised to form small groups and discuss various topics which would bolster their efforts to successively participate in the group discussions.

4. Technical Interview:

The pre final round of the selection process is the technical interview. A student appearing for the technical round should be thorough with the fundamental aspects of his subject. While a student may not be expected to know the entire subject inside out, he or she is expected to be proficient in the basic aspects of the subject and able to present the subject in a well formatted manner to his interviewers. It would greatly benefit the students if they would have completed their projects on their own rather than plagiarizing (copying) from other sources. This would exhibit the ingenuity of a student and increase his chances of clearing the technical round. Students who have interned in good organizations have an edge above the others in the technical round as company internships are greatly valued by the recruiters.

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QUANTITATIVE APTITUDE

NUMBER SYSTEM

CONCEPTS

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 digits 0 to 9. Here 0 is called *insignificant digit* where as 1, ... , 9 are called *significant digits*.

• Classification of Numbers:

Natural Numbers: The numbers 1, 2, 3, 4, 5, 6, ... which we use in counting 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.* Hence, every natural number is a whole number. The set of *whole numbers* is represented by W.

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

The set of integers can be represented by *Z* or I.

Z = {. . . . . –4, –3, –2, –1, 0, 1, 2, 3, 4, ...}

Every *natural number* is an *integer* but every *integer* is not *natural number.*

Positive Integers: The set I^+ = {1, 2, 3, 4, ...} is the set of all positive integers. Positive integers and Natural numbers are synonyms.

Negative Integers: The set I^- = {. . . , –3, –2, –1} is the set of all negative integers.

0 (zero) 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, *p* is not divisible by *q* and $q \neq 0$, are known as *rational numbers.*

(or) Any number that can be written in fraction form is a *rational number*. This includes *integers*, *terminating decimals*, and *repeating decimals* as well as *fractions.*

e.g.: $\frac{3}{7}, \frac{5}{2}, -\frac{5}{9}, \frac{1}{2}, -\frac{3}{5}$ etc

The set of rational numbers is denoted by *Q.*

Irrational Numbers: Any real number that cannot be written in fraction form is an *irrational number.* Numbers which are both *non-terminating as well as non-repeating decimals* are called irrational numbers.

e.g.: Absolute value of $\frac{10}{3}, \frac{22}{7}, \sqrt{2}, \sqrt{3}, \sqrt{10}\ldots$

Note: A *terminating decimal* will have a finite number of digits after the decimal point.

e.g.: $\frac{3}{4}=0.75, \frac{5}{4}=1.25, \frac{25}{16}=1.5625.$

Repeating Decimals: A decimal number that has digits that repeat forever.

e.g.: $\frac{1}{3}=0.333\ldots.(\text{here, 3 repeats forever.})$

Non–Repeating Decimal: A decimal that neither *terminates* nor *repeats*.

e.g.: $\sqrt{2}=1.4142135623\ldots.$

Real Numbers: The rational and irrational numbers together are called *real numbers.*

e.g.: $\frac{13}{21}, \frac{2}{5}, \frac{-3}{7}, \frac{+4}{2}$ etc are real numbers.

The set of real numbers is denoted by *R*.

Even Numbers: Any integer that can be divided exactly by 2.

e.g.: 2, 6, 0, -8, -10, ... are even numbers.

Odd Numbers: An integer that cannot be divided exactly by 2 is an Odd number.

e.g.: 1, 3, -5, -7, ... are odd numbers.

Prime Numbers: A Prime Number can be divided evenly only by 1, or itself. And it must be a whole number greater than 1.

e.g.: Numbers 2, 3, 5, 7, 11, 13, 17, ... are prime.

All primes which are greater than 3 are of the form (6*n*+1) or (6*n*–1).

Note: • 1 is not a prime number.

• 2 is the least and only even prime number.

• 3 is the least odd prime number.

• 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.

There are 25 prime numbers up to 100.

Composite Number: Natural numbers greater than 1 which are not prime, are known as *composite numbers.* The number 1 is neither *prime* nor *composite.*

Co-Prime Numbers: 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:

Natural Numbers = 1 + Prime + Composite Numbers.

Whole Numbers = 0 (Zero) + Natural Numbers.

Integers = Negative Integers + 0 + Positive Integers.

Real Numbers = Rational + Irrational Numbers.

Any two digit number is represented as $(10a + b)$, where a is the first digit, and b is the second.

e.g.: 63 is represented as 10(6)+3;

- The sum of its digits = $(a+b)$.
- The difference of the digits = $(a–b)$.

Similarly, any three digit number is represented as $(100a + 10b + c)$ etc.

- **Test of Divisibility:**

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

e.g.: Units digit of 76 is 6 which is divisible by 2 hence 76 is divisible by 2.

Units digit of 330 is 0 so it is divisible by 2.

Divisibility by 3: A number is divisible by 3 if sum of all digits in it is divisible by 3.

e.g.: The number 273 is divisible by 3 since 2 + 7 + 3 = 12 which is divisible by 3.

Divisibility by 4: A number is divisible by 4, if the number formed by the last two digits in it is divisible by 4, or last two digits are zeros.

e.g.: The number 5004 is divisible by 4 since last two digits 04 is divisible by 4.

Divisibility by 5: A number is divisible by 5 if the units digit in the number is either 0 or 5.

e.g.: 375 is divisible by 5 as 5 is in the units place.

Divisibility by 6: A number is divisible by 6 if it is even and sum of all digits is divisible by 3.

e.g.: The number 6492 is divisible by 6 as it is even and sum of its digits 6 + 4 + 9 + 2 = 21 is divisible by 3.

Divisibility by 7:

Step-1: Remove unit's digit. And double it.

Step-2: Subtract it from the rest of the number.

Step-3: Check whether the resulted number is divisible by 7 or not.

Step-4: Repeat the above steps until the resulted number is either 0 (zero) or divisible by 7.

e.g.: Consider the number 10717.

Step-1: Removing the unit's digit *i.e.* 7. Double of 7 =14.

Step-2: 1071 – 14 = 1057.

Step-3: Now remove 7 from 1057 and double it *i.e.* 14.

Step-4: 105 – 14 = 91.

Step-5: Now remove 1 and double it *i.e.* 2.

Step-6: 9 – 2 = 7

The final result 7 is divisible by 7. So the given number *i.e.* 10717 is also divisible by 7.

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

e.g.: The number 6573392 is divisible by 8 as the last 3 digits '392' is divisible by 8.

Divisibility by 9: A number is divisible by 9 if the sum of its digit is divisible by 9.

e.g.: The number 15606 is divisible by 9 as the sum of the digits 1 + 5 + 6 + 0 + 6 = 18 is divisible by 9.

Divisibility by 10: Last digit should be zero.

e.g.: Last digit of 4470 is zero. So, it is divisible by 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 the *even places* is either zero or divisible by 11. **(or)** Subtract the first digit from a number made by the other digits. If that number is divisible by 11 then the original number is also divisible by 11.

e.g.: In the number 9823, the sum of the digits at odd places is 9+2=11 and the sum of the digits at even places is 8+3=11. Difference between them is 11 – 11 = 0. Hence, the given number is divisible by 11.

e.g.: 14641

1464 − 1 is 1463; 146 − 3 is 143; 14 − 3 = 11, which is divisible by 11, so 14641 is also divisible by 11.

- If a number 'N' is divisible by two numbers *'a'* and *'b'*, where *a, b* are co primes, then 'N' is divisible by *'ab'*.

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

e.g.: The number 1644 is divisible by 12 as it is divisible by 3 and 4. Here 3 and 4 because they are co-prime to each other.

Divisibility by 13: Repeatedly add 4 times the last digit to the rest until you get a number divisible by 13 .

e.g.: 7462 ⇒ 746 + (2×4) = 754 ⇒ 75+ (4×4) = 91

91 is divisible by 13. So, 7462 is also divisible by 13.

Divisibility by 14: The number is divisible by 7 and 2.

Divisibility by 15: The number is divisible by 3 and 5.

Divisibility by 16:

With a 3 digit number: Multiply hundreds digit by 4, then add the last two digits.

e.g.: 352 ⇒ (3×4)+52 = 12 + 52 = 64

64 is divisible by 16. So, 352 is also divisible by 16.

With a more than 3 digit number: The last four digits form a number is divisible by 16.

e.g.: 38512 ⇒ Here is 8512 is divisible by 16. So, 38512 is also divisible by 16.

Divisibility by 17:

Subtract 5 times the last digit from the rest.

e.g.: 3961 ⇒ 396 – (1×5) = 391 ⇒ 39 – (1×5) = 34

34 is divisible by 17. So, 3961 is also divisible by 17.

Divisibility by 18: An even number satisfying the divisibility test by 9 is also divisible by 18.

e.g.: The number 80388 is divisible by 18 as it satisfies the divisibility test of 9.

Divisibility by 19: Add twice the last digit to the rest.
e.g.: 10944 ⇒ 1094 + (4 × 2) = 1102
⇒ 110 + (2×2) = 114 ⇒ 11 + (4 × 2) = 11 + 8 = 19.
Divisibility by 20: Last digit is zero & tens digit is even.
e.g.: 980; Last digit is zero. And tens digit is even.
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.
e.g.: The number 7975 is divisible by 25 as the last two digits are divisible by 25.

- **Common Factors:**

A common factor of two or more numbers is a number which divides each of them exactly.
e.g.: 3 is a common factor of 6 and 15.

▪ **Highest Common Factor (HCF):**

Highest common factor of two or more numbers is the greatest number that *divides each of them exactly*.
e.g.: 3, 4, 6, 12 are the factors of 12 and 36. Among them the greatest is 12. Hence the HCF of 12, 36 is 12.
HCF is also called as Greatest common divisor (GCD) or Greatest Common measure (GCM).
Method of Finding HCF: Method of division

▪ **HCF of Two Numbers:**

Step 1: Greater no. is divided by the smaller number.
Step 2: Divisor of step - 1 is divided by its remainder.
Step 3: Divisor of step - 2 is divided by its remainder.
This could be continued until the remainder is 0.
Then HCF = Divisor of the last step.
e.g.: Find the HCF of 96 and 348.
Explanation: Here the divisor of the last step is 12.
So, HCF of 96 and 348 is 12.

```
96)348(3
   288
    60)96(1
       60
       36)60(1
          36
          24)36(1
             24
       ⟶ 12)24(2
                24
                0
```

▪ **HCF of More than Two Numbers:**

Step 1: Take any two numbers and find their HCF.
Step 2: Now find the HCF of third number and HCF obtained for the previous two numbers.
Step 3: Now find the HCF of fourth number and HCF obtained in the previous step. Continue the same process till the last number. The final HCF is concluded to be the HCF of all the given numbers.

e.g.: Find the HCF of 120, 246, 100.

```
120) 246 (2
     240
  ⟶ 6) 120 (20
       120
       0
```

6 is HCF of 120, 246. Now take 3rd number (*i.e.* 100) and HCF obtained in the above step (*i.e.* 6) and find HCF.

```
6)100(16
  96
   4)6(1
     4
  ⟶ 2)4(2
       4
       0
```

▪ **HCF of Decimals: e.g.**: Find HCF of 3.2, 4.12, 1.3, 7.
Explanation: First eliminate the influence of decimals by multiplying it either by 10 or 100 or 1000 etc. Here multiply the numbers with 100 to make all the numbers decimal free. *i.e.* 320, 412, 130, 700.
Now, find the HCF of above numbers. We get it as 2. Did you remember we multiplied all the numbers by 100 to eliminate the influence of decimals. Hence, now we divide the answer by 100 to get HCF of the original numbers. The HCF is $\frac{2}{100}=0.02$

▪ **LCM (Least Common Multiple):**

Least common multiple of two or more given numbers is the '*least or lowest number*' which is divisible by each of them exactly. In the sense without a non zero remainder.
Method of Finding LCM:
Step-1: Write numbers in a line separated by comma.
Step 2: Divide any two of the given numbers exactly with a least possible prime number then the quotients and the undivided numbers are written in the next line.
Step 3: Repeat the same process till all the numbers in the line are prime to each other *i.e.* no more common factors exist.
Conclusion: The product of all divisors and the numbers in the last line is the LCM of the numbers.
e.g.: Find the LCM of 14, 18, 24, 30.

2	14, 18, 24, 30
3	7, 9, 12, 15
	7, 3, 4, 5

The LCM of 14, 18, 24, 30 = 2×3×7×3×4×5 = 2520.

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Observe another example below.

Square Root of 119716 is 346.

Step 1: Group two digits as pairs. 11, 97, 16.

Step 2: Largest number whose square is near to the 11 is 3. Hence, 3 is the divisor and also quotient.

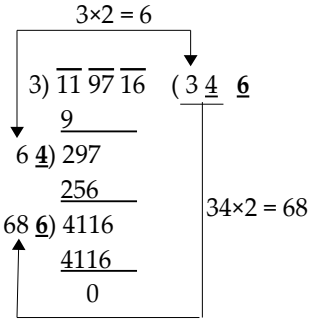
$$3)\ \overline{11}\ \overline{97}\ \overline{16}\ \ (3$$
$$\underline{9}\quad$$

Step 3: Now 297 is the new dividend.

$$3)\ \overline{11}\ \overline{97}\ \overline{16}\ \ (3$$
$$\underline{9}\quad$$
$$2\ 97$$

Step 4: Double the quotient 3 i.e. 3×2=6 and put a blank for a number beside 6 i.e. 6[?]. Now think of a largest number (for e.g., 4) to fill in the blank in such a way that the product of a new divisor (i.e. 64) and this digit (i.e. 4) is less than or equal to new dividend (i.e. 297).

Step 5:



For this type of questions, it is better to check from options in the exam.

• Key Points on Finding Square Root:

1. A number ending with 2, 3, 7, 8 cannot be a perfect square. The last digit of any perfect square must be any one among 0, 1, 4, 5, 6, 9.

2. A number ending with odd number of zeros can never be a perfect square. e.g.: 1000, 2000 etc.

3. The difference between squares of two consecutive numbers is always an odd number.

e.g.: $4^2–3^2 = 16–9 = 7$ (odd).

Finding square root of a decimal fraction:

First eliminate the decimal point by dividing and multiplying with even powers of 10 then find the square root of both numerator and denominator separately and then you can conclude the square root.

e.g.: Find the square root of 1190.25.

$$\sqrt{1190.25}=\sqrt{\frac{1190.25}{10^2}\times 10^2}=\frac{\sqrt{119025}}{10^2}=\frac{345}{10}=34.5$$

• Simplification:

In simplification we are supposed to follow the order which is essentially demanded by Mathematics and given by a common note of remembrance as VBODMAS.

V – Vinculum (bar $\bar{x}$), B – Bracket ( ) { }, O – of
D – Division (÷), M – Multiplication (×),
A – Addition (+), S – Subtraction (–).

Use of Algebraic Identities: The following algebraic identities will be useful in simplification.

1. $(a+b)^2 = a^2 + 2ab + b^2$

2. $(a-b)^2 = a^2 - 2ab + b^2$

3. $(a+b)^2 + (a-b)^2 = 2(a^2 + b^2)$

4. $(a+b)^2 - (a-b)^2 = 4ab$

5. $a^2 - b^2 = (a+b)(a-b)$

6. $(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3 = a^3 + b^3 + 3ab(a+b)$

7. $(a-b)^3 = a^3 - 3a^2b + 3ab^2 - b^3 = a^3 - b^3 - 3ab(a-b)$

8. $a^3 + b^3 = (a+b)(a^2 - ab + b^2)$

9. $a^3 - b^3 = (a-b)(a^2 + ab + b^2)$

8. $(a+b+c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$

10. $a^3+b^3+c^3 - 3abc = (a+b+c)(a^2 + b^2 + c^2 - ab - bc - ca)$

11. $a^4 - b^4 = (a^2 + b^2)(a^2 - b^2)$

• Number of Divisors of a Composite Number

If N is a composite number of the form $N = a^p b^q c^r \ldots$. where a, b, c are primes, then the number of divisors of N is given by $(p+1)(q+1)(r+1)$ . . . . .

e.g.: Let the number be 600.

$$\begin{array}{r|l} 2 & 600 \\ 2 & 300 \\ 2 & 150 \\ 3 & 75 \\ 5 & 25 \\ & 5 \end{array}$$

$600 = 2^3 \times 3^1 \times 5^2$

$\therefore$ Number of divisors of 600 = (3+1)(1+1)(2+1) = 24.

In these 24 divisors 1 and the number itself are also included. So, number of divisors of 600 excluding 1 and its self is 24 – 2 = 22.

• Sum of Divisors of a Composite Number :

If N is a composite number of the form $a^p b^q c^r \ldots$. Where a, b, c are primes, then the sum of the divisors, S_N is given by $S_N = \dfrac{(a^{p+1}-1)(b^{q+1}-1)(c^{r+1}-1)}{(a-1)(b-1)(c-1)}$

e.g.: Let the number be 600. $600 = 2^3 \times 3^1 \times 5^2$

Sum of the divisors $S_N = \dfrac{(2^{3+1}-1)(3^{1+1}-1)(5^{2+1}-1)}{(2-1)(3-1)(5-1)}$

$\Rightarrow \dfrac{(16-1)(9-1)(125-1)}{(1)(2)(4)} \Rightarrow \dfrac{(15)\times(8)\times(124)}{(1)\times(2)\times(4)} = 1860$

• **Important Key Points:**

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

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

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

4) Number of odd numbers from 1 to n $= \frac{\text{Last Odd Number} + 1}{2}$.

5) Number of even numbers from 1 to n $= \frac{\text{Last Even Number}}{2}$.

6) Sum of even numbers from 1 to n is $k(k+1)$, where k indicates number of even numbers from 1 to n.

e.g.: Sum of even no from 1 to 80 = 40(40+1) = 1640.
Here from 1 to 80 there exists 40 even numbers.

7) Sum of odd numbers from 1 to $n = k^2$, where k is equal to number of odd numbers from 1 to n.

e.g.: Sum of odd numbers from 1 to 60 is $(30)^2 = 900$.
30 odd natural numbers exist from 1 to 60.

8) Sum of the squares of first 'n' even natural numbers = $\frac{2}{3}(n)(n+1)(2n+1)$.

9) Sum of squares of first 'n' odd natural numbers is $\frac{n(2n+1)(2n-1)}{3}$.

10) Sum of any 5 consecutive whole numbers will always be divisible by 5.

e.g.: (3 + 4 + 5 + 6 + 7) = 25 is divisible by 5.

11) XY – YX; The difference between a two digit number and its reverse is divisible 9.

e.g.: Let the two numbers be 95 and 59. Here 59 is reverse of 95. Now 95 – 59 = 36 (which is divisible by 9).

12) Products: odd × odd = odd;
odd × even = even;
even × even = even;

13) $n! = n(n-1)(n-2)(n-3)\ldots\ldots(3)(2)(1)$.

e.g.: $6! = 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 720$.

Product of 'r' consecutive integers is divisible by ($r!$)

14) Finding the units digit of the numbers like $(252)^{54}$.
Here the units digit of 252 is 2 and the index is 54. We know that $2^1 = 2$, $2^2 = 4$, $2^3 = 8$, $2^4 = 16$, $2^5 = 32$. Here units digit is repeated after each 4 indices. So divide 54 by 4 to get the remainder. Here the remainder is 2.
Hence the last digit in $(252)^{54}$ is same as 2^2 *i.e.* 4.

CONCEPTUAL EXAMPLES

1) The smallest number which when added to 4, the sum is exactly divisible by 24, 36, 48 and 60 is:
a) 700 b) 716 c) 720 d) 730

Explanation:

2	24	36	48	60
2	12	18	24	30
3	6	9	12	15
2	2	3	4	5
	1	3	2	5

∴ LCM of 24, 36, 48, 60 = 2 × 2 × 3 × 2 × 3 × 2 × 5 = 720.
∴ Required number = 716

Ask doubt with Question Id: 1648

2) Number of integral divisors of 22050 except 1 and itself is.
a) 24 b) 28 c) 36 d) 52

Explanation:

2	22050
3	11025
3	3675
5	1225
5	245
7	49
	7

$\Rightarrow 22050 = 2^1 \times 3^2 \times 5^2 \times 7^2$
Using the formula discussed earlier,
∴ Number of divisors = (1+1) (2+1) (2+1) (2+1) = 54
∴ Number of divisors except 1 and itself = 54 –2 = 52.

Ask doubt with Question Id: 1650

3) Find the sum of first 20 multiples of 12.
a) 1830 b) 2520 c) 3494 d) None

Explanation: Sum of first 20 multiples of 12 are
= (12×1) + (12×2) + (12×3) + … + (12×19) + (12×20).
= 12 (1 + 2 + 3 + … + 20)
Use the formula for "Sum of first 'n' natural numbers".

$$\sum n = \frac{n(n+1)}{2} \Rightarrow 12 \times \sum n = \frac{12 \times (20 \times 21)}{2} = 2520$$

Ask doubt with Question Id: 1647

4) Mr. Srinivas saves one coin of ₹5 on first day of the week, three coins of ₹5 on the second day of the week. Five coins of ₹5 on third day and so on. How much money will he has at the end of the week?
a) 78 b) 125 c) 245 d) 289

Explanation: Number of ₹5 coins with him at the end of week = 5 × (1 + 3 + 5 + 7 + 9 + 11 + 13)
= 5 × (sum of first 7 odd numbers)
(By using the formula discussed earlier).
∴ Sum of all numbers = $5 \times 7^2 = 245$.

Ask doubt with Question Id: 1649

5) $\sqrt{12+\sqrt{12+\sqrt{12+\ldots\ldots}}}\ \infty$ terms $=?$

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

Explanation: Let the given expression $= x$

Then, we can write $\sqrt{12+x}=x \Rightarrow 12+x=x^2$

$\therefore x^2-x-12=0 \Rightarrow (x-4)(x+3)=0$

So, $x=+4$ (x cannot be negative since $\sqrt{12}=3.46$).

Ask doubt with Question Id: 1651

6) A Mango seller saves two coins of ₹2 on first day of the week, four coins of ₹2 on the second day of the week. Six coins of ₹2 on third day and so on. The total amount saved by him at the end of the week is

a) 246 b) 112 c) 88 d) None

Explanation: Number of ₹2 coins saved by him at the end of the week $= 2\times(2+4+6+8+10+12+14)$

Sum of first seven even numbers $= k(k+1) = 7\times8 = 56$

where k = number of even numbers.

Sum of the money with him $= 56\times2 =$ ₹112.

Ask doubt with Question Id: 1652

7) The sum of all the odd numbers starting from 1 and ending at the greatest number of three digits is.

a) 500 b) 5000 c) 2500 d) 250000

Explanation: Greatest number of three digits = 999.

There are 500 odd numbers from 1 to 999.

$\therefore$ Sum of first 500 odd numbers $= (500)^2 = 250000$.

Ask doubt with Question Id: 1653

8) What is the number whose eleventh part multiplied by its fifth part gives 2695.

a) 385 b) 434 c) 560 d) 583

Explanation:

Let x be the required number. Then $\frac{x}{11}\times\frac{x}{5}=2695$

$x^2 = 11\times5\times2695 \Rightarrow x^2 = 11\times5\times5\times7\times7\times11 \Rightarrow x = 5\times7\times11 = 385$

Alternate Method: To solve by options.

Ask doubt with Question Id: 1655

9) What least number must be added to the least number of six digits so that the resulting number may be a perfect square.

a) 283 b) 344 c) 489 d) 523

Explanation: The least number of six digits = 100000

3	10 00 00	317
	9	
61	100	
	61	
627	3900	
	4389	
	– 489	

Least number to be added = 489.

Alternative method is to solve by options.

Ask doubt with Question Id: 1654

10) What is the least number of cut pieces of equal length that can be cut out of two lengths 10 meters 857 millimeters and 15 meters 87 millimeters.

a) 78 b) 184 c) 232 d) None

Explanation: Here, you need to find the HCF. Because, to get least number of equal cut pieces you should cut as big as possible. So, HCF of 10857 and 15087 = 141. (This is the size of each cut piece). Then the number of cut pieces = (10857 + 15087) ÷ 141 = 184.

Ask doubt with Question Id: 1656

11) A certain number when successively divided by 3, 4 and 5 leaves remainders 1, 2 and 3 respectively. What is the remainder when the same number be divided by 4?

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

Explanation: Let p be the certain number and q, r, s be successive quotients upon successive division. Given,

$\frac{p}{3}=q$, Remainder 1; $\Rightarrow\ p = 3q+1$ …..... (I)

$\frac{q}{4}=r$, remainder 2; $\Rightarrow\ q = 4r+2$ …..... (II)

$\frac{r}{5}=s$, Remainder 3; $\Rightarrow\ r = 5s+3$ …..... (III)

From (I) and (II), $p = 3(4r+2)+1 \Rightarrow p = 12r+7$ …..... (IV)

From (IV) and (III), $p = 12(5s+3)+7 \Rightarrow p = 60s+43$.

Now question asked for remainder if p is divided by 4.

i.e. $\frac{60s+43}{4}$. When $60s$ leaves no remainder, but while 43 is divided by 4 it leaves remainder 3.

So when $60s+43$ is divided by 4 it leaves remainder 3.

Alternate Method-1: So, a number when successfully divided by 3, 4, 5 leaves remainder 1, 2, 3 would be of the form $= 3[4(5n+3)+2]+1 = 60n+43$.

Now, if $60n+43$ is divided by 4, the remainder is 3.

• **Alternate Method-2: Formula Approach**.

As discussed earlier, when there are three divisors d_1, d_2, d_3 and three remainders r_1, r_2, r_3 the complete remainder is given by $d_1d_2r_3 + d_1r_2 + r_1$.

By applying above formula, we get,

(3)(4)(3) + (3)(2) + (1) = 36 + 6 + 1 = 43.

When 43 is divided by 4 the remainder is 3.

Ask doubt with Question Id: 1657

12) Find the greatest number of four digits which is perfectly divisible by 3 and when divided by 5, 7 and 9 leaves a remainder 3 in each case.

a) 9985 b) 9960 c) 9768 d) 9660

Explanation: LCM of 3, 5, 7, 9 = 315.

Greatest number of four digits which is divisible by 315 is 9765. The required number = 9765 + 3 = 9768.

Ask doubt with Question Id: 1658

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13) Find greatest number of four digits which when increased by 3568 is exactly divisible by 6, 8, 12, 20.

a) 9992 b) 9785 c) 9840 d) None

Explanation: Greatest number of 4 digits = 9999.

9999 + 3568 = 13567. LCM of 6, 8, 12 and 20 is 120.

120)13567(113
13560
7 The remainder is 7.

∴ Required number of 4 digits = 9999 – 7 = 9992

Ask doubt with Question Id: 1659

14) Find the greatest number which when divided by 794, 858 and 1351, the remainders are all same.

a) 35 b) 21 c) 14 d) 1

Explanation: Given, the remainders are same *i.e.* differences of that numbers are exactly divisible.

Hence, you have to find HCF ($x–y$, $y–z$, $z–x$).

858–794 = 64; 1351–794 = 557; 1351–858 = 493.

HCF of (64, 557, 493) = 1.

Ask doubt with Question Id: 1660

15) Find the greatest five digit number to which if 7143 is added, the final number becomes exactly divisible by 18, 24, 30, 32 and 36.

a) 99846 b) 99682 c) 99417 d) None

Explanation: LCM of 18, 24, 30, 32 and 36 is 1440.

99999 + 7143 = 107142.

Dividing 107142 by 1440, the remainder is 582.

∴ Required number = 99999 – 582 = 99417

Alternate Method: Cross check with options.

Ask doubt with Question Id: 1662

16) Two numbers are in the ratio of 11:13. If the HCF of these numbers is 19, determine those numbers.

a) 304, 369 b) 209, 247 c) 182, 199 d) None

Explanation: Let the numbers be $11x$ and $13x$.

Since the HCF of given numbers is 19 which indicates that 19 is the common factor of these two numbers. Hence, it is obvious that value of x is 19.

∴ The numbers are 209 and 247 respectively.

Ask doubt with Question Id: 1665

17) Find the least number which when divided by 6, 9, 14, 21 and 24 leaves 1, 4, 9, 16 and 19 as respective remainders, but is divisible by 17.

a) 2425 b) 1895 c) 1003 d) 944

Explanation: LCM of 6, 9, 14, 21 and 24 is 504.

Required number = (504 k–5) which is divisible by 17 for the least value of k.

(504 k – 5) = (493k + 11k – 5) = (17×29)k + (11k–5)

Let $k = 1 \Rightarrow (11\times1 - 5) = 7$ (not divisible by 17)

Let $k = 2 \Rightarrow (11\times2 - 5) = 17$ (divisible by 17)

∴ (17×29)k + (11k–5) is exactly divisible by 17 for k = 2.

∴ Required Number = (504)k – 5 = (504×2) – 5 = 1003.

Ask doubt with Question Id: 1663

18) I collected some money by raising subscription for opening a society. If the whole amount collected by 720 currency notes of ₹1000 denomination and each person subscribed as many rupees as twice the number of subscribers. Then find the number of subscribers.

a) 500 b) 550 c) 600 d) 650

Explanation: Total amount collected =720×1000 =720000.

Let there be x subscribers so that each paid ₹ $2x$.

Total amount collected = (Number of subscribers) × (Amount paid by each subscriber).

$x\times2x = 720000 \Rightarrow 2(x^2) = 720000 \Rightarrow x^2 = 360000 \Rightarrow x = 600$

Ask doubt with Question Id: 1664

19) 3 bells commence tolling together and toll at intervals of 4, 7 and 14 seconds respectively. At which of the following time they might toll together?

a) 30 *sec* b) 78 *sec* c) 84 *sec* d) 92 *sec*

Explanation: Calculate LCM for time of tolling together. LCM of 4, 7, 14 = 28 *sec*.

These 3 balls toll together after every 28 *sec*.

∴ By checking with options, 84 is divisible by 28.

∴ They will toll together at 84^{th} *sec*.

Ask doubt with Question Id: 7699

20) What is the HCF of the fractions $\frac{6}{10}, \frac{9}{24}, \frac{15}{20}$.

a) $\frac{1}{120}$ b) $\frac{4}{120}$ c) $\frac{120}{3}$ d) $\frac{3}{120}$

Explanation: HCF of fraction = $\frac{\text{HCF of numerator}}{\text{LCM of denominator}}$

$= \frac{\text{HCF}(6,9,15)}{\text{LCM}(10,24,20)} = \frac{3}{120}$

Ask doubt with Question Id: 7700

21) The sum of two numbers is 100 and their difference is 40. The difference of their squares is.

a) 2000 b) 2500 c) 3500 d) 4000

Explanation: $x + y = 100$ and $x – y = 40$

$x^2 – y^2 \Rightarrow (x + y)(x – y) \Rightarrow 100\times40 = 4000$

Ask doubt with Question Id: 1488

22) A positive number when decreased by 4 is equal to 12 times the reciprocal of the number. Find the number.

a) 2 b) 6 c) 4 d) 3

Explanation: Let x be the number, then

$$x-4=\frac{12}{x}\Rightarrow x^2-4x-12=0\Rightarrow(x-6)(x+2)=0$$

i.e. $x = 6$ (or) –2, since $x \neq -2$, so $x = 6$.

Ask doubt with Question Id: 1489

23) There is a number of two digits the sum of whose digits is 5, and if 10 times the digit in the place of tens be added to 4 times the digit in the place of units, the number will be inverted. Then the number is.

a) 32 b) 41 c) 50 d) 23

Explanation: Let the two digit number be $(x\ y)$

such that $x + y = 5$ … (1)

and $10x + 4y = 10y + x$ … (2)

$\Rightarrow 9x = 6y$ (or) $3x = 2y$

From equation-(1), $2x+2y = 10$ ($\because 3x = 2y$)

$\Rightarrow 5x = 10$ *i.e.*, $x = 2$ and $y = 3$

$\therefore$ The number is 23.

Ask doubt with Question Id: 1491

24) The radius of a circle is of two digits and is 4 times the sum of the digits. When 18 be added to the radius, the digits in the radius are reversed. Then area of the circle is.

a) 1810.29 b) 2439.44 c) 3890.63 d) 5544

Explanation: $10x + y = 4\ (x+y)$ and $(10x+ y)+18 = 10y + x$

Solving for x and y, we get $x = 2$, $y = 4$.

$\therefore$ Radius of the circle is $(xy) = 24$,

Area of the circle is $\pi r^2 = 1810.29$ *sq. units.*

Ask doubt with Question Id: 1492

25) If + means –, – means ×, × means ÷, ÷ means + then $4 \div 8 + 2 \times 3 - 6 = ?$

Explanation: After interchanging the operators, we get

$\Rightarrow 4 + 8 - 2 \div 3 \times 6$

(Applying VBODMAS Rule)

$\Rightarrow 4 + 8 - \frac{2}{3} \times 6 = 4 + 8 - 4 = 8.$

Ask doubt with Question Id: 8247

EXERCISE

1) Find the greatest number of five digits which is a perfect square.

a) 99225 b) 99856 c) Both a,b d) None

2) Simplify $\frac{17}{2} - \left[\frac{16}{5} \div \frac{9}{2} of \frac{16}{3} + \left\{11 - \left(3 - \left(\frac{5}{4} - \frac{5}{8}\right)\right)\right\}\right]$

a) $-\frac{11}{120}$ b) $-\frac{21}{120}$ c) $-\frac{31}{120}$ d) None

3) Find the LCM of the fractions $\frac{108}{375}, \frac{42}{25}, \frac{54}{55}$.

a) $\frac{756}{5}$ b) $\frac{326}{5}$ c) $\frac{434}{5}$ d) $\frac{282}{5}$

4) Sum of three numbers is 132. First number is twice the second and third number is $\frac{1}{3}$ of the first. Find the second number.

a) 12 b) 24 c) 36 d) 42

5) If $\sqrt{1+x} = \frac{13}{12}$ then the value of x is.

a) $\frac{9}{144}$ b) $\frac{16}{144}$ c) $\frac{25}{144}$ d) $\frac{36}{144}$

6) Five bells begin to toll together and they toll at an interval of 36, 45, 72, 81 and 108 seconds. After what interval of time they will keep on tolling together?

a) 3240 *sec* b) 3080 *sec* c) 3140 *sec* d) 3200 *sec*

7) The least perfect square number which is exactly divisible by 4, 6, 8, 10 or 12 is

a) 9260 b) 7921 c) 5625 d) 3600

8) Each student in a class contributed as many paise as the number of students in the class, the teacher contributed ₹13, the total collection is of ₹ 49. How many students were there in the class?

a) 48 b) 60 c) 72 d) None

9) Sum of square of two numbers is 80 and square of their difference is 36. Product of the two numbers is

a) 22 b) 34 c) 42 d) 51

10) Find the greatest number that will divide 148, 246 and 623 leaving remainders 4, 6 and 11 respectively.

a) 11 b) 12 c) 13 d) 14

11) The least number which when divided by 36, 48 & 64 leaves the remainders 25, 37 and 53 respectively is

a) 656 b) 563 c) 565 d) 657

12) $\sqrt{3\sqrt{3\sqrt{3\sqrt{3\sqrt{3}}}}} = ?$

a) $3^{\frac{31}{64}}$ b) $3^{\frac{31}{32}}$ c) $3^{\frac{1}{64}}$ d) None

13) The HCF of two numbers is 16 and their LCM is 160. If one number is 32, then other number is.

a) 48 b) 80 c) 96 d) 112

14) Find the size of the largest square slabs which can be paved on the floor of a room 5 meters 44 *cm* long and 3 meters 74 *cm* broad.

a) 56 b) 42 c) 38 d) 34

15) Least number that must be added to 8492 such that the resulting number may be divisible by 72 is.

a) 68 b) 25 c) 11 d) 4

16) The LCM of two numbers is 1950 and their HCF is 65. If one of the number is 195, find the other number.

a) 398 b) 650 c) 792 d) None

17) Find the greatest number that will divide 532, 894 and 1003 leaving remainders 22, 44 and 68 respectively.

a) 85 b) 105 c) 90 d) 95

18) A biscuit dealer has 378 kgs, 434 kgs and 582 kgs of three different qualities of biscuits. He wants it all to be packed into boxes of equal size without mixing. Find the capacity of the largest possible box.

a) 5 kg b) 3 kg c) 2 kg d) 1 kg

19) Find the least number which when divided by 35 leaves remainder 25, when divided by 25 leaves remainder 15, when divided by 15 leaves remainder 5.
a) 420 b) 515 c) 435 d) 518

20) Find the least number which when increased by 4 is divisible by 21, 25, 27 and 35.
a) 4721 b) 4725 c) 4758 d) 2418

21) The product of two numbers is 211428 and their LCM is 3356. Find their GCM?
a) 72 b) 48 c) 36 d) 63

22) Find the least number for which when 5046 is divided or multiplied, becomes a perfect square.
a) 25 b) 15 c) 10 d) 6

23) Find the smallest number between 450 to 550 which is exactly divisible by 7, 8 and 14.
a) 454 b) 482 c) 504 d) 546

24) Three bells ring at an interval of 10, 12 and 14 seconds respectively. They ring together at 11:00 then at what time they ring together again.
a) 12 hours 12 *min* 12 sec b) 11 hours 7 *min*
c) 11 hours 35 *min* d) 10 hours 45 *min*

25) Sum of 4 consecutive natural numbers each divisible by 5 is 130. What is the greatest number?
a) 35 b) 40 c) 45 d) 50

26) Two numbers 2035 and 2880 when divided by a certain number of three digits, leaves the same remainder. Find the number.
a) 271 b) 293 c) 169 d) 421

27) A boy saves ₹ 1 on day-1, ₹2 on day-2, ₹3 on day-3 and so on. Then in how many days will he have ₹36?
a) 5 b) 6 c) 7 d) 8

28) The last digit of a number 49825# is missing. It is also given that the number is divisible by 8. Find the digit at unit's place.
a) 4 b) 6 c) 8 d) 0

29) Difference of squares of two numbers is 1160 and their sum is 116. What is their difference?
a) 5 b) 9 c) 10 d) 13

30) The sum of two numbers is 24 such that 7 times the first number added to 5 times the second number is 146. Find the second number
a) 11 b) 13 c) 12 d) None

31) A number consists of two digits whose sum is 9, when 27 is added to this number, the digits interchange their places. The number is.
a) 54 b) 36 c) 27 d) 12

32) In a field there are birds less than 100 in number. Another field has the number of birds in reversal of this number and less than 100. Then, the difference of the two sets of the birds is
a) 9 b) 27 c) both (a) and (b) d) None

33) A positive number when decreased by 9, is equal to 10 times the reciprocal of the number. Find the number.
a) 9 b) 10 c) 11 d) 12

34) Sum of square of two consecutive natural odd numbers is 202. Find the smallest number.
a) 5 b) 7 c) 9 d) 11

35) If the digits of a 2 digit number are interchanged, the summation of these two numbers will be 55, then which one of the following might be a number?
a) 14 b) 24 c) 33 d) None

36) If + means –, – means ×, × means ÷ and ÷ means +. Then $(256 \times 16 \div 49 \times 7 + 125 \times 5 - 2 \div 289 \times 17) = ?$
a) 10 b) –15 c) –10 d) –17

37) Interchanging signs + and –, numbers 1 and 2. Based on this information, which of the following is correct?
a) 12 + 21 – 12 = 21 b) 21 + 21 + 12 = 21
c) 12 + 12 – 21 = 12 d) 21 – 21 – 21 = 33

EXPLANATIONS

1) The greatest number of 5 digits = 99999.

3	9 99 99	3 1 6
	9	
61	0 99	
	61	
626	3899	
	3756	
	143	

∴ Required number = 99999 – 143 = 99856.

Ask doubt with Question Id: 1667

2) Applying VBODMAS rule,

$$= \frac{17}{2} - \left[\frac{16}{5} \div \frac{9}{2} of \frac{16}{3} + \left\{11 - \left(3 - \frac{5}{8}\right)\right\}\right]$$

$$= \frac{17}{2} - \left[\frac{16}{5} \div \frac{9}{2} of \frac{16}{3} + \left\{11 - \frac{19}{8}\right\}\right]$$

$$= \frac{17}{2} - \left[\frac{16}{5} \div \frac{9}{2} of \frac{16}{3} + \frac{69}{8}\right] = \frac{17}{2} - \left[\frac{16}{5} \div \frac{9}{2} \times \frac{16}{3} + \frac{69}{8}\right]$$

$$= \frac{17}{2} - \left[\frac{16}{5} \div \frac{24}{1} + \frac{69}{8}\right] = \frac{17}{2} - \left[\frac{16}{120} + \frac{69}{8}\right]$$

$$= \frac{17}{2} - \left[\frac{16 + 1035}{120}\right] = \frac{17}{2} - \frac{1051}{120} = \frac{1020 - 1051}{120} = \frac{-31}{120}$$

Ask doubt with Question Id: 1668

3) $\frac{108}{375}$ can be minimized to $\frac{36}{125}$.

$\text{LCM} = \frac{\text{LCM of } 36, 42, 54}{\text{HCF of } 125, 25, 55} = \frac{756}{5}$.

Ask doubt with Question Id: 1669

4) Let the second number be $3x$, so that the first number is $6x$ and the third number is $2x$.

$\therefore 6x + 3x + 2x = 132$

$\Rightarrow x = 12$.

Second number = $3x = 3 \times 12 = 36$.

Ask doubt with Question Id: 1670

5) $1 + x = \frac{169}{144} \Rightarrow x = \frac{169}{144} - 1 = \frac{25}{144}$

Ask doubt with Question Id: 1671

6) The interval of time is the LCM of the numbers.

2	36, 45, 72, 81, 108
2	18, 45, 36, 81, 54
3	9, 45, 18, 81, 27
3	3, 15, 6, 27, 9
3	1, 5, 2, 9, 3
	1, 5, 2, 3, 1

Ask doubt with Question Id: 1672

7) LCM of 4, 6, 8, 10, 12 = 120.

120 can be written as $2 \times 2 \times 2 \times 3 \times 5$

To make it a perfect square, you have to multiply by $2 \times 3 \times 5$. If you can see in the factors that $2 \times 2 \times 2 \times 3 \times 5 = 120$ can not make a perfect square until we multiply it by 2 to make $2 \times 2 \times 2 \times 2$ and by 3 to make 3×3 and by 5 to make 5×5. Now all the numbers are squares.

i.e. $4^2 \times 3^2 \times 5^2 = (4 \times 3 \times 5)^2 = 60^2 = 3600$.

Ask doubt with Question Id: 1673

8) Let x be the number of students so that each contributed x *paise.* Contribution of the students

= 49–13 = ₹36 = 3600 *paise.*

$\Rightarrow x^2 = 3600 \Rightarrow x = 60$.

$\therefore$ Number of students in the class is 60.

Ask doubt with Question Id: 1674

9) Let the number be x and y, it is required to find $x \times y$.

$x^2 + y^2 = 80$ and $(x - y)^2 = 36$

Now $(x - y)^2 = (x^2 + y^2) - 2xy$

$2xy = (x^2 + y^2) - (x - y)^2 = 80 - 36 = 44$ then $xy = 22$.

Ask doubt with Question Id: 1675

10) Required number = HCF (148–4), (246–6), (623 – 11)

= HCF of 144, 240 and 612 = 12.

Ask doubt with Question Id: 1676

11) Since (36 – 25) = (48 – 37) = (64 – 53) = 11

$\therefore$ Required smallest number = (LCM of 36, 48, 64)–11

= 576 – 11

= 565.

Ask doubt with Question Id: 1677

12) $\sqrt{3\sqrt{3\sqrt{3\sqrt{3\sqrt{3}}}}} = \sqrt{3\sqrt{3\sqrt{3\sqrt{3.3^{\frac{1}{2}}}}}}$

$= \sqrt{3\sqrt{3\sqrt{3\sqrt{3^{\frac{3}{2}}}}}} \quad = \sqrt{3\sqrt{3\sqrt{3.3^{\frac{3}{2}\times\frac{1}{2}}}}}$

$= \sqrt{3\sqrt{3\sqrt{3.3^{\frac{3}{4}}}}} \quad = \sqrt{3\sqrt{3\sqrt{3^{\frac{7}{4}}}}} \quad = \sqrt{3\sqrt{3.3^{\frac{7}{8}}}}$

$= \sqrt{3\sqrt{3^{\frac{15}{8}}}} \quad = \sqrt{3.3^{\frac{15}{16}}} \quad = \sqrt{3^{\frac{31}{16}}} \quad = 3^{\frac{31}{32}}$

Ask doubt with Question Id: 1678

13) Product of numbers = HCF × LCM

$32 \times K = 16 \times 160$

$\Rightarrow K = 80$.

Ask doubt with Question Id: 1679

14) 5 *meters* 44 *cm* = 544 *cm*;

3 *meters* 74 *cm* = 374 *cm*

The side of the square slab = HCF of 544, 374 = 34.

Ask doubt with Question Id: 1680

15) Divide 8492 by 72, the remainder is 68.

$\therefore$ Least number to be added = 72 – 68 = 4.

Ask doubt with Question Id: 1681

16) $\frac{\text{HCF} \times \text{LCM}}{\text{Given number}} = \frac{65 \times 1950}{195} = 650$

Ask doubt with Question Id: 1682

17) 532–22 = 510;

894–44 = 850;

1003–68 = 935;

HCF of 510 and 850 is 170. HCF of 170 and 935 is 85.

Ask doubt with Question Id: 1683

18) The capacity of the largest possible box =

HCF (378, 434, 582) = 2.

Ask doubt with Question Id: 1684

19) Here 35–25 = 25–15 = 15–5 = 10

Required number = (LCM of 35, 25, 15) – 10.

= 525 – 10 = 515.

Ask doubt with Question Id: 1685

20) LCM of 21, 25, 27, 35 = 4725

$\therefore$ Required number = 4725 – 4 = 4721.

Ask doubt with Question Id: 1686

21) GCM × LCM = Product of the two numbers

$\text{GCM} = \frac{211428}{3356} = 63$

Ask doubt with Question Id: 1687

22) $5046 = 6 \times 29 \times 29$.

Hence 5046 must be multiplied or divided by 6 to make it a perfect square. If you multiply by 6 it becomes $(6 \times 29)^2$ which is a perfect square (or) if you divide by 6 it becomes $(29)^2$ which is also a perfect square.

Ask doubt with Question Id: 1688

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RATIO – PROPORTION

CONCEPTS

Ratio: A ratio is the relation between two quantities which is expressed by a fraction.

• The ratio of the number *'a'* to the number *'b'* is written as $\frac{a}{b}$ (or) $a : b$ or a to b

e.g.: The ratio of 5 hours to 3 hours can be written as $\frac{5}{3}(\text{or})5:3.$

• The ratio is always a comparison between the quantities of same kind or of same units.

For example, you cannot form the ratio between 5 hours and 3 days. Because the two numbers are expressed in different units. Hence, convert 3 days to hours.

i.e. 3 days = 72 hours. Thus the proper form of this ratio is $\frac{5}{72}$ (or) $5:72.$

• Two quantities which are being compared ($a : b$) are called its terms. The first term (a) is called *antecedent* and second term (b) is called *consequent.*

• The ratio of two quantities is always an abstract number (without any units).

• If the terms of a ratio are multiplied or divided by the same quantity the value of the ratio remains unaltered.

e.g.: The ratio $a : b$ is same as $Ma : Mb.$

Proportion: Equality of two ratios is called proportion.

Consider the two ratios, $a : b$ and $c : d,$ then proportion is written as, $a : b :: c : d$ (or) $a : b = c : d$ (or) $\frac{a}{b}=\frac{c}{d}$

Here a, b, c, d are called *Terms.* a, d are called *Extremes* (end terms) and b, c are called *Means* (middle terms).

e.g.: Since the ratio $4:20$ (or) $\frac{4}{20}$ is equal to the ratio $1:5(\text{or})\frac{1}{5}$ we may write the proportion as 4 : 20 :: 1 : 5

or 4 : 20 = 1 : 5 or $\frac{4}{20}=\frac{1}{5}$

• In a proportion, product of *means* (middle terms) is equal to product of *extremes* (end terms).

i.e. $ad=bc$ or $\frac{a}{b}=\frac{c}{d}.$

Key Notes: If a and b are two quantities, then

1) Duplicate ratio of $a:b=a^2:b^2$

2) Sub-duplicate ratio of $a:b=\sqrt{a}:\sqrt{b}$

3) Triplicate ratio of $a:b=a^3:b^3$

4) Sub-triplicate ratio $a:b=\sqrt[3]{a}:\sqrt[3]{b}$

5) Inverse or reciprocal ratio of $a:b=\frac{1}{a}:\frac{1}{b}$

6) Third proportional of a and b is defined to be that number c such that a : b = b : c $\Rightarrow c=\frac{b^2}{a}.$

7) If $a : b = x : y$ and $b : c = p : q,$ then

a) $a:c=\frac{x\times p}{y\times q}$

b) $a : b : c = px : py : qy$

8) Compound Ratio of $(a : b), (c : d), (e : f)$ is $\frac{a}{b}\times\frac{c}{d}\times\frac{e}{f}.$

9) The ratio in which two kinds of substances must be mixed together one at ₹ x per kg and another at ₹ y per kg, so that the mixture may cost ₹ n per kg.

The ratio is $\frac{n-y}{x-n}.$

10) Let the incomes of two persons be in the ratio of a : b and their expenditure be in the ratio of $x : y$ and if the savings of each person is ₹ n then income of each is ₹$\frac{an(y-x)}{ay-bx}$ and ₹$\frac{bn(y-x)}{ay-bx}$ respectively.

11) In a mixture the ratio of milk and water is $a:b.$

In this mixture another n liters of water is added, then the ratio of milk and water in the resulting mixture became $a : m.$

Then, the quantity of milk in the original mixture

$= \frac{an}{m-b}$

and the quantity of water in the original mixture

$= \frac{bn}{m-b}$

12) In a mixture of n liters, the ratio of milk and water is $x : y.$

If another m liters of water is added to the mixture, the ratio of milk and water in the resulting mixture

$= xn:(yn+mx+my)$

13) If four numbers a, b, c and d are given then

a) $\frac{ad-bc}{(b+c)-(a+d)}$ should be added to each of these numbers so that the resulting numbers may be proportional.

b) $\frac{ad-bc}{(a+d)-(b+c)}$ should be subtracted from each of these numbers so that the resulting numbers may be proportional.

CHAIN RULE / VARIATION

CONCEPTS

What is Chain Rule or Variation:

Variations deal with, how one quantity changes with respect to one or more other quantities. Basically there are two types of variations: Direct variation and Indirect variation.

Direct Variation: Suppose that a painter charges ₹100 to paint a room. The below table shows the relationship between the number of rooms painted and the cost of the total job for 1 through 5 rooms.

Number of Rooms	Cost of the Job
1	₹ 100
2	₹ 200
3	₹ 300
4	₹ 400
5	₹ 500

From the above table we observe that as the number of rooms *increase*, cost of the job also *increases* and vice versa. There is a *direct variation* between these two quantities. It means these two quantities are *directly proportional* to each other.

• If the two quantities *'x'* and *'y'* are directly proportional to each other, then $x = k\,y$ (or) $\frac{x_1}{x_2}=\frac{y_1}{y_2}$.

e.g.: If 5 computers costs ₹ 275, how much would 18 computers cost?

Explanation: More number of computers : More cost

Less number of computers : Less cost

The two quantities, *computers* and *cost* are directly proportional to each other.

Computers	Cost
5 (x_1)	275 (y_1)
18 (x_2)	? (y_2)

$$\frac{x_1}{x_2}=\frac{y_1}{y_2}\Rightarrow\frac{5}{18}=\frac{275}{x}\Rightarrow x=990.$$

(or) $x = k\,y \Rightarrow 5 = 275\,k \Rightarrow k = \frac{1}{55}$

$$18 = k\,y \Rightarrow 18=\frac{1}{55}y \Rightarrow y = 990.$$

Indirect Variation: When two variables or quantities change in opposite directions, you have inverse variation.

The below table shows the relationship between the number of persons and number of days required to complete a work.

Persons	Days
1	120
2	60
3	20
4	5
5	1

If the number of persons *increase*, the days required to complete the work will *decrease*. There is an *indirect variation* between these two quantities. It means these two quantities are *inversely proportional* to each other.

• If the two quantities *x, y* are indirectly proportional to each other, then $x=\frac{k}{y}$ (or) $\frac{x_1}{x_2}=\frac{y_2}{y_1}$.

e.g.: There are 6 workers to paint a house. They typically paint the house in 8 hours. If 4 workers are not came to work today, how long will it take the remaining workers to paint the house.

Explanation: If there are *more workers*, it takes *less days* to complete the work. These two quantities are indirectly proportional each other.

Workers	Hours
6 (x_1)	8 (y_1)
2 (x_2)	? (y_2)

$$\frac{x_1}{x_2}=\frac{y_2}{y_1}\Rightarrow\frac{6}{2}=\frac{x}{8}\Rightarrow x = 24.$$

Combined Variation:

It involves both direct and indirect variation.

• If *'x'* varies directly with *'y'* and indirectly with *'z'*, then the general form of the combined variation is $x=k\frac{y}{z}$ or $\frac{x_1}{x_2}=\frac{y_1}{y_2}\times\frac{z_2}{z_1}$.

e.g.: If 300 men can complete a work in 16 days, how many men would do $\frac{1}{5}$ of the work in 15 days?

Explanation:	**Men**	**Work**	**Days**
	300 (x_1)	1 (y_1)	16 (z_1)
	x (x_2)	$\frac{1}{5}$ (y_2)	15 (z_2)

Compare *men* with *work* and *days*.

More men can do *more work*. (*Direct Variation*)

If there are *more men*, it takes *less days* to complete the work. (*Indirect Variation*)

Hence, It is a *Combined Variation*: $\frac{x_1}{x_2}=\frac{y_1}{y_2}\times\frac{z_2}{z_1}$.

$$\frac{300}{x}=\frac{1}{1/5}\times\frac{15}{16} \qquad \Rightarrow\frac{4}{x}=\frac{1}{16} \qquad \Rightarrow x = 64.$$

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PERCENTAGES

CONCEPTS

A percentage is a way of expressing a number as a fraction of 100. The word 'per cent' or 'percentage' means for every one hundred. In other words, it gives rate of a parameter per hundred. It is denoted by the symbol %.

e.g.: 30% means 30 out of one hundred or $\frac{30}{100}$.

Key Notes:

• To convert a percent into a fraction, divide by 100.

e.g.: $20\% = \frac{20}{100} = \frac{1}{5}$

• To convert a fraction into a percent, multiply by 100.

e.g.: $\frac{3}{4} = \frac{3}{4} \times 100 = 75\%$

• To write a decimal as a percent we move the decimal point two places to the right and put the % sign.

e.g.: $0.35 = \frac{35}{100} = 35\%$

• Conversely to write a percent as a decimal, we drop the % sign and insert or move the decimal point two places to the left.

e.g.: 43% = 0.43; 12% = 0.12.

Calculating Percentage: $Percentage = \left(\frac{Value}{Total}\right) \times 100.$

For example, if you obtained 18 marks out of 25 marks, what was your percentage of marks?

Explanation: Total marks = 25. Marks obtained = 18.

$\therefore$ Percentage of marks obtained = $\frac{18}{25} \times 100 = 72\%$.

Calculating Percentage Increase or Decrease:

• % Increase :

New value = $(1 + \frac{\text{Increase \%}}{100}) \times$ (Original Value)

• % Decrease :

New value = $(1 - \frac{\text{Decrease \%}}{100}) \times$ (Original Value)

e.g.: What is the discounted cost of a Rs. 80 book offered at 30% discount ?

Explanation:

New Amount = $\left(1 - \frac{30}{100}\right) \times 80 = 0.70 \times 80 = 56$

• Calculating Percent Change:

Percentage change refers to the relative percent change of an increase or decrease in the original amount.

$Percent = \frac{Change}{Original\ Value} \times 100$

e.g.: What is the discount percentage of a Rs.80 book that is sold for Rs 64 ?

Explanation: Change = 80–64 = 16. Original Value = 80.

Discount Percentage = $\frac{16}{80} \times 100 = \frac{1}{5} \times 100 = 20\%$

Calculating Successive Percentages:

• If a number is successively increased by x% and y% then a single equivalent increase in that number will be $\left(x + y + \frac{xy}{100}\right)\%$.

e.g.: The price of an article is successively increased by 10% and 20%. What is the overall percent increase in the price of the article.

Explanation:

₹100 —(10% Increase)→ ₹110 —(20% Increase)→ ₹132

Overall 32% Increase

(or) By using formula:

$= \left(x + y + \frac{xy}{100}\right)\% = \left(10 + 20 + \frac{(10)(20)}{100}\right)\% = 30 + 2 = 32\%.$

• If there's an increase and a decrease, in that case, the decrease will be considered a negative value.

e.g.: If there is an increase of 20% and then a decrease of 10% on the price of a commodity, the successive percentage will be

$20 + (-10) + \frac{20 \times (-10)}{100} = 20 - 10 - 2 = 8\%$ increase.

• In case of discounts, the value of discount percentages will be considered negative.

e.g.: If a shop keeper give 20% and 10% discounts on a festival day, the final discount given by shopkeeper is

$(-20) + (-10) + \frac{(-20)(-10)}{100}$ = -100+25 = 75% discount.

• If there are three discounts as x%, y% and z% then first find the total discount of x% and y% and using it find the total discount with z%.

• If the price of commodity increases by x%, the percentage should a family reduce its consumption so as not to increase the expenditure on the commodity = $\frac{x}{100 + x} \times 100$.

• If the price of commodity decreases by x%, the percentage should a family increase its consumption so as not to decrease the expenditure on the commodity = $\frac{x}{100 - x} \times 100$.

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PROFIT, LOSS AND DISCOUNTS

CONCEPTS

Cost Price (CP) is the price at which article is bought.

Selling Price (SP) is the price at which article is sold.

Marked Price (MP) or List Price is the price marked on the article. For example, a vendor buys 1kg of mangoes for ₹50. He labeled the price as ₹80. But sold for ₹ 70. Here CP = ₹50, MP = ₹80, SP = ₹70.

The expenses incurred on transportation, maintenance, packaging, advertisement etc. are considered as *overhead.* These *overheads* and the *profit* when added to the *cost price* determine the *selling price.*

Profit or Gain: Profit is made when the selling price is greater than the cost price.

Profit = SP – CP ; **Profit % = $\frac{\text{Profit}}{\text{Cost Price}} \times 100$**

Considering the same example given above,

Profit = 70–50 = ₹20. Profit % = $\frac{20}{50} \times 100 = 40\%$

Loss: Loss is made when the cost price is greater than the selling price.

Loss = CP – SP ; **Loss % = $\frac{\text{Loss}}{\text{Cost Price}} \times 100$**

• Profit or Loss is calculated on cost price only.

Discount is always calculated on the marked price.

Discount = MP–SP; **Discount%= $\frac{\text{Discount}}{\text{MP}} \times 100$**

Consider the same example given above,

Discount = 80–70 =10; Discount% = $\frac{10}{80} \times 100 = 12.5\%$

• To calculate Gain, Loss, Selling Price and Cost Price directly use the formula,

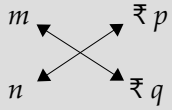
$$\textbf{SP} = \frac{(100 \pm \textbf{Gain or Loss}) \times \textbf{CP}}{100}$$

Use + sign for profit and – sign for loss.

Example: Cost Price of an article is ₹70. At what price it should be sold in order to gain 20%?

$SP = \frac{(100+20)\times 70}{100} = \frac{120\times 70}{100} = 12\times 7 = 84$

• If a man purchased m articles for ₹p and sold n articles for ₹ q. Then how much profit or loss does he make?



Profit or Loss % = $\frac{mq-np}{np} \times 100$

Example: A merchant purchased 7 watches for ₹500 and sold 5 watches for ₹400. What is loss/gain percent?

Explanation:

$\frac{7\times 400 - 5\times 500}{5\times 500} \times 100 = \frac{2800-2500}{2500} \times 100 = \frac{300}{25} = 12$

• By selling an article for ₹ P, a merchant would gain or loss x%. The price at which he sell it to gain or loss y% is $SP = P\left(\frac{100 \pm y}{100 \pm x}\right)$. (+ sign for gain; − sign for loss)

Example: By selling a furniture for ₹180 a merchant will loss 10%. At what price must he sell to gain 20%.

Explanation: $SP = 180 \times \left(\frac{100+20}{100-10}\right) = 240.$

• When a man buys two things on equal price each and in those things one is sold at a profit of x% and another is sold at a loss of x%, then there will be no loss or no gain percent.

Example: A merchant purchased a watch and a bag for ₹100 each. But he sold the watch at a profit of 20% and bag at a loss of 20%. What is his loss/gain percentage?

Explanation:

	CP		SP
Watch -	₹100	+ 20% Profit =	₹120
Bag -	₹100	– 20% Loss =	₹ 80
	₹ 200		₹ 200

Cost price = Selling Price. Hence, no gain or no loss.

• By selling two articles at the same price a merchant incurs x% loss on the first article and x% gain on the second article. In such a case there is always a loss.

$\text{Loss} = \frac{2\times SP}{\left(\frac{100}{x}\right)^2 - 1}$

Example: By selling a watch and a bag at ₹100 each a merchant incurred a loss of 20% on watch and gain of 20% on bag. What is his loss or gain percentage?

Explanation:

	SP		CP
Watch	₹ 100 (20% Loss on CP)	=	₹ 125
Bag	₹ 100 (20% Profit on CP)	=	₹ 83.33
	₹ 200		₹ 208.33

Here, CP > SP. Hence, Loss = $\frac{8.33}{208.33} \times 100 = 3.9\%$

(or) Using Formula: Loss = $\frac{2\times 100}{\left(\frac{100}{20}\right)^2 - 1} = \frac{200}{24} = 8.33.$

Then Cost Price = 200 + 8.33 = 208.33

And Loss Percentage = $\frac{8.33}{208.33} \times 100 = 3.9\%$

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PERMUTATIONS AND COMBINATIONS

CONCEPTS

• **Fundamental Principal of Multiplication:**

In general if some procedure can be performed in n_1 different ways, and if, following this procedure, a second procedure can be performed in n_2 different ways, and if, following this second procedure, a third procedure can be performed in n_3 different ways, and so fourth then the number of ways the procedure can be performed in the order indicated is the product of $n_1 . n_2 . n_3 \ldots\ldots\ldots$

e.g.: A letter lock consists of 5 rings each marked with 10 different letters. What is the maximum number of unsuccessful attempts to open the lock.

Explanation: Each ring is marked with 10 different letters. Hence each ring has 10 positions.

Thus, the total number of attempts that can be made to open the lock is $10 \times 10 \times 10 \times 10 \times 10 = 10^5$.

Out of these, there must be one attempt in which the lock will open.

$\therefore$ Total number of unsuccessful attempts = $10^5 - 1$.

•**Fundamental Principle of Addition:**

If there are two operations such that they can be performed independently in m and n ways respectively, then either of the two operations can be performed in $(m+n)$ ways.

•**Factorial:** The product of first 'n' natural numbers is called the 'n'-factorial and is denoted by $n!$

$n! = 1.2.3.4 \ldots\ldots\ldots\ldots\ldots (n-2).(n-1).n$

Example: $4! = 1.2.3.4 = 24$, $5! = 1.2.3.4.5 = 120$,

$5! = 5.4! = 5.24 = 120$, $6! = 6.5! = 6.120 = 720$.

Note: 1) $0! = 1$

2) The product of 'r' consecutive positive integers is divisible by $r!$

3) $(kn)!$ Is divisible by $(n!)k$ for all k is a positive constant.

4) The product of $2n!$ consecutive positive integers is equal to $2(n!)$.

PERMUTATIONS

•**Permutation:** An arrangement of any $r \le n$ of these objects in a given order is called an r–permutation or a permutation of the 'n' objects taken 'r' at a time.

Example: Consider the set of letters a, b, c, and d. Then

(i) *bdca, dcba* and *acdb* are permutations of the 4 letters taken all at time.

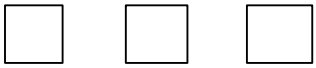
(ii) *bad, adb, cbd* and *bca* are permutations of the 4 letters taken 3 at a time.

(iii) *ad, cb, da* and *bd* are permutations of the 4 letters taken 2 at a time.

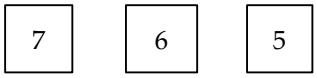
The number of permutations of 'n' objects taken 'r' at a time will be denoted by $P(n, r)$.

Before we derive the general formula for $P(n, r)$ we consider a special case. Find the number of permutations of 7 objects, say a, b, c, d, e, f, g taken three at a time. In other words, find the number of 'three letter words' with distinct letters that can be formed from the above seven letters.

Let the general three letters word be represented by three boxes.



Now the first letter can be chosen in 7 different ways; following this, the second letter can be chosen in 6 different ways; and, the last letter can be chosen in 5 different ways. Write each number in its appropriate box as follows:



Thus by the fundamental principle of counting there are 7.6.5=210 possible three letter words without repetitions from the seven letters. (or) There are 210 permutations of 7 objects taken 3 at a time.

i.e. $P(7, 3) = 210$.

The derivation of the formula for $P(n, r)$ follows the procedure in the preceding example:

The first element in an r-permutation of n-objects can be chosen in 'n' different ways; following this, the second element in the permutation can be chosen in $(n-1)$ ways; and, the third element in the permutation can be chosen in $(n-2)$ ways. Continuing in this manner, we have that the r^{th} (last) element in the r–permutation can be chosen in $n-(r-1) = n-r+1$ ways.

Thus $P(n, r) = n(n-1)(n-2) \ldots (n-r+1) = \dfrac{n!}{(n-r)!}$

The second part of the formula follows from the fact that $n(n-1)(n-2) \ldots\ldots .(n-r+1) =$

$$\frac{n(n-1)(n-2)\cdots\cdots(n-r+1)\cdot(n-r)!}{(n-r!)} = \frac{n!}{(n-r)!}$$

$\therefore$ A formula for the number of possible permutations of 'r' objects from a set of 'n' is $P(n, r)$ or ${}^{n}p_{r} = \dfrac{\boldsymbol{n!}}{\boldsymbol{(n-r)!}}$

In the special case that $r = n$, we have $P(n, n) = n(n-1)(n-2). \ldots\ldots 3.2.1 = \boldsymbol{n!}$ (in other words there are $n!$ permutations of 'n' objects taken all at a time).

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PROBABILITY

CONCEPTS

•**Random Experiment:** Probability is the study of random or non deterministic experiments. If the dice is tossed in the air, then it is certain that the dice will come down, but is not certain that, say a 3 will appear.

Definition: A *random experiment* is an experiment whose result would not be predicted but the list of possible outcomes are known. The non predicted outcomes cannot be taken under random experiments. The result of random experiments may not be predicted exactly but the result must be with in the list of predicted outputs.

Example:

1) Tossing a fair coin.

2) Rolling a dice is a random experiment, since its results could not be predicted in any trial.

3) Selection of a plastic component and verification of its compliance.

4) Life time of a computer.

5) Number of calls to a communication system during a fixed length interval of time.

•**Outcome:** The result of a random experiment will be called an outcome.

Example:

1) Tossing a coin.The result is either Head(H) or Tail(T).

2) In an experiment of throwing a six-faced dice. The possible outcomes are 1, 2, 3, 4, 5 and 6.

•**Sample Space:** The set of all possible outcomes of some given experiment is called *sample space.* A particular outcome, *i.e.* an element in that set is called a *sample point* or *sample*.

Example:

1) Toss a dice and observe the number that appears on top. Then the sample space consists of the six possible numbers: S = {1, 2, 3, 4, 5, 6}

2) Toss a coin 2 times and observe the sequence of heads (H) and tails (T) that appears. Then the sample space S consists of four elements: S = {HH, HT, TH, TT}

Note: Shortcut: Tossing a coin 2 times is same as tossing 2 coins at a time.

S = {H, T} × {H, T}

S = {HH, HT, TH, TT}

3) Toss a coin until a head appears and then count the number of times the coin was tossed. The sample space of this experiment is S = {1, 2, 3, ... ∞}. Here ∞ refers to the case when a head never appears and so the coin is tossed an infinite number of times. This is an example of a sample space which is countably infinite.

•**Events:** An event A is a set of outcomes or, in other words, a subset of the sample space S.

Example: If A random experiment is associated with what is the day today. It may be from Sunday to Saturday. If today is Friday and Friday belongs to the sample space S = {Sun, Mon, Tue, Wed, Thu, Fri, Sat}.

Different Types of Events:

•**Simple or Elementary Events:** An event with only one sample point is called *simple* or *elementary event.*

In an experiment of tossing three coins at a time, the event 'A' is that all coins turns up with heads consists of only one point HHH. Then 'A' is a simple event.

As a matter of fact each outcome of an experiment is a simple event.

•**Complimentary Event:** An event $\bar{A}$ (or A^1) is said to be *complementary* to an event 'A' in sample space 'S' consists of all those points which are not in 'A'.

Example: In tossing a coin three times, sample space S consists of eight points.

S = {HHH, HHT, HTH, THH, HTT, TTH, THT, TTT}

The event 'A' is such that there should be no heads in the sample point is {TTT}. Then the event $\bar{A}$ (or A^1) complementary to 'A' is that there exists at least one head in the sample space *i.e.* (HHH), (HHT), (HTH), (THH), (HTT), (TTH), (THT).

•**Equal Events:** Two events A and B are said to be *equal* if $A \subset B$ and $B \subset A$. This statement implies that all the points of A are also the points of B and vice-versa.

Example: Let sample space S = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}.

Let A be the event defined as *'even number'* and event B is defined as *'multiplies of* 2*'*.

Then A = {2, 4, 6, 8, 10}; B = {2, 4, 6, 8, 10} here every point in A is also a point in B and vice-versa. Therefore events A and B are said to be equal events.

•**Transitivity of events:** If A, B and C are 3 events such that $A \subset B$ and $B \subset C$ it implies that $A \subset C$ such a property of events is known s *transitivity* of events.

Let the sample space S = {1, 2,. . . . , 100}.

Event A be the *'even numbers'*: A = {2, 4, 6, 8,.....,100}

Event B be the *'multiples of* 4*'* : B = {4, 8, 12,.....,100}

Event C be the *'multiples of* 8*'*: C = {8, 16, 24,.....,100}

Event point in C is also point in B and event point in B is also point in A but not vice–versa *i.e.* $A \subset B \subset C$.

•**Compound event:** An event which is not simple or elementary is called a *compound event.* Every compound event can be uniquely represented by the union of a set of elementary events.

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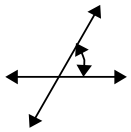
BASIC GEOMETRY

CONCEPTS

Angle: When two non-parallel and co-planar lines (lines in the same plane) intersect, at the point of intersection the measure of rotational displacement is called an angle.

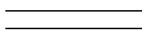


Types of Angles: If θ is an angle such that

1) If θ = 0° then θ is *zero angle.*
2) If 0° < θ < 90° then θ is called an *acute angle.*
3) If θ = 90° then θ is *right angle.*
4) If θ > 90^0 then θ is *obtuse angle.*
5) If θ = 180° then θ is called a *straight angle.*
6) If 180° < θ < 360° then θ is called *reflex angle*.
7) If θ = 360° then θ is called *complete angle*.

Parallel and Non-Parallel lines:

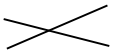
1) Two lines are said to be parallel lines if they are co-planar (in the same plane) and non intersecting.



The point of intersection of parallel lines is at infinite places which is not real.

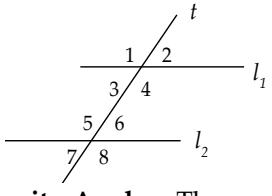
2) The angle between parallel lines is undefined, or it can be either 0° or 180° or any multiple of 180°.

3) Two lines are said to be non parallel (inclined lines) if they are co-planar and intersect at a real point.



The point of intersection of inclined lines is real.

Transversal: A line that intersects two parallel lines is called a *transversal.* Suppose l_1 , l_2 are two parallel lines and '*t*' is a transversal, then we will have eight angles as shown in figure.



•**Vertical Opposite Angles:** The angles ∠1∠4, ∠2∠3, ∠5∠8, ∠6∠7 pair wise are called pairs of *vertical angles.* The corresponding pairs of vertical angles are always equal *i.e.* ∠1=∠4, ∠2=∠3, ∠5=∠8, ∠6=∠7.

•**Corresponding Angles:** The angles ∠1∠5, ∠2∠6, ∠3∠7, ∠4∠8 pair wise are called *corresponding angles.* The pairs of corresponding angles are always equal. *i.e.* ∠1=∠5, ∠2=∠6, ∠3=∠7, ∠4=∠8.

•**Alternate Interior Angles:** The angles ∠3∠6, ∠4∠5 are called pairs of *alternate interior angles.*
The corresponding pairs of alternate angles are equal.
i.e. ∠3=∠6, ∠4=∠5

•**Alternate Exterior Angles:** The angles ∠1∠8, ∠2∠7 are called pairs of *alternate exterior angles.* ∠1=∠8, ∠2=∠7.

•**Complementary Angles:** Two angles whose sum is 90° are called *complementary angles*.

•**Supplementary Angles:** Two angles whose sum is 180° are called *supplementary angles.*

POLYGONS

•A closed plane figure made up of several line segments that are joined together is called a Polygon.

•If all the sides of a polygon are equal then it is called Regular Polygon.

Regular polygons are both equiangular and equilateral.
Equiangular = all angles are equal.
Equilateral = all sides are the same length.

Exterior angle: The angle subtended by a side of the regular polygon at the vertex outside.

Sum of the exterior angles of any polygon = 360°.

Each exterior angle (regular polygon) = $\frac{360}{n}$.

(where 'n' is the number of sides in a polygon).

Interior angle:

Sum of the interior angles of a polygon = $(n-2)\times180°$.

Each interior angle of a regular polygon = $\frac{180(n-2)}{n}$.

• The number of diagonals in a polygon = $\frac{n(n-3)}{2}$.

• The number of triangles (when you draw all the diagonals from one vertex) in a polygon = $(n-2)$.

Polygon Names:

Sides	Name
3	Triangle
4	Quadrilateral
5	Pentagon
6	Hexagon
7	Heptagon
8	Octagon
10	Decagon

Special Triangles:

Equilateral, Isosceles, Scalene, Right Angled, Acute, Obtuse.

Special Quadrilateral:

Square, Rhombus, Parallelogram, Rectangle, Trapezoid.

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DATA INTERPRETATION

CONCEPTS

The information related to any event given in the form of graphs, tables, charts etc is termed as data. The methodology of interpreting data to get the information is known as data interpretation.

Mathematical identities which we use in data interpretation are given below.

To solve the problems on data interpretation, you need to be thorough in 'Percentages', 'Ratios' and 'Averages' chapters.

Percentage: Proportions with the base 100 are known as percentages (%).

For example, $\frac{x}{y}\times 100$ is in percentage form.

e.g.: If the ratio of boys to total number of students in a college is $\frac{1015}{4060}$. This can be written in a percentage form as $\frac{1015}{4060}\times 100 = 25\%$.

To find by how much percent 'x' is more or less than y (or over y) when compared to y is given as

$$\text{Required Percentage} = \frac{\text{Value of X} - \text{Value of Y}}{\text{Value of Y}} \times 100$$

Observe that the denominator contains the value with which the comparison is made.

In the above formula, if numerator is positive, then there is percentage growth. If numerator is negative, then there is a decline in the percentage.

Ratio: In the simplest possible form, ratio is a quotient or the numerical quantity obtained by dividing one figure by the other figure of same units.

TABULAR DATA INTERPRETATION

In this type of questions a table with data as well as a set of questions on the same data is given to you. You need to analyze the table data and answer the given questions.

Example: Study the following table carefully and answer the questions that follow.

Table: Percentage of marks scored by students in SSC

Marks percentage	Girls	Boys
>75	25	12
60-75	15	12
50-59	10	23
35-49	5	2
< 35	3	1

1) Give the total percentage of Girls who wrote SSC examination from that School.

a) 25% b) 54% c) 23% d) 58%

2) Give the percentage of students who scored distinction (> 75).

a) 43% b) 34.25% c) 24.85% d) 40%

3) Give fail percentage of students in SSC examination.

a) 1% b) 2% c) 4% d) 8%

4) Give pass percentage of boys in SSC examination.

a) 90% b) 88% c) 98% d) 99%

5) Give the percentage of students who scored more than 60% in the SSC examination.

a) 25% b) 59.3% c) 22.2% d) 50%

Explanation:

1)b; Total no.of girls appeared for SSC Examination = 25 + 15 + 10 + 5 + 3 = 58.

Total no.of students appeared for SSC examination = 58 + 50 = 108.

∴ Percentage of girls who wrote SSC Examination = $\frac{58}{108}\times 100 = 53.7 = 54\%$ (approximately)

2)b; No.of students who scored distinction = 25 +12 =37.

∴ Percentage of students who scored distinction = $\frac{37}{108}\times 100 = 34.25\%$

3)c; Total no.of students failed in SSC examination = 4.

∴ Fail % = $\frac{4}{108}\times 100 = 3.7 = 4\%$ (approximately)

4)c; No.of boys passed in the examination = 49.

∴ Boys pass percentage = $\frac{49}{50}\times 100 = 98\%$

5)b; No.of students who scored more than 60% = 64.

∴ Percentage of students who scored more than 60% = $\frac{64}{108}\times 100 = 59.26\% = 59.3\%$ (approximately)

Example: Production of cars by different companies in the span of 1980-2005 given. Interpret the data to answer the questions given below.

Company	Production of cars in thousands				
	1980-85	1985-90	1990-95	1995-00	2000- 05
Maruthi	12.5	15.0	16.2	18.0	22
Hindustan Motors	10.4	11.1	11.5	11.5	12
Hyundai Motors	12	14.3	16.2	17.8	18.9
Ford	14.4	14.1	13.2	18.1	25.3
General Motors	19.2	13.8	13.5	14.1	15.8

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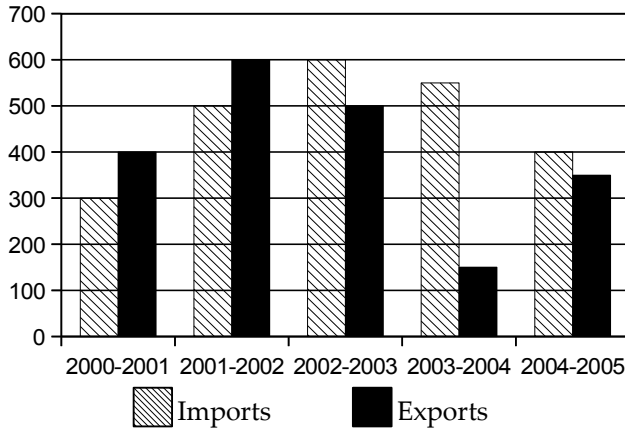
BAR GRAPHS

Bar graphs normally comprise X-axis, Y-axis and bars. X and Y-axes represent the data. And bars represent the trend of data with respect X and Y-axes. In this type of questions, data is given in the form of bar graphs. You need to analyze the bars with respect to X and Y-axes to answer the given questions.

Example: Imports and exports of a country from 2000 - 2001 to 2004 -2005.



1) In which of the following year the gap between import and export was maximum.

a) 2001-02 b) 2002-03 c) 2003-04 d) 2004-05

2) In which of the following year the gap between imports and exports was minimum.

a) 2002-2003 b) 2003-2004 c) 2004-2005 d) none

3) Exports in 2001–2002 was approximately how many times that of the year 2003–2004.

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

4) Give the ratio between the number of years in which exports is greater than imports and import is greater than exports.

a) 3 : 2 b) 2 : 3 c) 3 : 1 d) 1 : 3

5. Difference between average of imports and exports is

a) 100 b) 90 c) 80 d) 70

Explanations:

1)c; From the graph, gap between import and export was maximum in 2003-2004.

2)c; From the graph, gap between imports and exports is minimum in 2004-2005 = 400–350 = 50 crore.

3)c; Exports of the year 2001–2002 = 600

Exports of the year 2003–2004 = 150

$\therefore$ Exports of 2001–2002 is 4 times greater than that of 2003–2004.

4)b; In 2 years *i.e.* 2000-2001 and 2001-2002 exports are greater than imports.

In 3 years *i.e.* 2002-2003, 2003-2004, 2004-2005 imports are greater than exports.

5)d; Average of imports during 2000-2005 =

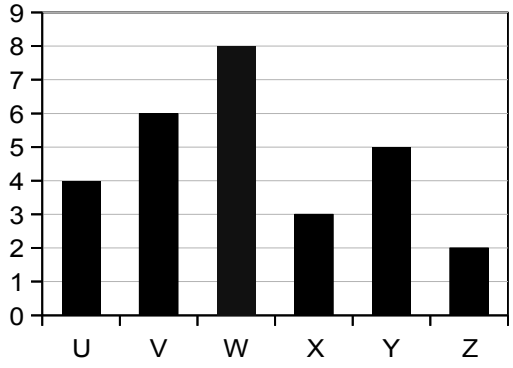
$$\frac{300+500+600+550+400}{5}=\frac{2350}{5}=470$$

Average of exports during 2000-2005 =

$$\frac{400+600+500+150+350}{5}=\frac{2000}{5}=400$$

$\therefore$ Difference = 470 – 400 = 70.

Example: Turnover in crores of six companies (U, V, W, X, Y and Z) are given.



1) Which company's turn over is highest?

a) U b) V c) W d) X

2) What is the percentage of turn over of the company-X over the turn over of the company-V?

a) 25% b) 50% c) 75% d) 100%

3) Give the difference of average turnovers of first three companies and last three companies.

a) 3.33 b) 6.66 c) 2.67 d) 1.85

4) Give the percentage contribution of turnover of W in the overall turnover of all the companies.

a) 12% b) 50% c) 40% d) 29%

5) Difference of average percentage contribution of turnovers of companies U, V and X, Y is.

a) 1% b) 2% c) 3% d) 4%

Explanations:

1)c; It is clear from the graph that turn over of company W is highest *i.e.* 8 crores.

2)b; Turnover of company X = 3 crores

Turnover of company V = 6 crores

$\therefore$ Percentage of turn over of X over V= $\frac{3}{6}\times 100=50\%$

3)a; Average turn over of first three companies

$$\frac{4+6+8}{3}=\frac{18}{3}=6$$

Average turn over of last three companies

$$\frac{3+5+2}{3}=\frac{10}{3}=3.33$$

$\therefore$ Difference = 6.00 – 3.33 = 2.67

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MIXED DIAGRAMS

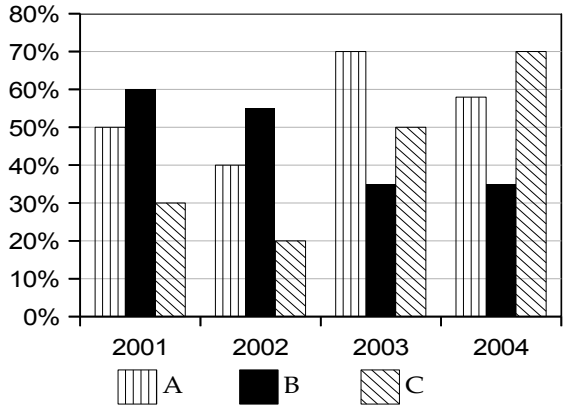
CONCEPTS

In this type of data interpretation, data will be given in the form of two or more diagrams. The combination of the diagrams can be a bar diagram and a pie chart (or) a line graph and a table diagram (or) a pie chart and line graph.

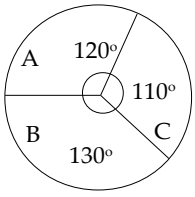
EXERCISE

A) Study the following graphs carefully to answer the questions given below it.

Readers of newspapers in percentages in 3 different cities A, B and C over the years.



Total population of 3 crores in 3 cities is represented in the following diagram.



1) In 2002 in the city B how many people were reading a news paper in lakhs ?

a) 108.333 b) 59.5883 c) 48.7499 d) 38.9421

2) According to the data in city B what is the difference between minimum number of newspaper readers in a particular year and maximum number of newspaper readers in a particular year (*approximately*)?

a) 34 b) 31 c) 29 d) 27

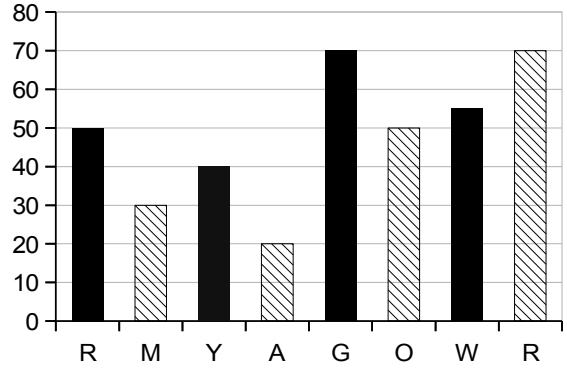
3) What is the sum of populations of city A those who don't read any newspapers in all the 4 years (in lakhs)?

a) 220 b) 200 c) 180 d) 160

4) In the 2 years in which same and maximum percentage of readership is maintained in the cities A and C. What is the decrease in readership in the city A?

a) 5 lakhs b) 10 lakhs c) 20 lakhs d) 30 lakhs

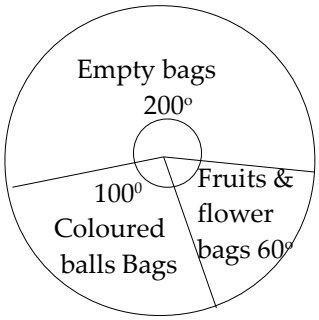
B) Study the following graphs carefully to answer the questions given below it. (Use most approximate figures, if necessary).



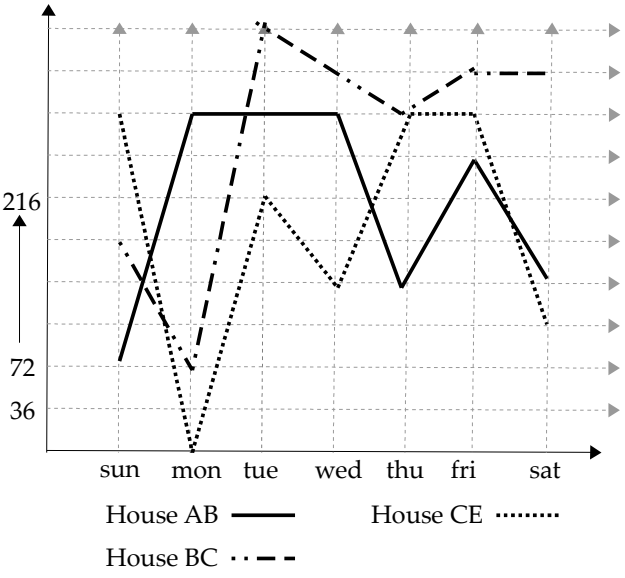
Different Bags containing colored (red, yellow, green, white) balls

Different Bags containing fruits and Flowers (Mango, Apple, Orange, Rose)

Percentage of bags (empty, fruits and Flowers, colored balls) available in every house is given in the following Pie chart.



There are 3 go-downs namely AB, BC, CE which have *n* bags in different days of the week as shown below.



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ARITHMETIC REASONING

CONCEPTS

Arithmetic Reasoning involves logical calculation, Venn–diagram and data–based problems. In this type of problems, some information is given, which makes us get confused. You need to analyze that information carefully and answer the question accordingly.

CONCEPTUAL EXAMPLES

1) Kiran, an eight years old boy has 27 toys. He gave 19 toys to his brother Gourav, while Gourav playing all but 6 got destroyed. While Kiran playing all but 3 got destroyed. Finally how many toys left with both of them?

a) 10 b) 18 c) 9 d) 8 e) none of these

Explanation: While Gourav playing 'All but 6 got destroyed' means '*All* except 6 got destroyed'.

i.e., 13 toys got destroyed. It means now Gourav has 6 toys. While Kiran is playing '*All but* 3 *got destroyed*' means 'except 3 all are not working i.e; 3 toys are good working so total toys at both of them is 6 + 3 = 9.

Ask doubt with Question Id: 8282

2) Rohith,who works in a parcel service, has a certain number of small plastic boxes to pack into parcels. If he packs 3,4,5 or 6 in a parcel, he is left with one over; if he packs 7 in a parcel, none is left over. What is the number of boxes, he may have to pack?

a) 300 b) 500 c) 301 d) 200 e) 201

Explanation: The required number of boxes is such that it leaves a remainder of 1 when divided by 3, 4, 5 or 6 and no remainder of 1 when divided by 3, 4, 5 or 6 and no remainder when divided by 7. Such a number is 301.

Ask doubt with Question Id: 8283

3) If man pays ₹20 for each Km which he travels by taxi and ₹10 for each Km which he travels by bus. If in one week he payed ₹800 for traveling 60 Km. How many kilometers did he travel by taxi ?

a) 10 b) 15 c) 25 d) 20 e) 50

Explanation: Let the distance covered by the taxi be 'x' *Km*. Then, distance covered by bus = $(60 - x)$ *Km*.

$20x + 10(60 - x) \Rightarrow 20x + 600 - 10x = 800$

$10x = 200 \Rightarrow x = 20$ *Km*.

He traveled 20 *Km* by taxi.

Ask doubt with Question Id: 8284

4) In a group of dogs and peacocks, the number of legs are 18 less than four times the number of heads How many peacocks are there in that group?

a) 9 b) 16 c) 8 d) 12 e) 13

Explanation: Let the number of dogs be 'x' and the number of peacocks by 'y'.

Then, number of legs in the group = $4x + 2y$.

Number of heads in the group = $x+y$

So, $4x+2y = 4(x+y) - 18 \Rightarrow 2y = 18 \Rightarrow y = 9$

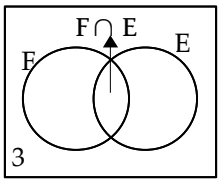
Number of peacocks in that group = 9.

Ask doubt with Question Id: 8285

5) In a group of 15 people, 8 read English, 7 read French while 3 of them read none of these two. How many of them read French and English both?

a) 6 b) 3 c) 5 d) 4 e) 2

Explanation: In the Venn diagram, F and E represent people who read French and English respectively.



Now, $[F+(\{F \cap E\}) + E] = 15-3$ (or) $F+E+(F \cap E) = 12$ .....(1)

Also, $F+(F \cap E) = 7$; $E+(F \cap E) = 8$.

By adding, $F+E+2(F \cap E) = 15$ ---------- (2)

By subtracting (1) from (2), we get $(F \cap E) = 3$.

$\therefore$ 3 of them read both French and English.

Ask doubt with Question Id: 8286

EXERCISE

1) The number of girls in a class is 5 times the number of boys. Which one of the following numbers cannot represent the total number of children in the class.

a) 36 b) 41 c) 42 d) 48 e) 72

2) In a class, there are 21 boys who are over 160 *cm* tall. If these constitute three–fourth of the boys and the total number of boys is one–fourth of the total number of students in the class. What is the total number of girls in the class?

a) 84 b) 68 c) 74

d) 64 e) cannot be determined

3) In a BCCI meeting there are ten people. All shake hands with each other once. How many handshakes will be there altogether?

a) 10 b) 100 c) 45 d) 95 e) 15

4) A certain number of donkeys and an equal number of men are going to a village. Half of the men are on their donkey's back while the remaining are walking along leading their donkeys. If the number of legs walking on the ground is 70. How many donkeys are there?

a) 16 b) 18 c) 17 d) 14 e) 28

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CODING – DECODING

CONCEPTS

A code is a system of words, letters or signs which is used to represent a message in secret form. Coding and Decoding test is to examine the student's ability to identify the rule interpreted and decode the given message.

Approach to solve the questions:

1. You will be given two messages, one is original message and another one is coded message.
2. You have to compare each element of the original message with corresponding element of coded message. Thereafter try to identify the rule in which coded message is formed.
3. Using the identified rule you can easily answer the question asked.

Tips to solve easily:

1) Remember English alphabets from A to Z with their position values *i.e.* A–1, B–2, C–3, ..., Z–26.

2) Remember reverse order of English alphabets. *i.e.* Z to A with their position values *i.e.* Z–1, Y–2, ... , A–26.

3) Remember the corresponding opposite letter of each alphabet with their position values. The following table will give the opposite letter of each alphabet.

1	2	3	4	5	6	7	8	9	10	11	12	13
A Z	B Y	C X	D W	E V	F U	G T	H S	I R	J Q	K P	L O	M N
26	25	24	23	22	21	20	19	18	17	16	15	14

To find out the opposite letter of a particular letter, we can use the below formula.

Sum of the position numbers of a letter and it's opposite letter is always 27.

Position number of a letter + Position number of its opposite letter = 27.

e.g.: The opposite letter of 'H' is 'S'.

Because, H–8, S–19. H+S = 27 $\Rightarrow$ 8+19=27.

Types of Coding-Decoding:

(I) <u>Letter Coding:</u> In this type of coding, the original alphabets of the given word are replaced by certain other alphabets based on specific rule to form its code. You have to detect the hidden rule and answer the questions accordingly.

Examples: (1) In a certain code language,'COLLEGE' is written as 'GSPPIKI' then how will 'GROUPS' be written in that code?

Explanation: Each letter of the word is moved four steps forward to obtain the code. So, GROUPS will be coded as KVSYTW.

2) 'ZYXW' as coded as 'ABCD' then 'STUV' is coded as.

Explanation: Here each letter is coded with its opposite letter. *i.e.* Z – A, Y – B, X – C, W – D.

Similarly, S – H, T – G, U – F, V – E.

3) *'bcd'* is coded as *'def'* then *'true'* is coded as.

Explanation: Here every letter is moved two steps forward. *i.e. b* (+2) → *d* , *c* (+2) → *e*, *d* (+2) → *f* .

Similarly, *t*→ *v, r*→ *t, u*→ *w, e*→ *g*. So, the answer is *'vtwg'*.

4) *'Hyderabad'* : *'ixedszcze'* then *'chennai'* :?

Explanation: Here the letters are alternatively increasing and decreasing by 1.

h(+1) → *i* , *y*(-1) → *x* , *d*(+1) → *e* , *e*(-1) → *d*, *r*(+1) → *s*,

a(-1) → *z*, *b*(+1) → *c*, *a*(-1) → *z*, *d*(+1) → *e*.

So, *chennai* will be coded as *dgfmozj*.

(II) <u>Number Coding:</u> In this type of coding, alphabets are assigned to the numbers or numerical code values are assigned to a word or alphabets. You have to compare the given codes to answer the questions.

Example: 1) If READ is coded as 7421 and BOOK is coded as 8335, then how would you encode BOARD?

Explanation: The alphabets are coded as follows.

R	E	A	D		B	O	O	K
7	4	2	1		8	3	3	5

From the above codes, we can say, B is coded as 8, O is coded as 3, A is coded as 2, R is coded as 7, D is coded as 1. Hence, BOARD is coded as 83271.

(III) <u>Substitution:</u> In this type, the names of objects are substituted with different names. We should carefully trace the substitution to answer the questions.

Example: 1) In a certain code language, *'book'* is coded as *'pencil'*, *'pencil'* is coded as *'mirror'*, *'mirror'* is coded as *'board'*. Then what is useful to write on a paper?

Explanation: We use *pencil* to write on a paper but here *pencil* is coded as *mirror.* So, the answer is *mirror.*

2) In a certain language, *'man'* is called as *'woman'*, *'woman'* is called as *'girl'*, *'girl'* is called as *'boy'*, *'boy'* is called as *'worker'*. Then in the same language what does a 6 year old female is called?

Explanation: In general language, 6 years old female is called as *girl*. But in the given coded language *'girl'* is called as *'boy'*. So, the answer is *'boy'*.

(IV) <u>Mixed Letter/ Number Coding:</u> In this type, few sentences are given in a code language. Based on that you are asked to find the code for a particular given word(s). To answer such questions, you have to compare the two messages and deduce the common words and its corresponding codes. Analyze the entire message until the code for the given word is found.

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DAY SEQUENCE / CALENDAR

CONCEPTS

In day sequence, questions will be asked on calendars to find a particular day of the week (or) a particular day of the given date. In order to solve these problems easily, you should have knowledge on calendar *i.e.* leap year, odd days etc.

• **Leap year:** If the last two digits of a given year is perfectly divisible by 4 then that year is a *leap year.*

Example: 2016 is a leap year because last 2 digits *i.e.* 16 is perfectly divisible by 4.

But a century year is not a leap year *i.e.* 100, 200, 300,.... But every 4th century year is a leap year. *i.e.* 400, 800, 1200, 1600, 2000 etc.

A leap year has 366 days.

Examples:

(i) Each of the years 1764, 1028, 1948, 1676, 2004 etc is a leap year.

(ii) Each of the years 400, 800, 1200, 1600, 2000, 2400 etc is a leap year.

(iii) The years 2001, 2002, 2003, 2005, 1900, 2100 are not leap years.

• **Ordinary year:** The year that is not a leap year is called an *ordinary year*. An ordinary year has 365 days.

In order to solve the questions on calendars, we use a concept called *'odd days'*.

• **Odd day:** The number of days more than a complete week are called *odd days* in a given period.

Lets discuss how to count the odd days in a given period.

• **Counting of odd days:**

To find the number of odd days in a given period, we divide the total number of days with 7. The remainder obtained is the total number of *odd days*.

Examples:

1) How many odd days are there in 10 days.

Explanation:
```
7) 10 (1
   7
   3 = Remainder → 3 odd days.
```

2) How many odd days are there in 100 days.

Explanation:
```
7) 100 (14
   98
    2 → odd days
```

3) How many odd days are there in an ordinary year?

Explanation: An ordinary year has 365 days. So,
```
7) 365 (52
   364
    1 → odd day
```

• Hence, in an **ordinary year** there are 52 perfect weeks and **1 odd day**. [365 days = 52 weeks + 1 day]

4) How many odd days are there in a leap year?

Explanation: As we know, a leap year has 366 days. So,
```
7) 366 (52
   364
    2 → odd days
```

• Hence, in a **leap year**, there are 52 perfect week and **2 odd days**. [366 days = 52 weeks + 2 days]

Note: Total number of odd days can be from **0 to 6** only.

• Counting odd days for century years:

1) 100 years = 76 ordinary years + 24 leap years.

= (76×1 + 24×2) odd days = 124 odd days

(Here 1 and 2 indicates number of odd days in *an ordinary year* and *a leap year* respectively)

124 odd days = 17 weeks + 5 days = 5 odd days.

∴ Number of odd days in **100** years = **5**.

2) Number of odd days in **200** years = (5×2) = **3**.

3) Number of odd days in **300** years = (5×3) = **1**.

4) Number of odd days in **400** years = (5×4+1) = **0**.

Similarly, each set of 800, 1200, 1600, 2000 year etc has 0 (zero) odd days as they are multiples of 400.

• Some Important points to remember:

1) In every *normal / ordinary year* the first day (1st January) and the last day (31st December) are always same. For example, if January 1st is *Monday* then December 31st is also *Monday.*

2) In every leap year if the first day (January 1st) is *Sunday*, then last day (December 31st) will be it's next day *i.e. Monday.*

3) In every year, the calendar for the months *April* and *July* are always same.

4) For every 400 years, the day repeats.

For example, if 14-April-1604 is *Saturday*, then 14-April-2004 will also be *Saturday.*

5) The last day of a century cannot be either *Tuesday* or *Thursday* or *Saturday.*

Questions on day sequence / calendar are mainly 5 types.

1) Problems based on Total Day–Particular Day.

2) Problems based on Leap Year.

3) Problems based on Particular Date–Day.

4) Problems based on Same Calendar Year.

5) Problems based on Same Day–Date of the Month.

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CLOCKS

CONCEPTS

1) 60 minute space traces an angle of 360^0 for minutes hand. $\therefore$ 1 minute space traverses an angle of 6^0.

2) In 1 hour:

Minute hand traverses 60 minute space or 360^0.

Hour hand traverses 5 minute space or 30^0.

3) The minute hand travels 90^0 in 15 minutes.

4) The hands of the clock are in straight line when they coincide (or) when they are opposite to each other.

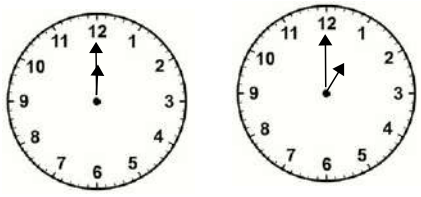
5) The hands of the clock are perpendicular to each other for 22 times in 12 hours and for 44 times in day.

6) The hands of the clock are opposite to each other for 11 times in 12 hours and 22 times in a day.

7) The hands of the clock coincides with each other for 11 times in 12 hours and 22 times per day.

8) The hands of the clock are 44 times in a straight line per day.

9) 55 minute spaces are gained by minute hand in 60 minutes period.



To find how many minute spaces it has actually gained, let us assume a standard point where the both minute hand and hour hand coincides. After 60 minutes, minute hand moves 60 minute spaces and hour hand moves 5 minute spaces. Now there are 55 minute spaces between minute hand and hour hand. So we can say in 60 minutes of time, minute hand leads/gains hours hand by 55 minute spaces.

Angle traversed by the hands of the clock:

Hand of clock	Second (S)	Minute (M)	Hour (H)
1 sec	6^o	$\left(\frac{1}{10}\right)^o$	$\left(\frac{1}{120}\right)^o$
1 min = 60 sec	360^o	6^o	$\left(\frac{1}{2}\right)^o$
1 h = 60m = 3600s	21600^o	360^o	30^o
12 h	259200^o	4320^o	360^o

Angle of hands with respect to 12 - marking on clock when hour, minute and seconds are given,

$$\theta_H = \left[30\text{H} + \frac{M}{2} + \frac{\text{S}}{120}\right]^o$$

$$\theta_M = \left[6\text{M} + \frac{\text{S}}{10}\right]^o$$

$$\theta_S = 6\text{S}^o$$

Example: At what time between 2 O'clock and 3 O'clock the hands of the clock be together.

Explanation: At 2 O'clock the minute hand is at 12 and hour hand is at 2. They are 10 minute spaces apart. To be together, minute hand must gain 10 minute spaces over hour hand. 55 minutes are gained in 60 minutes.

10 minutes are gained in x minutes.

i.e. $x = \frac{10\times 60}{55} = 10\frac{10}{11}$ minutes after 2 O'clock the two hands of a clock will be together.

Alternate Method:

Hands of the clock are together. It means the angle between minute hand and hour hand is zero. Since, seconds hand is not given we take $S = 0$.

$$\theta = |\theta_M - \theta_H| = \left|6M - \left(30H + \frac{M}{2}\right)\right| = \frac{11}{2}M - 30H$$

$$\Rightarrow \frac{11}{2}M - (30\times 2) = 0$$

$$\Rightarrow \frac{11}{2}M = 60 \; M = \frac{120}{11} = 10\frac{10}{11}$$

Example: What is the angular difference between the Hours hand and Seconds hand at 4:25:40.

Explanation:

$$\theta = |\theta_S - \theta_H| = \left|6\text{S} - \left(30\text{H} + \frac{M}{2} + \frac{S}{120}\right)\right|$$

$$= \left|\frac{119\text{S}}{120} - 30\text{H} - \frac{M}{2}\right|$$

$$= \left|\frac{119\times 40}{120} - 30\times 4 - \frac{30}{2}\right|$$

$$= \left(120 + 15 - \frac{119}{3}\right)^o = \left(\frac{286}{3}\right)^o$$

Example: What is the angular difference between the Minute hand and Seconds hand at 4:25:40.

Explanation:

$$\theta = |\theta_S - \theta_M| = \left|6S - \left(6M + \frac{S}{10}\right)\right|$$

$$= \left|\frac{9S}{10} - 6M\right| = \left|\frac{9\times 40}{10} - 6\times 25\right|$$

$$= (150 - 36)^o = 114^o$$

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DIRECTION SENSE TEST

CONCEPTS

Direction sense test question will be asked to check the candidates ability in deciding the shortest way within time. In this type of questions, we will see persons or things moving in East, West, North and South directions from an initial point.

There are 4 directions viz., East, West, North, South.

And 4 cardinal directions viz., North–East, North–West, South–East, South–West.

There are 4 types of problems which are frequently been asked in Campus Recruitment Tests.

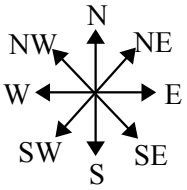
1) Problems on Distances

2) Problems on clocks

3) Problems on Angles

4) Problems on Shadows

The diagram below illustrates the relevant positions of all the 8 directions.



Problems on directions can be solved in 2 ways.

(1) Diagrammatic way **(2)** Shortcut way

While solving the problems on directions, it is very important for you to remember the left and right directions of each direction. *i.e.* Left of the East is North. Right of East is South and so on.

Type-(1): Problems on Distances:

Steps for shortcut method:

1) If the directions are same, then add the distances.

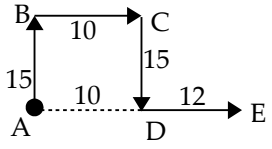
2) If directions are opposite, then subtract the distances and write the direction which has maximum value.

3) If directions are *North–East, North–West, South–East* or *South–West* then take both directions as single direction and calculate the distance using the formula.

$\sqrt{(First\ Distance)^2 + (Second\ Distance)^2}$

Example: A man walk 15 Km towards North. From there he walks 10 Km towards East. Then 15 Km towards South. Finally he walks towards East 12 K*m*. How far and in which direction is he with reference to his starting point?

Explanation: Diagrammatic Method



The shortest distance is AD + DE = 10 + 12 = 22 km and the direction is East.

Shortcut Method:

First he walked 15 Km *North*, so write N(15).

Next he walked 10 Km *East*, so write E(10) *i.e* N(15)E(10) and continue till the last statement.

Then we get, N(15) E(10) S(15) E(12)

Now apply the tips discussed above.

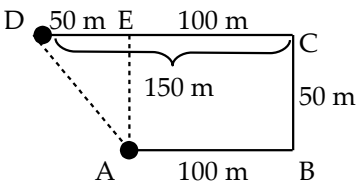
i.e. add E(10) and E(12) = E(22) ($\because$ same directions)

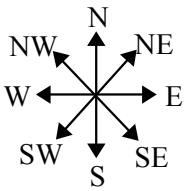
and subtract N(15) and S(15) = 0 ($\because$ opposite directions)

$\therefore$ Finally he is in *East* direction with distance 22 Km.

Example: A Boy started to school from his home. He walks 100 m in East. Then he walks 50 m to his left. From there he walks 150 m to his left again, finally he reached his school. How far and in which direction his school is located from his home?

Explanation: Diagrammatic Method:





From Δ ADE the shortest distance is AD.

BC || EA. So, BC = EA = 50.

$AD = \sqrt{(AE)^2 + (DE)^2} = \sqrt{(50)^2 + (50)^2}$

$AD = \sqrt{2500 + 2500} = \sqrt{5000} = 10\sqrt{50}$

The school is in *North West* direction and at a distance of $10\sqrt{50}\ meters$ from his home.

Shortcut Method:

Write from starting point to destination.

i.e. E(100) N(50) W(150)

East and *West* are opposite directions to each other, so subtract them and write the direction which has highest value. *i.e.* W(50).

$N(50)\ W(50) = NW\left[\sqrt{(50)^2 + (50)^2}\right]$

$= NW\left[\sqrt{2500 + 2500}\right] = NW\left[\sqrt{5000}\right] = NW\left[10\sqrt{50}\right]$

Required direction= *North–West*; Distance = $10\sqrt{50}\,m$

Type-(2): Problems on Clocks:

Steps to Solve:

1) Representing the given time in a clock diagram. Rotate the directions diagram according to the given clock timings. (Rotation of the direction arrows either clock wise or and clockwise but maximum 180^0 only).

2) If two timings are given in the problem, then apply the same rotated directions to second timing also.

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DATA SUFFICIENCY

CONCEPTS

Purpose of Data sufficiency:

Here the examiners intention is to check the student's capability in decision making. One can agree that the decision making is the sense of checking whether the data is sufficient or not.

Nature of Questions: You will be given a question followed with the two statements.

You don't need to solve the question. You just have to judge whether given two statements have enough information to solve the question.

CONCEPTUAL EXAMPLES

Each of the questions below consist of a question and two statements numbered I and II. You have to decide whether the data provided in the statements are sufficient to answer the given question. Read both the statements and give answer as

a: If the data in statement-I alone is sufficient and the data in statement-II alone is not sufficient to answer the question.

b: If the data in statement-II alone is sufficient and the data in statement-I alone is not sufficient to answer the question.

c: If the data either in statement-I or in statement-II alone are sufficient to answer the question.

d: If the data either in statement-I and II together are not sufficient to answer the questions. And some more data needed.

e: If the data in both statement-I and II together are necessary to answer the question.

1) What is the average of p, q and r?

I. r is 25. **II.** $p + q$ is 20.

Explanation: To find the average, we need values of p, q, r. From the given two statements values of p, q, r are known. Hence, we require both the statement-I and II to answer the given question. Hence,option-*e* is correct.

Ask doubt with Question Id: 5503

2) Who is youngest among Raju, Vamsi and Rajni?

I. Raju is one year elder to Vamsi.

II. Vamsi age is average age of Raju and Rajni.

Explanation: From statement-II, Vamsi's age is between the ages of Raju and Rajni.

From statement-I, Raju is one year elder to Vamsi. It means Rajni will be one year younger to Vamsi.

$\therefore$ From both the statements, we can say, Rajni is youngest among the three. Hence, option-*e* is correct.

Ask doubt with Question Id: 5504

3) What is the value of x?

I. $x^2+2x-3=0$ **II.** $x^2+4x-5=0$

Explanation: From statement-I, $x^2 + 2x - 3 = 0$

$x^2 + 3x - x - 3 = 0 \Rightarrow x(x + 3) - 1(x + 3) = 0 \Rightarrow x = 1$ or -3

$\therefore$ From statement-I alone we can't say exact value of x.

From statement-II, $x^2 + 4x - 5 = 0 \Rightarrow x^2 + 5x - x - 5 = 0$

$x(x + 5) - 1(x + 5)=0$ *i.e.* $x = 1$ or -5.

$\therefore$ From statement-I and II, we conclude, $x = 1$.

As both the statements together are required to answer the given question, option-e is correct.

Ask doubt with Question Id: 5505

4) Find the area of the square?

I. The side of the square is 7 cm

II. The circumference of the square is 28 cm

Explanation: *Area* = $(side)^2$

From statement-I, we know the value of *side.* Therefore *area* can be found.

From statement-II, circumference *i.e.* 4(*side*)=28.

From this we can find the value of *side.* As a result *area* can also be found.

Here, either of the statements-I or II alone are sufficient to answer the given question. Hence,option-c is correct.

Ask doubt with Question Id: 5506

5) What is the cost price of the chair?

I. The selling price of the chair is ₹324 at profit of 8%.

II. The profit is 12%.

Explanation:

From statement-I, $CP = \frac{100}{100+8} \times 324 = ₹300$

$\therefore$ Statement-I alone is sufficient to answer.

Statement-II does not have the enough information to solve the given question. Hence, option-a is correct.

Ask doubt with Question Id: 5507

6) Who is tallest?

I. C is eldest.

II. A is shortest and B is youngest but taller than C.

Explanation: Statement-I alone is not sufficient to answer. From statement-II, A is shortest. And B is taller than C. It means B is taller than A and C. *i.e.* only statement -II is sufficient to answer the question.

Hence, option-b is correct.

Ask doubt with Question Id: 5508

7) Is $r > s$? **I.** $r > t$ **II.** $at > ar$, $a < 0$.

Explanation: Statement-I and II gave information about t and r. But not s. So, it is not possible to say whether $r > s$ or not because of insufficient information from both the statements. Hence, option-*d* is correct.

Ask doubt with Question Id: 5509

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SYLLOGISMS

CONCEPTS

Questions on syllogism contains statements followed by conclusions. You have to analyze the given statements carefully and find which of the conclusions logically follow. Each statement of syllogism contains of three parts. They are, *subject*, *predicate* and *copula.*

Subject is that about which something is said.

Predicate is that part of the statement that which affirms is denied about the subject.

Copula is the word of the statement which denotes the relation between the subject and predicate.

Example: Consider the statement, *'woman is talented'*.

Here an information about *woman* is given. So, *woman* is the subject. *'talented'* is the quality affirmed for this subject. So it is the predicate. *'is'* denotes the relation between subject and predicate. So, it is *copula.*

Here we will discuss three types of methods to solve the questions on syllogism.

1) Diagrammatic method

2) Rules and Application method

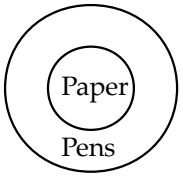
3) Numbering and Apply method

<u>1) Diagrammatic Method</u>:

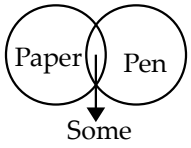
To solve the syllogism questions in this method, you have to represent the given statements in the form of a diagram. In syllogisms, frequently we come across the terms like *all*, *some* and *no, not* etc.

Example: 1) *All papers are pens.*

If the above statement are represented in a diagram, *papers* will be in inner circle and *pens* will be in outer circle. *i.e.*

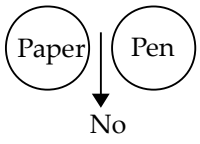


2) *Some papers are pens*.



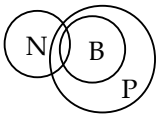
3) *No paper is pen.*

'no' indicates there is no relations exists between subject and predicate of the given statement. Hence, the two circles will not meet each other.



Example: Statements: Some Note books are books
All books are papers
Conclusions: I. Some Notebooks are papers
II. No papers is notebook

Explanation: The possible Venn diagram for the statements is given:



From the given statements, statement-I follows from the above diagram but statement-II does not follow.

Ask doubt with Question Id: 8078

<u>2) Rules and Application Method:</u>

The following rules are useful in solving problems.

all	+	*all*	→	*all*
all	+	*no*	→	*no*
some	+	*all*	→	*some*
all	+	*some*	→	no conclusion
no	+	*no*	→	no conclusion
some	+	*some*	→	no conclusion
some	+	*no*	→	*some-not*
no	+	*all*	→	reverse of *some-not*
no	+	*some*	→	reverse of *some-not*

some-not/reverse of *some not*+ anything = no conclusion.

Implication Statements:

1) All → Some

If *'all A`s are B`s'* then *'some A`s are B`s'* is also true.

2) Some ↔ Some

If *'some cats are rats'* then *'some rats are cats'* is also true.

3) No ↔ No

If *'no car is bus'* then *'no bus is car'* is also true.

Note: For ***either-or*** option: If one conclusion is positive (*i.e.* starts with *all/ some*) and the other conclusion is negative (*i.e.* starts with *no*) and if they both have same objects as that of the given statements then the answer will be those two conclusions with *either-or* words.

Example: 1) Statements: Some keys are locks
All locks are doors
Conclusions: I. All keys are doors
II. Some keys are doors
III. Some keys are not doors

a) only conclusion-(I) follows
b) only conclusion-(II) follows
c) only conclusion-(III) follows
d) both conclusion-(I) and (III) follows
e) None of the given conclusions follow

Explanation:

Step-1: Compare special words in both the statements. *i.e. some + all.* Then, from the rule, *some + all → some.*

Step-2: Compare *predicate* of the first statement and *subject* of the second statement. If both are same then cancel them and deduce a new conclusion.

'some keys are doors' is there in conclusion-(II). So, only conclusion-(II) follows. Hence, option-b is correct.

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STATEMENTS AND ARGUMENTS

CONCEPTS

In this type of questions, the statement deals with all general aspects of day to day life which may include socio economic, scientific, political issues etc. A statement is followed by two arguments. One supports the statement by pointing out the positive aspects and the other deny the statement by pointing out it's negative impact. You have to analyze given statement, arguments and decide which of the arguments strongly supports the statement by giving an appropriate opinion on the subject. Read the given arguments in the question and discard them if they are *ambiguous*, *disproportionate*, *irrelevant*, *comparative*, *simplistic.*

1) Ambiguous: If the given arguments does not have a clear reason or if it is not contextual or not expressing its opinion whether supporting or not. Such an argument should be discarded.

2) Disproportionate: If the given arguments are too large or too small in comparison with given statements. This kind of arguments can be discarded.

3) Irrelevant: If the given arguments are irrelevant to the context of the given statements, they can be discarded.

4) Comparative: If the argument do not state the reasons for why the proposed action is implemented and its consequences. Such arguments can be discarded.

5) Simplistic: If the given arguments do not have sufficient information to support the given statements, they cannot be considered.

CONCEPTUAL EXAMPLES

Direction: Each of the following examples consists of a statement followed by two arguments (I) and (II). Give your answer as,

a: if only argument-(I) is strong.

b: if only argument-(II) is strong.

c: if either argument-(I) or (II) is strong.

d: if neither of the arguments is strong.

e: if both the arguments are strong.

1) Statement: Should number of holidays be increased to private employees?

Arguments:

I. Yes, because employee satisfaction will be better.

II. No, it will lead to decreased productivity of private organizations.

Explanation: Though employee satisfaction is important but this will adversely affect the productivity and revenue of the organization. So the argument-(I) does not hold strong. Hence, only argument-(II) is strong.

Ask doubt with Question Id: 8322

2) Statement: Should taxes on air conditioners be further increased?

Arguments:

I. Yes, air conditioner is a luxury item and rich people can only buy them.

II. No, air conditioners are bought by financially backward sector also.

Explanation: Generally, taxes on any commodities or goods doesn't depend on the financial position of the individuals so, both the arguments does not hold strong. Hence, option-d is correct choice.

Ask doubt with Question Id: 8323

3) Statement: Should Indian software professionals who are working abroad be called back?

Arguments:

I. Yes, they must serve the mother land first and forget about high pay scales or facilities etc.

II. No, we have adequate talent here, let them stay according to their will and wish.

Explanation: The demands of an individual are as important as the demands of motherland. So, argument-(I) is not strong. Argument-(II) is weak because of its complacent attitude. Hence, option-d is correct choice.

Ask doubt with Question Id: 8324

4) Statement: Should education to women be made free in India?

Arguments:

I. No, this will weaken our present social structure.

II. Yes, this is the only way to bring back glory to Indian woman hood.

Explanation: Argument-(I) is strong. It is links, providing free education to women with weakening of social structure, which is not sensible. Argument-(II) also weak because of the term *'only'*.

Hence, option-d is correct choice.

Ask doubt with Question Id: 8325

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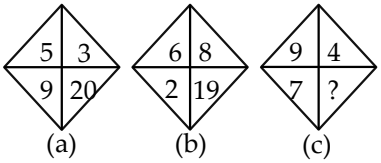
CHARACTER PUZZLE

CONCEPTS

In this type of questions, a figure or a matrix is given in which some numbers are filled according to a rule. A place is left blank. You have to analyze the given character or number and find out the missing number or letter from the given possible answers which may be filled in the blank space.

CONCEPTUAL EXAMPLES

1) Which number will replace the question mark?



a) 23 b) 18 c) 22 d) 21 e) None of these

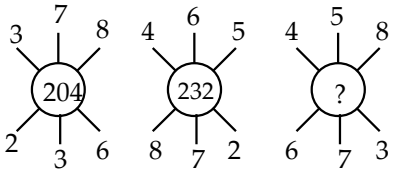
Explanation: From figure (a),9 + 5 + 3 = 17⇒ 17 + 3 = 20

From figure (b), 2 + 6 + 8 = 16 ⇒ 16 + 3 = 9

From figure (c), 7 + 9 + 4 = 20 ⇒ 20 + 3 = 23

Ask doubt with Question Id: 8206

2) Which number will replace the question mark ?



a) 236 b) 336 c) 286 d) 386 e) 436

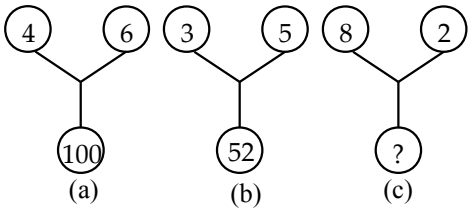
Explanation: [3×7×8] + [2×3×6] = 204

[4×6×5] + [8×7×2] = 232

Similarly, [4×5×8] + [6×7×3] = 286

Ask doubt with Question Id: 8207

3) which number will replace the question mark?



a) 81 b) 84 c) 516 d) 514 e) 86

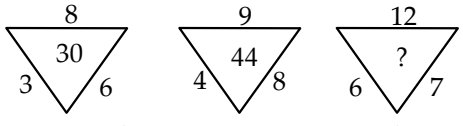
Explanation: From (a), $4^3 + 6^2 = 64 + 36 = 100$

From (b), $3^3 + 5^2 = 27 + 25 = 52$

So, From (c), $8^3 + 2^2 = 512 + 4 = 516$

Ask doubt with Question Id: 8208

4) Which number will replace the question mark?



a) 79 b) 89 c) 99 d) 69 e) 109

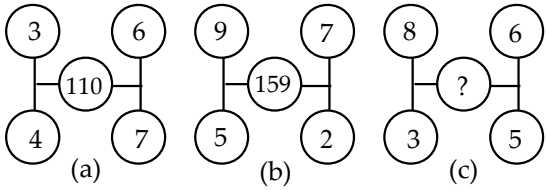
Explanation: From (a), 8 × 3 + 6 = 30

From (b), 9 × 4 + 8 = 44

So, from (c), 12× 6 +7 = 79

Ask doubt with Question Id: 8209

5) What number will replace the question mark ?



a) 229 b) 134 c) 329 d) 439 e) 339

Explanation: From (a), $3^2 + 6^2 + 4^2 + 7^2 = 110$

From (b), $9^2 + 7^2 + 5^2 + 2^2 = 159$

So, from (c), $8^2 + 6^2 + 3^2 + 5^2 = 134$

Ask doubt with Question Id: 8210

6) Which number will replace the question mark?

12	19	16
4	3	?
6	3	8
8	19	4

a) 8 b) 16 c) 4 d) 2 e) None of these

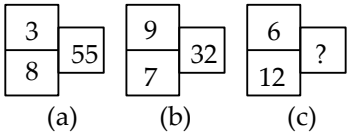
Explanation: From Column-I: (12 × 4) ÷ 6 = 8

From column-II: (19 × 3) ÷ 3 =19

So, from column-III: (16 × ?) ÷ 8 = 4 ⇒ 16×? = 32 ⇒ ? = 2.

Ask doubt with Question Id: 8211

7) Which number will replace the question mark?



a) 108 b) 46 c) 64 d) 104 e) can't be determined

Explanation: From (a), $8^2 - 3^2 = 55$

From (b), $9^2 - 7^2 = 32$

So, from (c), $12^2 - 6^2 = 108$

Ask doubt with Question Id: 8212

8) Which character will replace the question mark?

A_5	F_{10}	K_{15}
B_{16}	G_{21}	L_{26}
C_{27}	H_{32}	?

a) M_{37} b) N_{36} c) O_{37} d) M_{36} e) M_{38}

Explanation:

From column-I, A→B→C (5+11+11)

From column-II, F→G→H (10+11+11)

From column-III, K→L→M (15+11+11)

The character M_{37} will replace the question mark

Ask doubt with Question Id: 8213

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NON-VERBAL REASONING

CONCEPTS

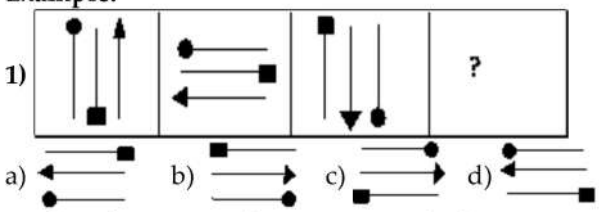
In this type of questions you will be given set of figures and asked you to identify next figure or odd figure. This chapter can be further classified into the following sections.

1. Analogy
2. Classification
3. Series
4. Addition
5. Subtraction
6. Addition and subtraction
7. Rotation-clockwise
8. Rotation-anti clockwise
9. Horizontal
10. Vertical
11. Alternative–rotation
12. Combination (clock wise rotation with addition/ subtraction)

• **Analogy:** Analogy question contains three figures and it asks to find out the fourth figure. we have to identify the relation between first two figures then apply the same relation to third figure for finding the fourth figure.

Example:

1)

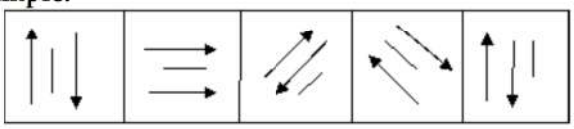


Explanation: From figure-1 to 2, the lines are rotated 90^{o} clockwise and the circle, triangle, square are moved to its opposite side. The same rule is applied to figure-3 to obtain figure-4. The answer is option-b.

Ask doubt with Question Id: 5828

• **Classification:** In classification question you will be given five figures from which you have to identify the odd one. *i.e.* four figures out of the five are connected to each other where as one figure is no way connected. That figure is the answer for given question.

Example.



Explanation: In all above figures, each figure contain two arrows (↑) and one small line, those two arrows are in opposite direction to each other except figure-2.

• **Series:** In this type of question you will be given three or four figures which are in series. *i.e.* all the given figures are related to each other in certain pattern. You'll be asked to find out the next figure in the series. To find out the next figure you have to identify the hidden logic of the series. After tracing the logic you have to apply it to the last figure to find the asked figure. The logic in series figures can be classified into following.

Addition: In this type of series an addition of component is happening to the figures incrementally.

Subtraction: In this type of series subtraction of components is happening to the figure decrementally.

Addition and Subtraction: In this type of series, alternative addition and subtraction happens to the figure.

Rotation–Clockwise: In this type of series, figures are rotating in clockwise direction.

Rotation–Anti clockwise: In this series, figures are rotating anti clockwise.

Horizontal: In this type of series, figures move in horizontal direction.

Vertical: In this type of series, figures move in vertical direction.

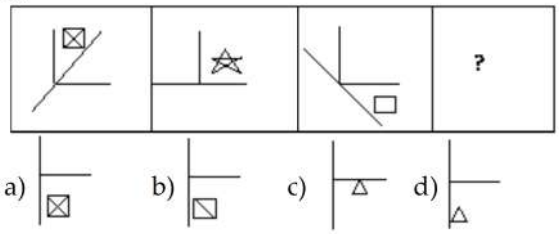
Alternative–Rotation: In this type of series, figures move in horizontal and vertical direction alternatively.

Combination: In this type of series all the above mentioned actions can happen.

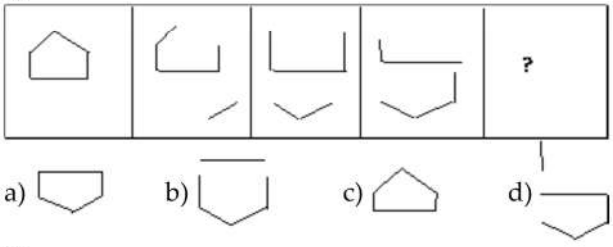
EXERCISE-I

Select a figure from the given options which will continue the same series as established by the four figures in the question.

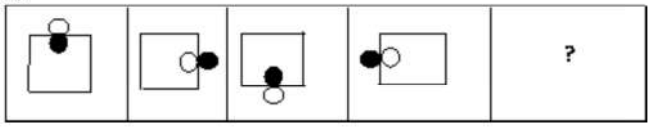
1)



2)



3)



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PARTS OF SPEECH

Parts of speech in a language mean the role or part played by a word in a sentence. This is similar to the roles we play in our lives. In one place you might be a student, in another a friend, yet in another, if you are working, you might be a boss or a subordinate. We also play different roles at home when we interact with different people. In all the roles we play, our role and interaction depends upon the relationship with the people with whom we are interacting. Similarly, words are categorized according to the role or part they play in a sentence. Seeing a word, we cannot categorize it as a noun/ pronoun/ verb/ adjective etc. In order to categorize a word, we need to know what role it plays in the sentence. Words are normally categorized into 8 parts of speech. Here we give you the categories with some examples:

Part of Speech	Function	Example Words	Example Sentences
NOUN	Name of a person, place, thing or quality	Girl, Manchester, Gandhiji, peace, honesty	• *Gandhiji* loved peace.
PRONOUN	Words used instead of a noun	He, she, our, theirs, my ...	• *She* is *our* teacher.
ADJECTIVE	Words used to describe nouns.	Beautiful, big, tall, awesome …	• The girl is *tall*. • Gandhi was a *great* leader.
VERB	Words which tell the state of a thing, possession and action.	Be verbs, have verbs and do verbs, am, Is, are, was, were, have, has, had Do, does, did work, talk, walk …	• She *is* my friend. • He *paints* well. • She *works* meticulously.
ADVERB	Words which tell us where, when and how an action takes place, as well as to what degree an action takes place…..	fast, very, sincerely, properly, quite …..	• She works *fast.* • This train is *quite fast*.
PREPOSITION	Words which tell us the position or relationship between two nouns in a sentence.	In, on, between, under, for, near, by, with …	• There's a park *near* my house. • Your pen has fallen *under* the chair.
CONJUNCTION	Words which join other words or sentences to make language more concise	And, but, or, neither…nor, either…or, so when, while, who whom…….	• Bread *and* butter is taken by many for breakfast. • He started early *but* could not reach on time.
INTERJECTION	Words used to express sudden feelings and expressions.	Wow! Great! Spectacular! Awesome!	• *Wow!* What a great shot! • What a *spectacular* performance!

Let's see these parts of speech in detail:

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SUBJECT - VERB AGREEMENT

1. All subjects must agree in number and person with the verb.
e.g.: The *students* of the primary section *are* going on a picnic.
The *quality* of these mangoes *is* very good.
2. Two or more singular subjects connected by *'and'* usually take a verb in the plural.
e.g.: Sheela and Ragini *are* here.
Wealth and generosity *don't* go together.
3. If two singular nouns refer to the same person or thing the verb must be singular.
e.g.: My best friend and confidant *has* come.
(a *confidant* is a friend in whom you can confide your secrets)
The Chairman and Managing Director ***is*** going to address the employees.
4. If two subjects together express one idea, the verb is singular:
e.g.: Slow and steady *wins* the race.
Bread and butter *is* his only food.
5. Words joined to a singular subject by '*with*, *together with*, *in addition to*, or *as well as* are parenthetical and so the verb should be in singular.
e.g.: The house with its contents *was* insured.
The price of silver as well as gold *has* fallen.
6. Two nouns qualified by *'each'* or *'every'* even though connected by *'and'* require a singular verb.
e.g.: Each senior member *was* honored.
Every man and woman *was* present at the festival.
7. Two or more singular subjects connected by *'or, neither….. nor, either…..or'* take a verb in the singular.
e.g.: Neither he nor I *was* there.
Either he or I *am* mistaken.
8. When the subjects joined by *'or, nor'* are of different numbers, the verb must be plural and the plural subject must be placed before the verb.
e.g.: Rana or his *brothers have* done this.
Neither the Principal nor the *teachers were* present.
9. When the subjects joined by *'or, nor'* are of different persons, the verb agrees in person with the one nearest to it.
e.g.: Either he or I *am* mistaken.
Neither you nor he *is* to blame.
10. A singular verb should be used with a collective noun, when the collection is thought of as one whole.
A plural verb should be used with a collective noun when it refers to the individuals who comprise it.
e.g.: The crew *was* large.
The crew *were* taken prisoners.
The council *has* chosen its president.
The council *are* divided on the issue of making Aadhar card mandatory.
11. Some nouns which are plural in form, but singular in meaning, take a singular verb.
e.g.: The news *is* true.
Civics *is* important for people who wish to enter the civil services**.**
12. When the plural noun is a proper name for some single object or some collective unit, the verb should be singular.
e.g.: The United States *has* a big army.
Gulliver's travels *was* written by Swift.
13. When a plural noun denotes some specific quantity or amount considered as a whole, the verb is generally singular.
e.g.: Ten miles *is* not a short distance.
Fifty thousand rupees *is* a large sum.
14. A common blunder is to leave the Participle without proper subject.
e.g.: Sitting on a gate, a scorpion stung him. (*wrong*) (who was sitting on the gate)
While he was sitting on the gate a scorpion stung him. (*correct*)
Being a hot day, I stayed at home. (*wrong*)
(who or what is the hot day)
It being a hot day, I stayed at home. (*correct*)

Correction of Sentences

1. She is going to temple everyday.
(simple present; so *goes*)
2. These school children needs books and pencils. *(need*)
3. When he is playing cricket, he fell down.(*was playing*)
4. She has completed her graduation last year.
(remove *'has'*)
5. They are living here since 2010. (*have been living*)
6. When the ambulance came the patient died.(*had died*)
7. They are having the same car for 10 years. (*have had*)
8. She will leave for Mumbai tomorrow. (*is leaving*)
9. We have gone to Chennai last week. *(have been to*)
10. She is hearing to carnatic music. (*listening*)
11. She never visited Charminar before.
(*had never visited*)
12. Your parcel didn't come yet. (*hasn't*)
13) He sleeping while his wife cleaning the house.
(*was sleeping …… was cleaning*)
14. I am liking mangoes. (*like*)
15. He is always forgetting my phone number. (*forgets*)

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CONJUNCTION

• A conjunction is a word which merely joins together words or sentences, they do no other work.
e.g.: She *and* her friends are visiting us.
He came early *but* couldn't complete the work.
• Some conjunctions are single and some conjunctions are used in pairs. Some of these are:
either – or, neither – nor, not only – but also, though – yet, whether – or etc. these conjunctions which are used in pairs are called Correlative Conjunctions or just Correlatives.
• Some compound expressions are also used as conjunctions and these are called compound conjunctions. Some of these are:
even if, as though, as well as, as if, as soon as, so that, in order that etc.
Conjunctions are divided into two classes:
Coordinating and Subordinating.
• **Coordinating Conjunctions** bring together two independent statements or two statements of equal rank or importance. The main coordinating conjunctions are:
and, but, or, nor, also, either-or, neither-nor.
e.g.: He is slow *but* steady.
The thieves broke the door *and* entered the house.
You must return the book tomorrow *or* pay the fine.
• **Subordinating conjunctions** bring together two statements or clauses, one of which is dependent on the other. The chief subordinating conjunctions are:
after, because, if, that, though, although, till, before, unless, as, when, where, while.
e.g.: You will pass *if* you work hard.
He didn't speak up because he was afraid.
Though he was ill, he attended the meeting.
He came *after* I had left.
Subordinating conjunctions may be classified according to meaning or function:
1. Time:
e.g.: I knew him *before* he came here.
I waited *till* the train arrived.
2. Cause or reason:
e.g.: *Since* you say so I must believe it.
He did not come *because* you did not call him.
3. Purpose:
e.g.: We eat *that* we may live.
He deserved the prize *for* he had worked hard.
4. Result or consequence:
e.g.: He was rude *so* he was punished.
5. Condition:
e.g.: *Unless* you bring your Passport, the tickets cannot be booked.
If you had asked me earlier, I could have helped you.
6. Comparison:
e.g.: She is *as* tall as her sister.
He is richer *than* I am.
7. Concession: For example,
Although he worked hard, he could not get a state rank.
Though he is strong, he is unable to do this work.

Troublesome Rules and Confusing Areas

1. The most common mistake is the placement of the conjunction. The conjunction should be placed just before the clause it introduces.
e.g.: It is raining because he has not come. (*incorrect*)
He has not come because it is raining. (*correct*)
2. *'Scarcely'* is followed by *'when'*.
e.g.: *Scarcely* had we entered the house *when* it started raining.
3. *'No sooner'* is followed by *'than'*.
e.g.: No sooner had she got her results than she got a job.
4. '*Neither'* is followed by *'nor'*.
e.g.: He is neither intelligent nor hardworking.
5. While using *'not only . . . but also'*, the verb must agree with the noun or pronoun mentioned second.
e.g.: Not only the students but the teacher were also injured. (*incorrect*)
Not only the students but the teacher was also injured. (*correct*)

Correction of Errors

1. He is sincere and also hardworking.
(*not only - but also*)
2. She asked me whether I had a pen or not.
(*'or not'* can be omitted)
3. He did not come or sent a message. (*neither …… nor*)
4. He not only broke the glass, but threw it away.
(*not only…. but also*)
5. Both he and I contributed to the fund. (no error)
6. No sooner had the bell rung then the students ran out. (replace *'then'* with *'than'*)
7. She is taller as her sister. (*as tall as*)
8. He worked hard and could not get a state rank. (you can use *'but'* instead of *'and'*, or start the sentence with *'Although'*)
9. There is a bus strike because she is not coming.
(*she is not coming because there is a bus strike*)
10. He will return the money on the 1st or 2nd.
(*He will return the money either on* 1st *or* 2nd)

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ANTONYMS

Antonyms are words that have the opposite meaning of a given word. In this section, you are given a word and asked to choose a word, or phrase, which is most opposite in meaning to that word. When you are doing the antonym portion of the Campus recruitment tests, keep in mind the prefixes, suffixes, and roots that you learned while developing your vocabulary. While testing your ability on questions pertaining to Antonyms, the first thing to be observed is your ability to grasp the meaning of the given word and to distinguish between the fine shades of meaning. Unless you know the meaning of the given words, you will not be able to find out or choose the exact antonym from the options given. Mostly antonyms appear in the form of nouns, verbs and adjectives.

Strategies to Solve Questions Based on Antonyms:

1. Check whether the question word and the opposite of the word given under the options are in the same parts of speech.

2. You should have an idea of the roots of the words and know their meanings. For example, in the word *benefactor*, if you know the meaning of *bene* you will be able to guess the meaning of the word, and opt for the best antonym.

3. Look for the best answer and not for the ideal. Eliminate two or three of the options if they are nowhere related to the given word.

4. Do not go for an antonym which is too limited or too broad to be an opposite.

5. When you get confused about the antonym to be chosen, try to think of how you have heard the word used before. You may discover a suitable context to guess the exact antonym.

1. DILAPIDATED

a) ruined b) condemned c) renovated
d) destroyed e) shabby

Explanation: *Dilapidated* means 'falling apart';
Therefore options-*a* and *d* can be eliminated as they show intentional actions. The only word which means making good to look as new is *'Renovated'*. It standout as the best antonym. Option-b means 'to disapprove' so that is also not suitable.

2. MELODIOUS

a) mellifluous b) unpleasant c) spiritual
d) comfort e) indefinite

Explanation: In this example, the word *'Melodious'* means 'Mellifluous', means pleasant in sound. The options-*c*, *d* and *e* are irrelevant in this context. The only antonym is option-*b*–Unpleasant.

3. PROFUSION

a) deficiency b) certainty c) proliferation
d) largeness e) maximum

Explanation:*'Profusion'* means excess, surplus, fullness. So, options-*c*, *d* and *e* can be eliminated. Certainty, generally means confidence. *Deficiency* means lack or shortage. Hence, option-*a* is correct choice.

CONCEPTUAL EXAMPLES

1) ABUNDANCE

a) Sufficiency b) Plenty c) Resign
d) Decrease e) Dearth

Explanation: *Abundance* means plentiful or in great quantity. Option-*a* and *b* synonymous to *abundance*. Option-*c, d* are irrelevant in the present context. *Dearth,* which means scarcity or lack of something, is the antonym of the given word. Hence, option-*e* is correct.

Ask doubt with Question Id: 5619

2) ABDUCT

a) Release b) Abbreviate c) Degrade
d) Give Up e) Kidnap

Explanation: The prefix *'ab'* generally denotes 'away from' or 'off'. For example *absent*, *abnormal*, *aversion* etc. The suffix *'duct'* generally means 'to lead'. For example *conduct*, *induct* etc. *Abduct* means 'to carry off by force' or 'lead away by force' or 'kidnap'. Opposite of *abduct* is to release, to let go, to give etc. Option-*d* is not an appropriate antonym of *abduct*. Hence, option-*a* is the best choice.

Ask doubt with Question Id: 5620

3) ABANDON

a) Continue b) Steal c) Restoration
d) Desert e) Abnormal

Explanation: The root word *'don'* gives meaning as 'to give' or 'to gift'. For example *pardon*, *donation* etc. *Abandon* means 'to leave completely', 'to give up the control of', 'discontinue' or 'withdraw from'. Opposite is to continue or take control of. Hence, option-*a* is the correct choice.

Ask doubt with Question Id: 5621

4) BOLD

a) Bald b) Hairless c) Brave d)Timid e) Thick

Explanation: *Bold* means confident and courageous. Option-*a, b* and *e* are completely irrelevant. Option-*c* is synonym of *bold. Timid* means lack of courage or confidence. Hence, it is the correct choice.

Ask doubt with Question Id: 5623

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SYNONYMS

A synonym is a word or expression accepted as a figurative or a symbolic substitute for another word or expression. It has the same or almost the same meaning as that of another word in the same language.

English being the language with the largest number of words, it has many synonyms. A strong grasp of words, their **synonyms** (meanings) and **antonyms** (opposites) goes a long way towards enhancing your ability to comprehend and express clearly.

e.g.: The words *see, look, view, watch, glance* etc more or less have the same meaning so they are synonyms. They may however differ slightly in degree of abstraction.

▪ **Type: 1**

1. Agenda

a) Assignment b) Schedule c) Correction d) Annexure

Explanation: *Agenda* means organized plan for matters to be attended to during a meeting. In this context, *schedule* is nearest in meaning though it isn't a clear meaning of agenda. So option-*b* is correct choice.

2. Effort

a) Attempt b) Create c) Wonder d) Overtake

Explanation: *Effort* is an action intended to do or accomplish something. So option-a is correct.

▪ **Type: 2**

Four pairs of words are given below. Each pair consists of two words which have more or less similar meaning. Find the pair which have opposite meanings.

1. a. Induce/ Coax b. Fatal/ Deadly
c. Disparate/ Alike d. Abettor/ Thief

Explanation: Except option-c, all other pair of words have more or less similar meaning. Hence, option-c is correct choice.

2. a. Authentic/ Genuine b. Genius/ Aptitude
c. Ghastly/ Pretty d. Gruesome/ Grim

Explanation: Ghastly means horrifying and pretty means attractive. Hence, option-c is correct choice.

▪ **Type: 3**

Find the appropriate synonym of the word in bold in the below sentence.

1. He changed his statement so many times that entire his message became **ambiguous**.

a) clear b) impressive c) unimpressive d) unclear

The correct answer is (d) unclear.

2. There was crazy **pandemonium** as people were trying to leave the rock concert.

a) Silence b) craziness c) chaos d) order

The correct answer is (c) chaos.

CONCEPTUAL EXAMPLES

In each of the sentences, one word is given in bold and four options are given. Select the word or phrase nearest in meaning to the word given in bold.

1. The engineers subjected the engine to **exhaustive** tests.

a) Complicated b) Thorough
c) Exclusive d) Compulsory

Explanation: *Exhaustive* means thorough, complete or in-depth. Hence, option-*b* is synonym of *exhaustive*.

Ask doubt with Question Id: 8432

2. The inspector was a **vigilant** man.

a) Intelligent b) Ambitious c) Watchful d) Smart

Explanation: The root word *'vigi'* means watchful, wakeful or alert. For example, *vigilant*, *invigilation*, *surveillance*, *reveille* etc. *Vigilant* means careful or watchful. Hence, option-*c* is correct choice.

Ask doubt with Question Id: 8433

3. The Professor is one of the most **erudite** in our college**.**

a) Boring b) Pleasant c) Learned d) Demanding

Explanation: *Erudite* means well educated or cultured. *Learned* is the synonym of *erudite.*

Ask doubt with Question Id: 8434

4. The world leader are trying to prevent the **proliferation** of nuclear weapons.

a) Use b) Increase c) Expansion d) Extension

Explanation: *Proliferation* means rapid increase. Option-b is the best suitable synonym for *proliferation* than option-*c* and *d*.

Ask doubt with Question Id: 8435

5. The tribunal's order may finally nudge the two warring groups to come to an **amicable** solution.

a) Just b) Appropriate c) Durable d) Friendly

Explanation: The prefix *'am'* generally denotes friendly, casual or lovable. For example, amiable, amateur, amicable etc. *Amicable* means friendly, peaceful, polite etc. Hence, option-*d* is correct choice. *Durable* means long-lasting or strong.

Ask doubt with Question Id: 8436

6. The poor old man seems **famished.**

a) Exhausted b) Peevish c) Hungry d) Relaxed

Explanation: *Famished* means being extremely hungry. For example, 'After such a long walk in the mountains, they were tired and famished for food and sleep'.

Ask doubt with Question Id: 8437

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ANALOGY

CONCEPTS

In verbal analogies, the student is given one pair of related words. The student must find a pair words from the given choices that has the same relationship to the word as the first pair. Analogy questions test your ability to recognize relationships between words or ideas and to know when these relationships are parallel.

How to Read Analogies: The symbol (:) means *'is to'* and the symbol (: :) means *'as'*.

Thus, the analogy, *key* : *lock* :: *spoon* : *stir* should be read as *key* ***is to*** *lock* ***as*** *spoon* ***is to*** *stir.*

It means the relationship between *key* and *lock* is the same as the relationship between *spoon* and *stir.*

Tips for doing Analogies:

1. Try to create a logical relationship between the given pair of words.

2. Eliminate the options that do not have a clear relationship to main word.

3. Don't assume any answer until you've read all of the choices.

4. If the meaning of the given pair of words is unknown then try to recollect the context in which you have come across those words.

5. Though you don't know the meanings of given pair of words, you can still have a chance to find the correct answer using parts of speech.

e.g: falling (*v*) : gravitation (*n*) :: collapse (*v*) : pressure (*n*)

Sometimes more than one answer choice will have same parts of speech. You need to be very careful because even though the parts of speech of more than one pair remains same, the words may have different meaning.

6. Eliminate the word pairs that expresses the same relationship as the given question but in the opposite order.

e.g.: eye : see : : hear : ear (*incorrect*)

eye : see : : ear : hear (*correct*)

The analogy is an area where, with practice, you can achieve a very good score. First, you must find the relationship between the original pair of words. To help you, listed below are some common types of analogies.

Some Common Types of Analogies:

1. Part to Whole:

e.g.: *poem* : *stanzas* :: *play* : *acts*

2. Cause and Effect:

e.g.: *joke* : *laughter* :: *tragedy* : *sadness*

3. Sameness or Synonyms

e.g.: *system* : *method* :: *faith* : *trust*

4. Oppositeness or Antonyms

e.g.: *negligence* : *careful* :: *bravery* : *cowardice*

5. Measure

e.g.: *fahrenheit* : *temperature* :: *decibel* : *sound*

6. Variation in Degree:

e.g.: *chukle* : *laugh* :: *whimper* : *cry*

7. Thing and what it lacks:

e.g.: *atheist* : *belief* :: *indigent* : *money*

8. Study of entity

e.g.: *linguistic* : *language* :: *human* : *anthropology -*

9: Function/purpose/use:

e.g.: *knife* : *cut* :: *shovel* : *dig*

10. Person and skill /tools/ work place:

e.g.:*author* : *write* : : *chef* : *cook*

11. Qualities or Characteristics:

e.g.: *president* : *leads* :: *captain* : *directs*

Make a Sentence: Creating a sentence that shows the connection between the two words is absolutely essential.

• The key issue in analogy problems is picking the proper relationship sentence. With analogies, you are looking for similar relationships, not similar meanings. To answer analogy questions, you must first figure out the relationship between the two words in the given question. Then look for the pair of words among the answer choices that has the same relationship.

• You can also create your own analogies using the list of common types given above. Creating your own list has the advantage of forcing you to think analogously.

You should keep in mind that there must be a reasonable and necessary connection between given two words. The connection must be valid, otherwise there would be no point in making the analogy.

For example, what type of reasonable connection could be there between *Bird* : *Algebra* ? (no relation)

On the other hand, there is a reasonable connection between *Fish* : *Salmon* since *salmon* is a type of *fish.*

• All analogies will have connections that are reasonable (logical, valid) and necessary or inevitable. Any choices that fail to meet these criteria should be rejected. Even if you cannot figure out the connection between the original pair of words, you can still improve your chances of picking the correct answer by eliminating any choices that do not confirm to the above rule.

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READING COMPREHENSION

Reading is a skill which has other sub-skills included in it. It is not mere recognition of the words, it also includes being able to understand, comprehend and respond, if questioned about the text. Many languages share the same script: Hindi, Punjabi, Telugu, Kannada. For that matter all European Languages like English, French, Spanish and German have the same script. Being able to read a script does not ensure understanding the script. Another important aspect is familiarity with the content. If you are not in the habit of reading, if you are not aware of what's happening around you, then even the simplest of scripts will seem like Greek and Latin. The most important point is READ, READ and READ.

1. Spend a few minutes a day reading at a faster than comfortable rate (about 2 to 3 times faster than your normal speed). Use your hand or an index card to guide your eyes down the page. Then time yourself reading a few pages at your normal speed.

2. If you have poor concentration when reading, practice reading for only 5 to 10 minutes at a time and gradually increase this time

3. As we read, our eyes move along the line in a series of jerky movements, stopping at each word. Fast readers usually take in 3-4 words in each movement that their eye makes. The more words you can take in with each movement of the eye, the faster your reading will be. Try to avoid focusing on every word, but rather look at groups of 2 to 3 words.

e.g.: The above sentence could be read as:

Try to avoid/ focusing on every word/ but/ rather look at/ groups of 2 to 3 words.

4. Read more! 15 min a day of reading an average size novel equals 18 books a year at an avg reading speed!

5. Being a voracious reader is just not enough. In examinations where reading skills are tested, the ability to read and comprehend fast is needed. Here are some tips to tackle the reading section. In order to improve your reading speed, follow these steps.

One of the most effective ways of reading in order to be able to comprehend quickly is the SQ3R method:

- Scan
- Question
- Read
- Review
- Recite

Scanning provides a rapid overview. Many well written books follow logical outlines that can orient the reader to the subject matter.

Questioning is a natural, instinctive, second step that most winners follow. In the scanning process, certain questions naturally arise. These should be noted in a short list of questions to be answered through reading. The **questioning** procedure helps the reader stay focused.

- First, determine the main idea from the title, the first paragraph, and the last paragraph.
- Second, determine if a large subject is divided into smaller subjects with some outlining scheme.
- Underline key words or take notes to the side what the purpose of the paragraph is. *i.e.* cause, effect, reason, example, definition, instructions, background info, etc. Don't worry if you can't do that for all and don't spend too much time trying to identify each paragraph.
- **Read** for Author's Main Idea and Primary Purpose.
- At the end of reading, ask yourself questions like: What was the passage about? What was author's motive in writing all this?
- Don't over read. Skip examples, dates, lengthy names, any details which can be referred in case something is asked explicitly.
- Don't go for choices which hold true only for one part of the author's argument.
- Finally, **review** as often as necessary to keep focused. Outlining and note-taking often help.
- Once you start to become an effective reader, you will find that you are also becoming a faster reader.

With these tips your reading skills are sure to improve.

- **Recite** the question along with the answer to make sure they fit in

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CLOZE TEST – FILL IN THE BLANKS

A cloze/closet test, consisting of a portion of text with certain words removed, where the student is asked to replace the missing words from among the given choices. The sentence completion section tests your vocabulary skills as well as your reading ability. The question contains a paragraph or a sentence expressing a complete idea that can be understood without any additional information. Each blank need to be filled up appropriately retaining the meaning of the sentence and the syntax.

Strategies to solve questions on *Sentence Completion*.

First, slowly read all the text without filling any of the gaps. Read it until you got a clear understanding of what the text is about.

1) First, complete the gaps you are absolutely sure of.

2) Next try and find out what the missing words in the remaining gaps are. See which ***part of speech*** may fit in each gap (article?, pronoun?, noun?, adverb?, adjective?, preposition?, conjunction?, verb?) and pay special attention to the ***grammar*** around the words in each gap.

3. Read the sentence once again after choosing the words to fill up the blanks.

4. To solve the sentence completion section, you must have a through understanding of the sentence given. This understanding is possible only if you develop your knowledge of the root words, synonyms, antonyms, analogies, idioms, phrases etc.

5. In many cases, several options may fit in but you must select the one that gives the meaning of the sentence most precisely.

6. Understand the message of the sentence by analyzing the principal clause(s) and the sub-ordinate clause(s). Briefly speaking, analyze whether the sentence is a simple sentence or compound sentence or complex sentence.

7. Observe the subject of the sentence, the keywords or the signal words. For example the key words like, '*therefore*', '*so*', '*because*', '*although*', '*in addition to*', '*further more*' etc can help you to make the right option from the options given.

8. Understand the author's tone. It means whether the author is positive or negative in his/her approach to the idea he has presented. Look for negative words like *'no'* or *'not'*. Negative words can change the direction of the sentence.

9. If you don't spot any signal words or keywords and if you don't know the meaning of the option words, read once again and choose the one that sounds the best, eliminating one or two choices.

A Solved example is given below

(A) ____ of his reputation as a comedian, the director of the film ____ Mr.Bean from acting a very serious role of a priest in his new movie.

Options:

1. a) Since b) Due to
c) Because d) As

2. a) Encouraged b) Discouraged
c) Supported d) Boosted

Explanation: Among the given choices, *'because'* is the only word that can go with *'of'*. Similarly, we can understand that it is difficult for a comedian to act as a priest. So it is natural that the director of the movie *'discouraged'* him. Therefore, *'discouraged'* is the most suitable word.

EXERCISE-I

(A) A blog is a web page made up of brief, frequently updated entries that are arranged __(1)__ like a journal. The purpose of blogs __(2)__ greatly from links to news, photos, even fiction. Blog posts are __(3)__ to instant messages to the web. Many blogs are __(4)__ "what's on my mind" type musings others are collaborative efforts based on a __(5)__ topic or area of mutual interest.

1. a) symmetrically b) chronologically
c) interestingly d) passionately

2. a) depend b) shift
c) vary d) change

3. a) familiar b) similar
c) unique d) superior

4. a) personal b) ephemeral
c) temporal d) local

5. a) vague b) specific
c) controversial d) contemporary

(B) My final year at MIT was a year of __(6)__. A new wave of thought __(7)__ through the country in those years. The popular view in those days was that a belief in scientific methods was the only __(8)__ approach to knowledge. If so, I wondered, what about spiritual __(9)__? I had been taught from my early childhood that knowledge could be __(10)__ only through the inner experience.

6. a) achievement b) transition
c) tribulations d) accomplishment

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SENTENCE REARRANGEMENT

CONCEPTS

Sentence Rearrangement as the name itself advocates, consist of sentences not arranged in a logical sequence. A choice of arrangement of the sentences is given from which the candidate has to choose the most logical sequence which would be the most appropriate for conveying the message of the passage.

Type of Questions:

Four Sentences: In this type, paragraph consists of four sentences which are jumbled and the student is supposed to choose the correct sequence.

Five Sentences: This type is quite similar to the "four sentence" except instead of four sentences student has to rearrange five sentences.

Six Sentences: This is a typical one of this chapter where six sentences are given in which first and sixth sentences are fixed. The student has to rearrange the four sentences in between the first and sixth.

Tips to Solve:

• **Read as they are:** It is a kind of reading which gives an overall concept to the reader. In this step student has to tick or write the crucial words to make his remembrance more effective. He has to have an idea of passage by this squashed reading technique.

• **Finding either starting or concluding sentences**

Finding either starting or concluding sentences is also necessary to get the answer properly. In this finding procedure students have to keep an eye in the options too. Therefore finding either starting or concluding sentences can be derived as technical method of logical answer.

• **Linking sentences:** This is a technique of mastering in jumbled paragraph. In order to get proper linking sentences students have to identify the main or supplementary ideas which constitute the message being conveyed by the paragraph. If a clear picture of the main paragraph is found, then the link of the sentences will be come out automatically. Once the link is found, then obviously the given options will direct the correct answer.

• Here is the list of words which are used as linking devices: *also, again, as well as, as a rule, besides, furthermore, generally, in addition, likewise, moreover, consequently, similarly, to sum up, hence, otherwise, subsequently, later, therefore, thus, for example, for instance, to illustrate, much like, such as, above all, besides, even though, although, despite, probably, due to, unless, whether, until, yet, first of all, to begin with, consequently, considering, I mean, in other words, as a result, last of all, in summary, in conclusion.*

Abbreviations or Acronyms: If full form and its abbreviation or acronym are present in two different sentences, then the sentence containing the full form will come before the sentence containing abbreviation or acronym.

Personal and Demonstrative Pronouns: If a sentence contains a personal or demonstrative pronouns (i.e. *you, your, he, she, it, they, this, that, these, those* etc) without mentioning the person, place or object it is referring to, the person, place or object must have come in the previous sentence.

Checking vocabulary inventiveness

For this process a candidate has to look into the starting and the concluding words of the sentences that may have an apparent link. In addition to this students have to concentrate in some particular conjunction words that may appear either ending or starting of the sentences, namely, *so, therefore, moreover, meanwhile, nevertheless, notwithstanding* etc.

CONCEPTUAL EXAMPLES

Rearrange the following sentences (A), (B), (C), (D) in the proper sequence to form a meaningful paragraph, then answer the questions given below them.

1) A. In formal speech, syllables are likely to be more deliberately sounded than in informal speech

B. Yet dictionary editors have no choice but to deal with each word as an individual entity.

C. The pronunciation of words is influenced by the situation.

D. Further, the pronunciation of a word is affected by its position in the sentence and by the meaning it carries.

a) ACBD b) ACDB c) ABCD d) CADB

Explanation: First of all, try to identify the starting and ending/ concluding sentences. Sentences B, D can not be the first sentence as they have the linking words like *'yet'*, *'another'* which generally indicates continuation to its previous sentences. Sentence-A is speaking about two kinds of pronunciation. But sentence-C has an introduction about pronunciation. Hence, it forms the first sentence. Sentence-A, D are continuation for C as they explain about how the pronunciation is affected.

Ask doubt with Question Id: 1947

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PLACEMENT PAPER–1

QUANTITATIVE APTITUDE

1) A train running at a speed of 90 *km/hr* crosses a platform double of its length in 36 *sec*. What is the length of platform in meters?

a) 450 b) 200 c) 300
d) Can't be determined e) None of these

2) 'A' can finish a work in 32 days and 'B' can do the same work in half the time taken by 'A'. Then working together what part of the same work they can finish in a day?

a) $\frac{3}{32}$ b) $\frac{1}{8}$ c) $\frac{5}{32}$ d) $\frac{16}{32}$ e) $\frac{1}{32}$

3) The owner of an electronic shop charges his customer 24% more than the cost price. If a customer paid Rs 10080 for a TV set, then what was the cost price of the TV set?

a) Rs 8119 b) Rs 8129 c) Rs 8250
d) Rs 8139 e) None of these

4) What would be the simple interest obtained on an amount of Rs 12690 at the rate of 6% per annum for 3 years?

a) Rs 2423.40 b) Rs 2233.40 c) Rs 2284.20
d) Rs 2525 e) None of these

5) Find the compound interest on Rs 8000 at 5% per annum for 3 years compounded annually?

a) Rs 1261 b) Rs 6261 c) Rs 9261
d) Rs 8261 e) None of these

6) 6 same type of machines can produce a total of 270 bottles per minute. How many bottles are produced by the 10 machines in four minutes of time?

a) 648 b) 1800 c) 2700 d) 10800 e) None

7) Find the least perfect square number which is divisible by 8, 15 and 24.

a) 3600 b) 360 c) 6400 d) 64 e) None

8) A person had a rectangular shaped garden with sides of 16 *feet* and 9 *feet*. The garden was changed into a square with the same area as the original rectangular– shaped garden. How many feet in length is each of the sides of the new square shaped garden?

a) 7 b) 9 c) 12 d) 55 e) 16

9) The average of five consecutive numbers *A*, *B*, *C*, *D* and *E* is 48. What is the product of *A* and *E*?

a) 2162 b) 2208 c) 2024 d) 2300 e) None

10) *A*, *B* and *C* enter into a partnership. *A* contributes Rs. 2400 for 6 months. '*B*' contributes Rs.7200 for 2 months and '*C*' contributes Rs.3500 for 7 months. If the total profit be Rs.1250, what is A's share in the profit?

a) 121 b) 112 c) 111 d) 122 e) None

11) At what time between 2 O'clock and 3 O'clock the two hands coincide?

a) $10\frac{10}{11}$ minutes past 2 O'clock

b) $11\frac{10}{11}$ minutes past 2 O'clock

c) $12\frac{10}{11}$ minutes past 2 O'clock

d) $13\frac{10}{11}$ minutes past 2 O'clock

e) None of these

12) Find the mean proportion of 45 and 405.

a) 9 b) 15 c) 90 d) 135 e) None

13) Find the cost of running a fence round a square field 49284 m^2 in the area of Rs.3 per meter.

a) 2614 b) 2714 c) 2914 d) 2664 e) None

Directions (14 to 17): Following table gives the production of computers of six companies A, B, C, D, E and F over the years.

Production of Computers (in 000's)						
Years→ Company↓	2005	2006	2007	2008	2009	2010
A	125	114	85	95	138	146
B	102	90	72	88	115	145
C	80	116	110	80	84	75
D	68	156	142	60	95	84
E	100	120	126	115	95	80
F	140	110	126	124	90	88

14) What is the ratio of the total production of companies *B*, *C* and *E* together in 2006 to the total production of companies *A*, *C* and *D* together in 2008?

a) 10 : 11 b) 11 : 10 c) 27 : 31
d) 55 : 56 e) None **(*Asked in Infosys*)**

15) What is the approximate percentage decrease in production of computers of company *D* from 2006 to 2009?

a) 10% b) 90% c) 40% d) 45% e) 30%

16) What is the average production of computers of company *E* over the year?

a) 106 b) 10000 c) 132 d) 106000 e) None of these

17) The production of F in 2010 is the same as the production of B in the year,

a) 2009 b) 2006 c) 2008 d) 2005 e) None of these

18) The sum of a number and its reciprocal is $\frac{13}{6}$.

Find the numbers?

a) $\frac{3}{2}, \frac{2}{3}$ b) $\frac{1}{3}, 3$ c) $6, \frac{13}{6}$ d) $\frac{1}{13}, \frac{13}{6}$ e) None

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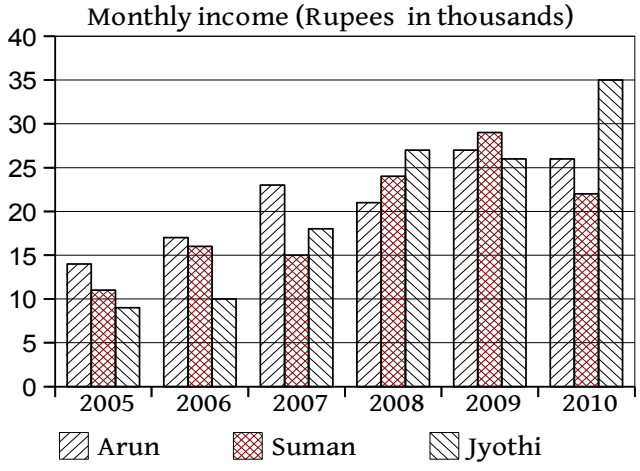
PLACEMENT PAPER–5

QUANTITATIVE APTITUDE

Directions(1–4): Study the following graph carefully to answer the questions that follow



Monthly income (Rupees in thousands) of three different persons in six different years.

1) What was the difference between the total monthly salary of Arun in all the years together and Suman's monthly income in the year 2007 ?

a) Rs. 1.24 *lakh* b) Rs. 1.14 *lakh* c) Rs. 11.4 *lakh*
d) Rs. 12.4 *lakh* e) None

2) What is the ratio of Arun's monthly income in the year 2006, Suman's monthly income in the year 2007 and Jyothi's monthly income in the year 2005?

a) 6 : 3 : 5 b) 6 : 4 : 5 c) 5 : 6 : 4 d) 5 : 4 : 7 e) None

3) In which year was the difference between Jyothi's and Arun's monthly income the second highest?

a) 2005 b) 2006 c) 2007 d) 2009 e) 2010

4) The monthly income of Suman in the year 2009 was approximately what percentage of the monthly income of Jyothi in the year 2010?

a) 72 b) 89 c) 83 d) 67 e) 95

5) How many ways are there to lay four balls, colored red, black, blue and green in a row?

a) 4 b) 4 ! c) 4^4 d) $\frac{4!}{4^4}$ e) 4(4 !)

6) There are 20 states in a certain country and every pair of them is connected by a road way. How many road ways are there? ***(Asked in ABB)***

a) 20! b) 19! c) 18! d) $\frac{20.19}{2}$ e) $^{20}C_2$

7) Two cards are selected at random from 10 cards numbered 1 to 10. Find the probability that the sum is odd if two cards are drawn together.

a) $\frac{4}{9}$ b) $\frac{5}{9}$ c) $\frac{5}{10}$ d) $\frac{5!}{10!}$ e) $\frac{2}{10}$

8) Which of the statements is true for 31^{11} & 17^{14}?

a) 31^{11} is greater b) 31^{11} is lesser c) $31^{11} \leq 17^{14}$
d) $31^{11} \geq 17^{14}$ e) None

9) The average of five numbers is 281. The average of the first two numbers is 280 and the average of last two numbers is 178.5. What is the third number?

a) 488 b) 336 c) 228 d) 464 e) None

10) At 30 minutes past 4 O'clock, what is the angle between the two hands?

a) 45^0 b) 48^0 c) 50^0 d) 40^0 e) 55^0

11) Two equal glasses are respectively $\frac{1}{3}$ and $\frac{1}{4}$ full of milk. They are then filled up with water and the contents are mixed in a tumbler. Find the ratio of milk and water in the tumbler. ***(Asked in Syntel)***

a) 1 : 5 b) 7 : 17 c) 3 : 9 d) 2 : 5 e) 4 : 7

12) *A*, *B* & *C* invested Rs.500, Rs.630 & Rs.700. If *A* gets Rs. 75 as profit then how much *C* will get?

a) $57\frac{3}{4}\%$ b) Rs. 105 c) Rs. 90 d) Rs.126 e) Rs.117

13) How long will a man take to go, walking at 4 *km* per hour, twice round a circular garden of 70 *m* radius?

a) 13 *m* 2 *sec* b) 12 *m* 13 *sec* c) 13 *m* 11 *sec*
d) 12 *m* 11 *sec* e) 11 *m* 13 *sec*

Directions(14 to 15): Read the following question and the conclusions that follow and answer as

a: *If statement–*1 *alone is sufficient, but statement–*2 *alone is not sufficient to answer the question.*

b: *If statement–*2 *alone is sufficient, but statement–*1 *alone is not sufficient to answer the question.*

c: *Both statement–*1 *and* 2 *together are sufficient to answer the question, but neither of the statement alone is sufficient to answer the question.*

d: *If both statements alone are sufficient to answer the question.*

e: *If statement–*1 *and* 2 *together are not sufficient to answer the question asked, and additional data specifics to the problem are needed.*

14) Is *y* is a positive number?

Statement–1: $2x+y > 27$; **Statement–2:** $x-3y < 24$

15) If *x* is a positive integer less than 30, is '*x*' an odd number?

1: When *x* is divided by 3, the remainder is 2.

2: When *x* is divided by 5, the remainder is 2.

16) A train of length 330 *meters* crosses a platform of length 550 *meters* in 44 *seconds*. What is the speed of the train?

a) 5 *m/s* b) 7.5 *m/s* c) 12.5 *m/s* d) 20 *m/s* e) None

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TECHNICAL INTERVIEW QUESTIONS

TECHNICAL INTERVIEW

In the present days, most of the companies are conducting the Technical Interview Round in their recruitment process. It is one of the efficient way of filtering the suitable person for the industry. Many students have a wrong notion that it is very hard to clear this round. But it is not true. This round will mainly focus on the basics or fundamentals of the stream. Students need to be thorough and confident in the fundamentals of the subject. Recruiting team will not expect that the student should answer all questions perfectly, but he/she must be reasonably good and confident about the subject. The most important questions for technical interview are given below. These questions will give you the idea about what type and toughness generally the companies are asking.

CIVIL ENGINEERING

Building Materials and Construction

1) What is the term used to call the vertical member in the middle of the door/window frame?

2) What is the standard or commonly recommended depth between finished level of ground and the general ground level around the building?

3) Do you know the number of BIS standard used for building drawing purpose?

4) Can you draw a typical sign indicating brick?

5) State a few conditions at where eccentricity of building occurs?

6) What are the requirements of a material used for damp proofing in building construction?

7) At what level damp proofing course on the internal wall is provided if two ground floors at different levels are connected by an internal wall?

8) What is the term used to indicate the sides of the openings such as doors or windows?

9) What is the maximum thickness of mortar joint width provided in Ashlar fine masonry?

10) What is the term used to indicate the rod which is used to dress roughly the hard stone?

11) What is the bond that is provided to strengthen the corner of a wall where a modified form of English bond is used?

12) What is the duration of immersing brick which are used before they actually placed in position, during construction?

13) Does an expansion joint in brick wall is necessary? State its interval along its length?

14) What is the minimum depth of concrete at the crown of a jack arch roof?

15) What material is used to obtain noiseless flooring?

16) What is the approximate thickness of brick course used in Madras Terrace Roof?

17) What is the term used to indicate inner surface of an arch?

18) What is the commonly adopted bearing length used for wooded lintels?

19) Up to what spans the brick lintels are used?

20) Can you define Wainscot which is used in paneling of wood masonry wall?

21) Can you draw a sketch showing soffit, tread and rise of a typical stair case?

22) What is the minimum percentage of the window area is provided with reference to the total inside area of the room?

23) What is the commonly used thickness of the plywood facing on flush door?

24) What is the term used to indicate the angle formed at the intersection of the two roof slopes?

25) Steel trusses are generally adopted because ..... state the reasons?

26) What are the factors that influence quality of mosaic tiles/flooring?

27) Where the external metal staircase is generally used?

28) What is the most commonly adopted values of tread and rise, for Indian conditions?

29) What type of lines a combined line is represented by?

30) State the significance of GTS bench mark?

Transportation Engineering

31) What is the camber provided in case of WBM roads?

32) What is the standard interval of providing expansion joints in a CC pavement slab?

33) What is the minim grade of concrete recommended in case of truck serving CC pavements?

34) Do you know anything about Superpave technology?

35) What do you know about CRF: Central Road Fund?

36) What is the finding scenario of NHDP?

37) What is the funding difference between PMGSY an d Bharath Nirman Projects?

38) What are the instruments used during reconnaissance survey?

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C Programming

1) Write a program to print?

```
* * * * *
* * * *
* * *
* *
*
```

2) When should a type cast be used?

3) What are the different data types?

4) What is the output of the below program?

```
#include<stdio.h>
int main(){
char a='A';
printf("size of variable a is %d \n",sizeof(c));
printf("size of A is %d ",sizeof('A'));
return 0;
}
```

5) Does the below program runs successfully?

```
#include<stdio.h>
int main(){
int const a = 1;
a = 2;
}
```

6) What is difference between i++ and ++i?

7) What is the output of the below program?

```
include <stdio.h>
int main()
{
 int m=40,n=20,o=20,p=30;
 if (m>n && m !=0)
 printf("&& Operator:Both conditions are true\n");
 if (o>p || p!=20)
 printf("|| Operator : Only one condition is true\n");
 if (!(m>n && m !=0))
 printf("! Operator  : Both conditions are true\n");
 else
  printf("! Operator  : Both conditions are true. But, status is inverted as  false\n");
}
```

8) What is the output of the following code?

```
#include<stdio.h>
void main(){
int check=2;
switch(check){
case 1: printf("Infosys");
case 2: printf("Gail");
case 3: printf("L&T");
 default: printf("AirIndia");
 }
}
```

9) What is the difference between

a. parameter passed by reference

b. parameter passed by value

10) In the code below, which variable has the largest scope?

```
 include <stdio.h>
 int b;
 int main()
        {
            int c;
            return 0;
         }
          int a;
```

11) Can we convert *int* to *double*? If yes, give an example expression?

12) What is the difference between string and character arrays?

13) Define structure and give an example?

14) What does static variable mean?

15) What is the benefit of using '*const*'?

16) What is recursive function? Write a program of Fibonacci series using recursive function?

17) Give a syntax of declaring array?

18) Write a program to print every element of 2 x 5 x 3 dimensional array?

19) What is a pointer?

20) How do you use a pointer to a function?

21) What do you mean by inline function?

22) What are the different storage classes in C?

23) What is the difference between printf ( ) and sprintf ( )?

24) Does there exist any other function which can be used to convert an integer/float to a string?

25) Can a variable be both constant and volatile?

26) Advantages of a macro over a function?

27) Which bit wise operator is suitable for checking whether a particular bit is on or off?

28) When should the volatile modifier be used?

29) *const char *p , char const *p*

What is the difference between the above two?

30) What is output of below program?

```
#include <stdio.h>
 int main(){
 int a=500;
 char *ptr=(char *)&a;
 printf("%d\n",*ptr);
```

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HR INTERVIEW

Interviews are conducted to assess a candidate's suitability for an organization and the hiring role. The purpose of an interview is to ascertain what a candidate has mentioned in his resume. It is a brief meeting where your technical skills will be assessed in addition to your communication skills, motivational factors, your attitude, your goals and objectives.

What qualities does an interviewer observe?

a) Attitude: Show positive attitude and your interest for the job. Do not show arrogance even if you are a college topper.

b) Communication Skills: A candidate must speak confidently and use clear language with as little jargon as possible. Your conversation with the interviewer must reflect your enthusiasm, awareness and attitude.

c) Confidence: Your confidence is a reflection of optimism and speaks a lot about how you would handle a challenging professional situation. Confidence is great; Overconfidence is a strict no-no.

d) Body language: Good body language is an indicator on good non-verbal communication. Walk into the room with a confident smile and introduce yourself to everyone present with a firm handshake. Maintain a good posture, do not slouch, maintain eye contact, and nod your head when being talked to. Do not yawn, bite your nails, shake your limbs, look around, look down.

e) Leadership skills: When you attend an interview, make sure your interviewer knows that you are ready to take initiatives and help the members of your team.

f) Emotional Maturity: Sometimes, the interviewer, on purpose may provoke you by asking some unexpected questions. Do not get provoked or angry. Instead, show your maturity by answering the question in a manner that does not offend the interviewer. It is better to be honest and give direct answers instead of speaking as if you agree with all the points that the interviewer says. The given situation should be handled with ease, maturity and composure.

g) Dressing Sense: Wear neatly ironed formal clothes with a good pair of shoes. Women should apply minimal make up and avoid too much of jewelry. Both men and women should have well manicured nails and a professional hairstyle.

h) Integrity: Every interviewer appreciates honesty as that is one of the main traits to look for in a candidate. Do not lie about your professional achievements. Do not throw an air of arrogance. If you are appreciated for something, be gracious to say thanks.

i) Flexibility: Show the employers that you are flexible and can adjust to different circumstances. If you are asked for example, your willingness to re-locate far away from your family for a project, mention that you would be happy doing so as your career and organization's interest are foremost priorities.

j) Learnability: Learning is a continuous process. Desire to keep learning shows an employer that you are enthusiastic about what is being offered to you. You may be the best of candidates, but unless you have a thirst for knowledge, your knowledge repository may become saturated.

Do's and Don't for Interview

a) Research well on the company that is hiring you. Read about its milestones, customers, organization chart, vision and mission. This shows that you are genuinely interested in pursuing a job in the company.

b) Don't be late to interview. Arrive earlier than the scheduled time for your interview. This will show that you are interested in getting job and that you are punctual.

c) Always be prepared for possible questions during the interview. Practice responding to these questions in front of the mirror. Have a mock interview with your friend. If possible record the interview.

d) Pay attention to the questions and maintain eye contact while answering them.

e) Be proactive and show optimism. Give honest and simple answers. Your answer should reflect what you can do for the employer. In case you have a doubt regarding a question, do clarify. Ask questions regarding the job being offered and your roles and responsibilities towards the end of the interview.

f) Maintain positive body language throughout the interview. Greet your interviewer(s) when you walk into the room. Thank the interviewer(s) as you leave the interview.

g) Turn off your cell phone during the interview.

h) Try to use real examples while talking about your skills. For example, how has a particular skill benefited your previous job?

i) Don't dress inappropriately. For example, wearing slippers, T-shirt, jeans etc.

j) Don't lie about your skills and competencies. Instead, show the employers that you are eager to learn in areas where your knowledge is limited.

k) Do not use long sentences or monosyllabic answers. Example**:** If the interviewer asks *Are you good at coding*?

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Mock Interview with Body Language

Right Way:

On entering the interview room,

Student: Good morning (smiling). I am Krishna. Pleased to meet you. (Shake hands with everyone in the interview panel. If a lady is present, wait for her to extend her hand first).

Wait for the interviewer to offer a seat. Sit only when you are asked to and say a polite "Thanks" for the same.

Observation:

- Student is in time to the interview.
- Greeting the interviewer in a good way.
- Giving a firm hand shake to the interviewer.
- From the movement you walk in to the interview room be real.

Wrong Way:

On entering the interview room,

Student: Hi! Good morning. How're you?

Observation:

- Student came late to the interview.
- Greeting the interviewer in an informal way.
- Giving a bone crushing hand shake.
- Student sat down on the chair without asking/giving permission.

* When the interviewer offers you a seat at the start of the job interview, sit upright but not too stiffly in your chair. This indicates that you are comfortable and feeling confident. Hunching down in your chair gives the impression of nervousness and low self-esteem. A sloppy posture indicates a careless attitude and a lack of energy. Sitting on the edge of your chair can come across as being nervous and tense.

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6. If I were to ask your professors to describe you, what would they say?

Good Answer: I have submitted white papers at a recent technical conference. These are my testimonials that prove that the paper was well received by the faculty. These are the certificates that I have won in technical quizzes. So, I would confidently say that professors evaluate me as very creative student.

Body Language Observation:

- Enthusiastic facial expressions, little bit smile and good eye contact and using hand gestures etc, plays a major role in interview success.
- Do not get tensed during interview. Be cool why answering the questions. It is one of the important factor that leaves a good impression.
- How you position your head also sends a message. Tilting your head very slightly to one side comes across as friendly and open. Keeping your head straight comes across as self-assured and authoritative.

Bad Answer: My professor says I am the best in the class. He is of the opinion that I am a very hard working person and that I am generally good at everything (You are not justifying here).

Body Language Observation:

- Avoid interrupt or argue with the interviewer in any way.
- Be polite and answer properly.
- Do not maintain aggressive or angry facial expression.
- Some times interviewer asks unusual questions to test your mental ability, patience etc. Do not get tensed or angry and don't loose your patience.

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Tips to use Job Sites

Job sites like *Naukri.com*, *Monster.com*, *TimesJobs.com* are popular websites for searching and applying for jobs. These website are now serving as a database to all the recruiters and HRs who want to recruit candidates. You can get calls from recruiters if you utilize these sites effectively. The following the most important tips to use while applying for Jobs in job sites.

1. Update your resume regularly, on a daily basis. Upload your resume with minor changes. This way, your profile gets updated automatically. Timing for updating your resume is more important. You may surely expect to get a call from a recruiter if you update your resume between 12 am to 5 am.

2. Do not mention your expected salary. Quoting above or below the market standards will simply lead to the rejection of the resume. You can negotiate the salary details during the HR round of your interview, if you are called for one.

3. Recruiters search for candidates based on various parameters. So the more information you enter in your profile the more are the chances that your resume shows up. Make sure your profile completeness bar displays close to 100%.

4. Make sure your profile summary explains about your skills, competencies and your objectives in precise.

5. Resume Headline needs to reflect your skills and experience to catch the attention of a recruiter. The more precise it is, the more chances of it getting noticed by recruiters.

Some of the wrong titles include,

Resume

Krishna's Resume.

Krishna-CSE.

Krishna-ECE-Fresher.

Experienced in software industry.

Some of interesting Resume titles includes,

Sun Certified Java Programmer.

Microsoft Certified Professional.

Certified in Digital and analog VLSI Design.

6. The e-mail ID you use for applying jobs should be professional. For example, if your name is James Gosling you can have the professional email IDs as *jamesgosling@example.com, james.gosling@example.com, james_gosling@example.com*, etc.

Such e-mail IDs appear professional and would impress the employers as they describe the complete name of the applicant and not his/her nick names or any other words. You can use the number in combination with the alphabets for representing your email ID. For example, you can use *jamesgosling1@example.com*, *jamesgosling05@example.com*, etc. E-mail IDs with date of birth of the candidate will not make any sense and will make employer think that you are unprofessional. Also using random numbers or jumbled alphabets makes the E-mail ID appear as spam.

7. Make sure you verify your contact details. Recruiters do not contact candidates with unverified contact details. If your email and mobile numbers are verified then your chances of getting calls from recruiters is more.

8. Utilize video resumes. A Video resume is just one more way to stand out to employers. It is a supplement to your resume. Video resumes allow job seekers to showcase some of their personalities and highlight one or two points of interest in their resumes.

9. Utilize job alerts. Most job boards have features that allow you to sign up to receive e-mail alerts about newly available jobs that match your chosen criteria.

10. Customize your resume for every company**.** Know the company and read the job description, the skills they require and customize your resume based on that information. By customizing your resume for each company, you are highlighting the skills and personalities the company is looking for in a candidate.

11. Ensure that there are no differences between online profile and resume that you upload. Upload resume in MS word format as it is most widely accepted.

12. Never make factual mistakes. Preview before posting, especially things like date of birth, contact details etc.

13. Enter the right key skills. Write your Technical skills, soft skills, tools, certifications, technologies, databases, programming languages that you used in final year project and academics.

If you are a fresher, mention at least 2 to 3 academic projects or the projects that you interned in any organization.

14. Set the Profile Visibility. Give yourself the option of selecting your resume's visibility based on your job requirement. Select "Active" as you are currently looking for a job.

15. Apply only once for a particular notification. There is an option to hide those jobs for which you have already applied.

16. Broaden your job search by using all relevant technologies, tools, designations etc. of your field as keywords. For example the relevant keywords in IT field are those related to programming languages, OOPS, Database, Testing, Android, iPhone and designations like junior developer, database administrator etc. Make a list of all such key words prior to your search.

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RESUME PREPARATION

Your resume is the most important document that the employer would refer to. Hence, it is very important to keep your resume professional and up to date. Include your professional details, academic details total work experience, skills, tools and programming languages known. Do not lie about your skills and experience. Resume should be written honestly and carefully. Do not prepare a very long resume. A short but to the point resume should be prepared. Do not copy the resume from other sources. Write it on your own although you may take reference from sample resumes.

Tips to build an effective resume

- Choose a good resume format.
- Pick up a font that is easy to read. Fonts such as Verdana, Times New Roman and Arial in sizes 10-12 are conducive for reading.
- Use the right keywords in your resume.
- Use effective titles.

Example: Bad title: Software development.
Good title: Developing Java API.

- Divide your resume into sub sections.

Example: One section for details about your work experience, the second section about your academic qualifications, the third about your skill set, the fourth about your personal profile etc.

- The most important points should be placed at the beginning of your resume. This should be uniformly followed in the individual sections as well. The most recent work experience will come first.
- Your contact details including your address telephone number and email ID should be clearly mentioned in the resume.
- Use bullet points and short sentences in your resume. Do not make the resume boring by giving in depth explanation or being repetitive.
- Avoid writing negative sentences.
- Write a few sentences about your professional goals.
- Use your testimonial references for any skill that you would like to highlight.

Example: winning a technical white paper competition at the national level (testimonials included).

- Do not include your age, unless it is specifically asked for.
- Do not create a standard resume for all the jobs to be applied to. Restructure your resume depending on the job for which you are applying.
- Do a spelling and a grammar check before you send your resume.
- Update your resume on a periodic basis.
- Mention dates in order.
- Do not forget the basics, like your name.
- Mention the employers for whom you have worked.
- Mention the companies for whom you have interned (done your projects).
- Do not use heavy vocabulary or too much of jargon(technical words).
- Get your resume reviewed by a professional.

Things to avoid when writing your resume

- Lying about past work experience or qualification.
- Committing spelling and grammatical errors.
- Making the resume colorful in appearance.
- Including too much of information.
- Not using the right keywords.
- Writing an objective that does not match the job.
- Writing old or outdated details.
- Sending a handwritten or poorly photocopies resume
- Writing long sentences and paragraphs.
- Writing about your own goals more than your abilities to match the job expectation.
- Using 'I' in the sentences.
- Writing information that would make an employer feel that you discriminate (Mentioning your age/ marital status/ number of kids/gender etc).
- Writing about hobbies(Unless your hobby would contribute to your candidature, do not include it).
- Writing incomplete information.
- Writing negative things (Like failure in delivering a project).
- Writing please ("Please give me an opportunity to work for you.")

Contents of A Good Resume

a. Personal Details: The most important detail is your name, mentioned in bold. Your contact information including email IDs and telephone numbers should be clearly written.

b. Summary: Writing an objective is a thing of the past. Instead, summarize your experience and skill set in one or two effective sentences. This would immediately grab the hiring manager's attention. E.g. Five years of experience in software quality assurance.

c. Past Work Experience: Include the details of your previous employment and briefly mention the significant projects that you were involved in. Mention the organization name and also the duration of your work. The order should be starting from recent to past.

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GROUP DISCUSSION

Group Discussion is a process of selection rather than elimination. Group Discussion refers to the process where by a topic or a situation is presented to a group of candidates. It is a systematic exchange of ideas and information among a group of people. In a Group Discussion, a topic is given and each member is given about 10-15 minutes to think about the given topic. The members are then allowed to present their views and opinions to the other candidates in the group. The Group Discussion facilitates objective thinking, systematic presentation of ideas, interacting abilities, problem resolution, leadership abilities, ability to take initiatives, ability to work within a team, flexibility and assertiveness skills.

Why GD is a part of the selection process?

The primary reason for conducting the Group Discussion is to evaluate how effectively a candidate would perform as a member of a team. When more than one person is involved in problem solving, ideas have to be brainstormed, collaborated and a conclusion should be reached such that the organizational goals are met along with creating a win win situation for every member of the team. Thus apart from participation and contribution, team behavior and attitude of a person are the traits that a company would be evaluating in the Group Discussion.

The written test evaluates aptitude in Verbal Ability, Quantitative Ability and Reasoning Ability; These areas to judge the the analytical, logical, numerical and language abilities but they do not test the personality traits or group behavior of the individual. The ability to deal with people, individually or in a group, is vital for success in the corporate world. Therefore a group discussion is included in the selection process. A group discussion allows the selectors to judge the individual's performance and behavior in a group. Different aspects of group discussion include communication skills- both verbal and non-verbal, Ability to make decisions and co-operate with people.

Types of Group Discussions

The classification is based on the type of the topics that are chosen for group discussion. The topics could be:

1. Current Affairs-Topics related to current news items related to business, technology, politics, education and social activities etc.

2. Argumentative Issues- A topic is given to the candidates that they have to analyze and critically present their views on the topic.

3. Factual topics– The topics are which may directly or indirectly affect a person in his day to day life.

- Women's reservation bill
- Lokpal bill
- Status of women in India
- Global warming.

4. Controversial topics– Topics in which candidates can take a stance – for or against the given topic thereby leading to a bit of disagreement among the participating members of the group.

For example,

- We are becoming too dependent on computers.
- Video games contribute to youth violence.
- Reservation system should be removed.

5. Abstract subjects– These types of topics generally include imaginary or hypothetical topics. For example,

- What would happen if the Earth would stop rotating?
- What would happen if you were given a chance to rule the country?

6. Case study– instead of a topic a case study will be given in this category. They need to resolve the situation. The objective the case study is to think about the situation from different angles. Generally real life situations are given in case study. A complex and problematic situation and information about that situation is given to the group.

Popular Group Discussion Topics

1) Are Advertisements Beneficial or misleading?
2) Balance between Professionalism and Family.
3) Can Trade help the poor?
4) Demographic Dividend in India.
5) Depreciation of Indian Rupee.
6) Is FDI good for India?
7) Privatization will lead to Less Corruption.
8) To survive in the civilized world one needs to be hypocrite.
9) Growth and integrity are poles apart.
10)Cricket Has Spoiled Other Streams Of Indian Sports.
11) We will never be corruption free society.
12) Indian Primary Education Is Pathetic.
13) India needs more entrepreneurs than managers to face new challenges.
14) Artificial Intelligence - Will man be ever replaced by machines?
15) Role of India in combating terrorism.

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