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NUMBER SERIES

Number series is an important part of the reasoning section. This chapter deals with the series of numbers in which terms follow a certain pattern throughout. The task involved here is to recognize the pattern and complete the given series with the most suitable term.

The following are the different patterns of number series

1. Prime Series
2. Difference Series
3. Product Series
4. Binary Series
5. Combination Series
6. Miscellaneous Series

1. Prime Series:

Ex 1: 7, 11, 13, 17, 19, _____

Here the terms are consecutive primes. Hence, the next term is 23.

Ex 2: 4, 6, 9, 14, 21, _____

Here the difference between the terms is consecutive primes i.e. 2, 3, 5 and so on.

∴

Ex 3: 169, 121, 49, 25, _____

Here, the terms are squares of consecutive primes i.e. $(13)^2$, $(11)^2$, $(7)^2$, $(5)^2$, _____

∴ The required term is $3^2 = 9$.

Ex 4: 8, 27, 125, 343, _____

Here, the terms are cubes of consecutive primes i.e. $(2)^3$, $(3)^3$, $(5)^3$, $(7)^3$, _____

∴

3

Ex 6: 2, 5, 10, 17, _____

In example (6), the terms of the series can be written as

$1^2 + 1$, $2^2 + 1$, $3^2 + 1$, $4^2 + 1$,

∴ The required term is $5^2 + 1 = 26$.

In direct square series, the difference of the terms or the quotients which we multiply can be squares of consecutive numbers.

Ex 7: 5, 6, 10, 19, 35, _____

In example (7), the difference between the first and the second term is 1 i.e. 1^2 ; the difference between the second and the third term is 4 i.e. 2^2 and so on. We have to add 25 i.e. 5^2 to 35 to get the next term.

Ex 8: 1, 1, 4, 36, 576, _____

In example (8), the first term is multiplied by 1 i.e. 1^2 to get the second term. The second term is multiplied by 4 i.e. 2^2 to get the third term and so on. We have to multiply 576 by 25 to get the next term. The next term is 14400.



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4. Binary Series
5. Combination Series
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1. Prime Series:

Ex 1: 7, 11, 13, 17, 19, _____

Here the terms are consecutive primes. Hence, the next term is 23.

Ex 2: 4, 6, 9, 14, 21, _____

Here the difference between the terms is consecutive primes i.e. 2, 3, 5 and so on.

∴ The required term is $21+11=32$.

Ex 3: 169, 121, 49, 25, _____

Here, the terms are squares of consecutive primes i.e. $(13)^2$, $(11)^2$, $(7)^2$, $(5)^2$, _____

∴ The required term is $3^2=9$.

Ex 4: 8, 27, 125, 343, _____

Here, the terms are cubes of consecutive primes i.e. $(2)^3$, $(3)^3$, $(5)^3$, $(7)^3$, _____

∴ The required term is $11^3=1331$.

Ex 6: 2, 5, 10, 17, _____

In example (6), the terms of the series can be written as

1^2+1 , 2^2+1 , 3^2+1 , 4^2+1 ,

∴ The required term is $5^2+1=26$.

In direct square series, the difference of the terms or the quotients which we multiply can be squares of consecutive numbers.

Ex 7: 5, 6, 10, 19, 35, _____

In example (7), the difference between the first and the second term is 1 i.e. 1^2 ; the difference between the second and the third term is 4 i.e. 2^2 and so on. We have to add 25 i.e. 5^2 to 35 to get the next term.

Ex 8: 1, 1, 4, 36, 576, _____

In example (8), the first term is multiplied by 1 i.e. 1^2 to get the second term. The second term is multiplied by 4 i.e. 2^2 to get the third term and so on. We have to multiply 576 by 25 to get the next term. The next term is 14400.



Logical Reasoning



Ex 14: 3, 4, 6, 9, 13, _____

In example (14), the difference between the first and second terms is 1.

The difference between the second and third terms is 2.

∴ The required term is

The difference between the third and fourth terms is 3 and so on.

That is, the difference is increasing by a constant 1.

∴ The required term is $13+5=18$ **Ex 15:** 55, 45, 36, 28, _____

In example (15), the difference between the first and the second term is 10.

The difference between the second and the third term is 9.

The difference between the third and the fourth term is 8 and so on

The difference is decreasing by a constant.

∴ The required term is $28-7=21$ **4. Product series:**

The product series can be further classified as

Series with constant quotient.

Series with increasing or decreasing quotient.

In the series of "constant quotient", each term is multiplied by a constant to get the next term.

Ex 16: 2, 6, 18, 54, _____

In example (16), each term is multiplied by 3 to get the next term

∴ The required term is $54 \times 3 = 162$ **Ex 17:** 96, 48, 24, 12, _____In example (17), each term is multiplied by $\frac{1}{2}$ (or divided by 2) to get the next term.∴ The required term is $12 \times \frac{1}{2} = 6$

In the series of "increasing or decreasing quotient", the terms are obtained by multiplying with a variable (which is in an order).

Ex 18: 2, 2, 4, 12, 48, _____

In example (18), the first term is multiplied by 1 to get the second term;

The second term is multiplied by 2 to get the third term;

The third term is multiplied by 3 to get the fourth term and so on.

Term	1 st	2 nd	3 rd	4 th	5 th	Blank
	2	2	4	12	48	240
Multiply with	1	2	3	4	5	

∴ The required term is $48 \times 5 = 240$

∴ The required term is $35+5^2=60$.

Cube series:

The cube series can also be looked at as,

- Direct cube series
- Indirect cube series

In direct cube series, the terms in the series can be cubes of natural numbers or cubes of numbers decreased or increased by a certain numeral.

Ex 9: 1000, 729, 512, 343, _____

In example (9), the terms are cubes of consecutive numbers, i.e., $(10)^3$, $(9)^3$, $(8)^3$, $(7)^3$,

∴ The required term is $6^3=216$.

Ex 10: 2, 9, 28, 65, _____

In example (10), the terms can be written as

$(1)^3+1$, $(2)^3+1$, $(3)^3+1$, $(4)^3+1$,

∴ The required term is $5^3+1=126$.

In indirect cubeseries, the difference of the terms can be cubes of consecutive numbers

Ex 11: 7, 8, 16, 43, _____

The difference between consecutive terms is the cube of a natural number in increasing order.

Term	1 st		2 nd		3 rd		4 th		Blank
	7		8		16		43		107
Add		1^3		2^3		3^3		4^3	

∴ The required term is $43+4^3=107$

3. Difference series:

The difference series can be developed with

- A constant difference (or)
- An increasing difference (or)
- A decreasing difference

In the number series of "constant difference", the difference between every two consecutive terms is constant i.e., same.

Ex 12: 1, 5, 9, 13, 17, _____

In example (12), the difference between every two consecutive terms is constant i.e. 4.

∴ The required term is $17+4=21$

Ex 13: 100, 95, 90, 85, _____

In example (13), the difference between every two consecutive terms is constant i.e. 5.

∴ The required term is $85-5=80$

In the series with "increasing or decreasing difference", the difference between consecutive terms keeps on either increasing or decreasing.



Ex 19: 5, 25, 100, 300, _____

In example (19), the first term is multiplied by 5 to get the second term;
 The second term multiplied by 4 to get the third term;
 The third term is multiplied by 3 to get the next term;
 The fourth term has to be multiplied by 2 to get the next term.

Term	1 st		2 nd		3 rd		4 th		Blank
	5		25		100		300		600
Multiply with		5		4		3		2	

5. Binary series:

∴ The required term is $300 \times 2 = 600$

In binary series, the terms are expressed in the binary form. Convert them into decimal form and complete the series

Ex 20: 11_2 , 101_2 , 111_2 , 1001_2 , _____

Here, the terms are in binary form, converting into decimal form we get 3, 5, 7, 9, _____.i.e consecutive odd numbers.

∴ The required term is the next odd number $11=1011_2$

6. Combination series:

In combination series different types of patterns are usually come across either by combining two or three regular series or by expressing in a surd form.

Alternate series:

Alternate series is formed by putting two or more different series together.

Ex 21: 4, 72, 7, 68, 10, 64, 13, _____

Here 1st, 3rd, 5th, 7th terms i.e. 4, 7, 10, 13, _____ form a series with a constant difference of 3 and 2nd, 4th, 6th terms i.e. 72, 68, 64, _____ form another series with a constant difference of 4.

22, 1, 1, 2, 4, 8, 3, 9, 27, 4, 16, _____

Here, 1st, 4th, 7th, 10th terms form a series with a constant difference of 1.

2nd, 5th, 8th, 11th terms form a square series.

3rd, 6th, 9th, 12th terms form a

cube series

∴ The required term is $64-4=60$

∴ The required 13th term is $4^3=64$.



7. Miscellaneous Series:

There are some forms of series, which do not come under any of the above stated standard patterns.

Ex 22: 1, 1, 2, 3, 5, 8, 13, 21, _____

Here, each term is the sum of two preceding terms i.e.

$$1+1=2, 1+2=3, 2+3=5, 3+5=8, 5+8=13, 8+13=21.$$

Term	Add	\Rightarrow	=
3 rd	1 st + 2 nd	1+1	2
4 th	2 nd + 3 rd	1+2	3
5 th	3 rd + 4 th	2+3	5
6 th	4 th + 5 th	3+5	8
7 th	5 th + 6 th	5+8	13
8 th	6 th + 7 th	8+13	21
Blank	7 th + 8 th	13+21	34

∴ The required term is 13+21=34.

Ex 23: 2, 3, 6, 18, 108, _____

Here, each term is the product of two preceding terms i.e.,

$$2 \times 3 = 6, 3 \times 6 = 18, 6 \times 18 = 108, 18 \times 108 = 1944$$

Term	Multiply	\Rightarrow	=
3 rd	1 st x 2 nd	2 x 3	6
4 th	2 nd x 3 rd	3 x 6	18
5 th	3 rd x 4 th	6 x 18	108
Blank	4 th x 5 th	18 x 108	1944

∴ The required term is 13+21=34.

How to recognize number series easily and quickly?

- 1) If the numerical values of each of two consecutive terms are near, check for difference series or prime series or prime series or miscellaneous series.
- 2) If the terms are nearer to multiples of the preceding terms, then check for product series.
- 3) If the difference is varying drastically, then check for square or cube series
- 4) If all terms are in '0's and '1's, then check for binary series.
- 5) If the series is decreasing and increasing alternatively, check for alternate series.



Classroom Exercise

- 1) 89, 78, 68, 59, 51, 44, ___
 1) 40 2) 39 3) 38 4) 37
- 2) 67, 72, 78, 85, 93, 102, ___
 1) 103 2) 113 3) 112 4) 115
- 3) 2, 11, 19, 26, 32, 37, ___
 1) 40 2) 42 3) 41 4) 43
- 4) 53, 55, 58, 63, 70, 81, ___
 1) 90 2) 92 3) 94 4) 93
- 5) 9, 11, 14, 19, 26, 37, ___
 1) 50 2) 62 3) 58 4) 59
- 6) 4, 6, 9, 13, 18, 24, 31, ___
 1) 40 2) 39 3) 41 4) 42
- 7) 0, 1, 2, 4, 6, 9, 12, 16, ___
 1) 20 2) 21 3) 22 4) 23
- 8) 5, 5.5, 6.5, ___ 10, 12.5
 1) 7 2) 8 3) 8.5 4) 7.5
- 9) 6, 6.5, 7, 8, 9, 10.5, 12, ___
 1) 14 2) 15 3) 13.5 4) 14.5
- 10) 1, 5, 13, 25, 41, 61, ___
 1) 80 2) 85 3) 82 4) 71
- 11) 21.3, 20.7, 20.2, 19.8, 19.5, 19.3, ___
 1) 19.1 2) 19.2 3) 19.3 4) 19.3
- 12) 6, 6, 6, 12, 24, 72, 216, ___
 1) 864 2) 963 3) 775 4) 222
- 13) 2, 6, 12, 36, 72, 216, ___
 1) 450 2) 475 3) 432 4) 479
- 14) 13, 4, 25, 7, 15, 6, 19, ___
 1) 10 2) 21 3) 16 4) 17
- 15) 5, 6, 6.5, 6.5, 8, 7, 9.5, ___
 1) 11 2) 10.5 3) 5.5 4) 7.5
- 16) 11.6, 2.3, 9.7, 11.3, 2.1, 9.6, 11, 1.9, 9.5, ___
 1) 11 2) 10.3 3) 2.3 4) 10.7
- 17) 23, 32, 28, 30, 33, 28, 38, 26, ___
 1) 40 2) 43 3) 24 4) 28
- 18) 15, 49, 3, 93, 18, 48, 5, 90, 21, 47, 7, 87, ___
 1) 24 2) 45 3) 26 4) 9
- 19) 2, 6, 18, 54, 162, ___
 1) 480 2) 486 3) 490 4) 484
- 20) 2, 4, 8, 24, 72, 288, ___
 1) 1150 2) 1152 3) 864 4) 576
- 21) 3, 6, 18, 72, 360, ___
 1) 2160 2) 3600 3) 1440 4) None of these
- 22) 11, 11, 11, 22, 44, 132, 396, ___
 1) 1245 2) 1684 3) 1584 4) None of these
- 23) 15, 8, 23, 6, 15, 21, 8, 6, 14, 5, 12, ___
 1) 18 2) 16 3) 13 4) 17
- 24) 552, 12, 995, 23, 152, 8, 661, 13, 520, ___
 1) 8 2) 5 3) 2 4) 7
- 25) 17, 19, 38, 40, 80, 82, 164, ___
 1) 164 2) 166 3) 328 4) 320
- 26) 4, 4, 8, 24, 96, 480, ___



- 1) 2880 2) 2660 3) 2800 4) 2884
27) 2, 5, 11, 23, 47, 95, ____
 1) 190 2) 192 3) 191 4) 193
28) 10, 31, 94, 283, 850, ____
 1) 2500 2) 2551 3) 2451 4) 2561
29) 6, 15, 35, 77, 163, ____
 1) 330 2) 337 3) 336 4) 340
30) 1, 5, 13, 29, 61, 125, ____
 1) 250 2) 251 3) 255 4) 253
31) 3, 8, 19, 42, 89, 184, ____
 1) 344 2) 295 3) 375 4) 368
32) 1, 6, 30, 120, 360, ____
 1) 440 2) 1080 3) 720 4) 480
33) 5, 20, 24, 6, 2, 8, ____
 1) 12 2) 10 3) 15 4) 16
34) 3, 6, 10, 9, 12, 10, 15, 18, ____
 1) 10 2) 21 3) 16 4) None of these
35) 67, 61, 59, 53, ____, 43, 41
 1) 50 2) 49 3) 51 4) 47
36) 121, 169, 289, 361, 529, ____
 1) 729 2) 841 3) 848 4) 931
37) 23.2, 11, 5, 23, 11.3, 8, 22.8, 11.6, 11, 22.6, ____
 1) 11.9 2) 14 3) 22.4 4) 11.3
38) 9.3, 2.5, 16.2, 9, 2.7, 16.1, 8.7, 2.9, 16, 8.4, ____
 1) 3.1 2) 9.5 3) 19.5 4) 25.3
39) 47, 53, 59, 61, 67, 71, ____
 1) 94 2) 96 3) 73 4) 95
40) 1, 8, 9, 64, 25, 216, 49, ____
 1) 512 2) 64 3) 625 4) 343
41) 66, 12, 77, 14, 92, 11, 63, 9, 96, ____
 1) 14 2) 15 3) 16 4) 20
42) 46656, 3125, 256, ____, 4, 1
 1) 64 2) 121 3) 27 4) 100
43) 14, 15, 17, 20, 24, 29, ____
 1) 35 2) 45 3) 36 4) 38
44) $1331 + \sqrt{11}, 1000 + \sqrt{10}, \dots, 512 + \sqrt{8}, 343 + \sqrt{7}$
 1) 729 2) 730 3) 731 4) 732
45) 56, 89, 33, 21, 57, 88, 35, 19, 60, 85, 39, 15, ____
 1) 64 2) 65 3) 88 4) 69
46) 5, 1, 2, 8, 6, 2, 3, 11, 4, 0, 1, 5, 9, 2, 1, ____
 1) 12 2) 11 3) 6 4) 13
47) 5, 3, 8, 7, 5, 12, 19, 16, 35, 14, 6, ____
 1) 21 2) 20 3) 22 4) 16
48) 19, 22, 41, 16, 5, 21, 23, 2, 25, 14, 15, ____
 1) 30 2) 28 3) 29 4) 31

Practice Exercise I

- 1) 17, 18, 20, 23, 27, 32, ____
 a) 40 b) 39 c) 38 d) 37
- 2) 1, 1, 1, 2, 3, 5, 7, 10, ____
 a) 12 b) 14 c) 15 d) 13
- 3) 11, 13, 17, 19, 23, 29, ____
 a) 33 b) 32 c) 31 d) 34
- 4) 8, 10, 13, 18, 25, 36, ____
 a) 48 b) 49 c) 50 d) 51
- 5) 32.9, 32.7, 32.4, 32, 31.5, ____
 a) 30.5 b) 30.8 c) 30.4 d) 30.9
- 6) 21, 26, 36, 41, 51, 56, ____
 a) 61 b) 66 c) 76 d) 70
- 7) 5, 8, 10, 11, 14, 10, 17, 20, ____
 a) 22 b) 23 c) 13 d) 10
- 8) 95, 85, 76, 68, 61, 55, ____
 a) 48 b) 49 c) 50 d) 51
- 9) 21, 22, 26, 35, 51, ____
 a) 76 b) 77 c) 58 d) 82
- 10) 12.3, 12.4, 12.6, 12.9, 13.3, 13.8, ____
 a) 14.6 b) 14.4 c) 14.7 d) 14.5
- 11) 11, 11.5, 13, 15.5, 19, 23.5, ____
 a) 29.5 b) 29 c) 30 d) 30.5
- 12) 6, 6, 6.5, 5.5, 7, 4.5, 7.5, 3, 8, ____
 a) 0.5 b) 8.5 c) 2 d) 1
- 13) 53, 8, 51, 6, 47, 11, 49, 13, 12, ____
 a) 11 b) 3 c) 4 d) 6
- 14) 23, 6, 53, 15, 96, 54, 18, ____
 a) 18 b) 10 c) 8 d) 9
- 15) 2515, 13, 6251, 14, 1250, 8, 4256, ____
 a) 15 b) 17 c) 19 d) 18
- 16) 4664, 20, 5665, 22, 3883, 22, 1661, ____
 a) 12 b) 16 c) 18 d) 14
- 17) 1, 1, 2, 6, 24, 120, ____
 a) 600 b) 720 c) 500 d) 625
- 18) $\frac{625}{3}, \frac{125}{3}, \frac{25}{3}, \frac{5}{3}, \frac{1}{3}, \text{____}$
 a) $\frac{1}{15}$ b) $\frac{2}{15}$ c) $\frac{1}{3}$ d) $\frac{5}{3}$
- 19) 5, 10, 30, 60, 180, 360, ____ 2160
 a) 1800 b) 720 c) 740 d) 1080
- 20) 4, 4, 8, 24, 96, 480, ____
 a) 2800 b) 2660 c) 2880 d) 2884

o

- 21) 6, 12, 14, 28, 30, 60, 62, ____
 a) 124 b) 128 c) 64 d) 66
- 22) 41, 37, 31, 29, 23, 19, ____
 a) 15 b) 14 c) 17 d) 13
- 23) 89, 83, 79, 73, 71, 67, ____
 a) 65 b) 59 c) 61 d) 63
- 24) 87, 76, 63, 46, 27, ____
 a) 20 b) 3 c) 15 d) 4
- 25) 8, 9, 8.5, 10.5, 9, 12, 9.5, ____
 a) 13 b) 13.5 c) 14 d) 10.5
- 26) 11, 15, 19, 18, 26, 21, 32, 24, 37, ____
 a) 27 b) 33 c) 34 d) 45
- 27) 23.2, 11, 5, 23, 11.3, 8, 22.8, 11.6, 11, 22.6, ____
 a) 12 b) 11.9 c) 11.8 d) 11.7
- 28) 82, 86, 83, 84, 84, 82, ____ , 80
 a) 82 b) 84 c) 83 d) 85
- 29) 96, 25, 42, 95, 23, 44, 94, 21, 46, 93, ____
 a) 18 b) 19 c) 48 d) 17
- 30) 3, 12, 26, 81, 164, 495, ____
 a) 1404 b) 1406 c) 1405 d) 992
- 31) 62, 26, 46, 64, 24, 48, 68, 20, 52, 74, 14, 58, ____
 a) 80 b) 84 c) 85 d) 82
- 32) 5, 2, 1, 8, 6, 2, 1, 9, 3, 1, 0, ____
 a) 3 b) 5 c) 2 d) 4
- 33) 3, 2, 5, 6, 1, 7, 9, 2, ____ 2, 5, 7
 a) 11 b) 19 c) 12 d) 8
- 34) $\frac{13}{7}, \frac{11}{9}, \frac{15}{9}, \frac{9}{7}, \frac{17}{11}, \frac{7}{5}, \frac{19}{13}, \frac{5}{3}, \dots$
 a) $\frac{19}{15}$ b) $\frac{21}{15}$ c) $\frac{22}{15}$ d) $\frac{21}{13}$
- 35) $\frac{5}{7}, \frac{18}{11}, \frac{9}{11}, \frac{15}{8}, \frac{13}{15}, \frac{12}{5}, \frac{17}{19}, \frac{9}{2}, \dots$
 a) $\frac{21}{25}$ b) $\frac{22}{17}$ c) $\frac{21}{23}$ d) $\frac{22}{24}$

Check the Answers

1	C	6	B	11	B	16	D	21	B	26	A	31	D
2	D	7	D	12	D	17	B	22	C	27	B	32	D
3	C	8	C	13	B	18	A	23	C	28	D	33	A
4	B	9	A	14	C	19	D	24	D	29	B	34	B
5	D	10	B	15	B	20	C	25	B	30	D	35	C



Practice Exercise II

- 1) 14, 15, 17, 20, 24, 29, ____
a) 35 b) 45 c) 85 d) 95

2) 1, 1, 1, 2, 3, 5, 7, 10, ____
a) 55 b) 13 c) 95 d) 78

3) 9, 11, 14, 19, 26, 37, ____
a) 50 b) 100 c) 200 d) 59

4) 2, 11, 46, 141, 286, ____
a) 291 b) 292 c) 293 d) 294

5) 13, 40, 124, 381, 1159, ____
a) 3052 b) 3204 c) 3053 d) 3502

6) 47, 53, 59, 61, 67, 71, ____
a) 10 b) 25 c) 73 d) 95

7) 16.3, 16.4, 16.6, 16.9, 17.3, 17.8, ____
a) 18.4 b) 17.9 c) 18.5 d) 18.4

8) 17, 17.5, 19, 21.5, 25, ____
a) 29.5 b) 44.5 c) 58.5 d) 87.3

9) 13, 17, 19, 23, ____, 29, 31
a) 28 b) 25 c) 24 d) 26

10) 3, 12, 20, 27, 33, 38, ____
a) 42 b) 45 c) 44 d) 47

11) 42, 43, 47, 53, 61, ____
a) 70 b) 71 c) 68 d) 78

12) 22.9, 22.7, 22.4, 22, 21.5, ____
a) 21.1 b) 22.3 c) 21.4 d) 20.9

13) $\frac{5}{3}, \frac{8}{5}, \frac{13}{8}, \frac{21}{13}, \frac{34}{21}, \frac{55}{34}, \dots$
a) $\frac{89}{55}$ b) $\frac{99}{55}$ c) $\frac{98}{55}$ d) $\frac{98}{65}$

14) 11, 13, 17, 19, 23, ____, 29
a) 27 b) 25 c) 23 d) 26

15) $1\frac{4}{11}, 1\frac{4}{9}, 1\frac{4}{7}, 1\frac{4}{5}, 2\frac{1}{3}, \dots$
a) 9 b) 5 c) 1 d) 15

16) 96, 25, 42, 95, 23, 44, 94, 21, 46, 93, ____
a) 24 b) 19 c) 23 d) 48

17) 8, 9, 8.5, 10.5, 9, 12, ____
a) 11 b) 8.5 c) 9.5 d) 10.5

18) 11, 15, 19, 18, 26, 21, 32, 24, 37, ____
a) 27 b) 33 c) 34 d) 45

19) 3, 5, 13, 43, 177, 891, ____
a) 5354 b) 5535 c) 5353 d) 5346

20) 15, 3, 45, 16, 4, 64, 17, 5, 85, 20, 6, ____
a) 120 b) 92 c) 20 d) 107

- 21) 16, 18, 16.5, 17.5, 17, 17, 17.5, _____**
- a) 16.5 b) 20 c) 18 d) 19.5
- 22) $\frac{5}{7}, \frac{6}{11}, \frac{7}{10}, \frac{7}{13}, \frac{9}{13}, \frac{8}{15}, \frac{11}{15}, \text{_____}$**
- a) $\frac{9}{17}$ b) $\frac{15}{17}$ c) $\frac{22}{17}$ d) $\frac{32}{17}$
- 23) $\frac{2}{3}, \frac{21}{17}, \frac{6}{7}, \frac{19}{15}, \frac{10}{11}, \frac{17}{13}, \text{_____}$**
- a) $\frac{14}{15}$ b) $\frac{20}{15}$ c) $\frac{17}{15}$ d) $\frac{9}{17}$
- 24) 11, 11.5, 13, 15.5, 19, 23.5, _____**
- a) 29 b) 30 c) 25.5 d) 25
- 25) 6, 6, 6.5, 5.5, 7, 4.5, 7.5, 3, 8, _____**
- a) 7.5 b) 1 c) 8 d) 10
- 26) 2, 2, 4, 12, 48, 240, _____**
- a) 1690 b) 1575 c) 1440 d) 1750
- 27) 8, 16, 18, 36, 38, 76, 78, _____**
- a) 196 b) 174 c) 156 d) 224
- 28) 10, 2, 36, 12, 10, 2, 30, 10, 10, 2, 24, _____**
- a) 8 b) 10 c) 16 d) 24
- 29) 6, 6, 6, 12, 24, 72, 216, _____**
- a) 864 b) 963 c) 775 d) 222
- 30) 2, 6, 12, 36, 72, 216, _____**
- a) 450 b) 475 c) 432 d) 479
- 31) 12, 12, 18, 36, 90, 270, _____**
- a) 945 b) 950 c) 540 d) 560
- 32) 1800, 1800, 900, 300, 75, _____**
- a) 15 b) 75 c) 25 d) 35
- 33) 16, 32, 37, 74, 79, 158, 163, _____**
- a) 326 b) 330 c) 334 d) 349
- 34) 31, 36, 46, 51, 61, 66, _____**
- a) 77 b) 85 c) 95 d) 76
- 35) 4, 7, 10, 10, 13, 10, 16, 19, _____**
- a) 23 b) 10 c) 27 d) 25
- 36) 25, 30, 150, 145, 29, 34, _____**
- a) 140 b) 190 c) 170 d) 120
- 37) 5, 17, 16, 6, 10, 9, 7, 1, 0, 8, 22, _____**
- a) 21 b) 42 c) 32 d) 51
- 38) 6, 12, 14, 7, 5, 10, 12, 6, _____**
- a) 13 b) 15 c) 4 d) 14



Check The Answers

1	a	11	a	21	a	31	a	41	b
2	b	12	d	22	a	32	a	42	d
3	a	13	a	23	a	33	a	43	a
4	a	14	b	24	a	34	d	44	a
5	d	15	c	25	b	35	b	45	d
6	c	16	b	26	c	36	c	46	a
7	a	17	c	27	c	37	a	47	d
8	a	18	a	28	a	38	c	48	a
9	b	19	c	29	a	39	a	49	d
10	a	20	a	30	c	40	c	50	b

Practice Exercise III

Check the Answers

1	d	11	b	21	b	31	b
2	c	12	b	22	c	32	b
3	b	13	c	23	c	33	c
4	a	14	c	24	c	34	a
5	c	15	a	25	c	35	a
6	c	16	d	26	c		
7	a	17	b	27	b		
8	d	18	a	28	d		
9	c	19	b	29	b		
10	c	20	b	30	b		

IBM Questions

1) $\frac{1}{12}, \frac{1}{4}, \frac{3}{4}, \frac{9}{4}, \frac{27}{4}, \dots$

[IBM]

1) $\frac{81}{8}$

2) $\frac{81}{4}$

3) $\frac{27}{4}$

4) $\frac{27}{8}$

5) $\frac{1}{4}$

2) $\frac{1}{7}, \frac{3}{4}, \frac{4}{9}, \frac{5}{6}, \frac{7}{11}, \frac{7}{8}, \dots$

[IBM]

1) $\frac{10}{9}$

2) $\frac{11}{13}$

3) $\frac{10}{13}$

4) $\frac{11}{12}$

5) $\frac{10}{15}$

3) $\frac{3}{2}, 2\frac{1}{4}, \frac{9}{4}, \frac{7}{2}, 12\frac{1}{4}, \frac{49}{4}, \frac{4}{3}, 1\frac{7}{9}, \frac{16}{9}, \frac{8}{3}, \dots$

[IBM]

1) $\frac{8}{3}$

2) $\frac{16}{9}$

3) $\frac{64}{3}$

4) $\frac{64}{9}$

5) None of these

4) 56, 89, 33, 21, 57, 88, 35, 19, 60, 85, 39, 15,

[IBM]

1) 64

2) 37

3) 69

4) 65

5) 88

5) 3, 2, 1, 4, 5, 4, 5, 1, 0, 6, 3, __

[IBM]

1) 2

2) 0

3) 4

4) 3

5) 5

6) 1, 1, 1, 2, 4, 12, 36, __

[IBM]

1) 44

2) 144

3) 72

4) 118

5) 48

7) 6, 18, 21, 8, 11, 33, 2, 6, 9, 5, 8, 24, 7, 21, __

[IBM]

1) 23

2) 63

3) 33

4) 24

5) 21

8) 12, 3, 15, 14, 6, 19, 16, 9, 23, 18, 12, __

[IBM]

1) 27

2) 29

3) 23

4) 21

5) 15

9) -27, 9, -3, 81, -27, 9, 54, __

[IBM]

1) -27

2) -18

3) 18

4) 27

5) None of these

10) 10, 12, -36, -7, -5, 15, 19, 21, __

[IBM]

1) 63

2) -63

3) 23

4) -23

5) None of these

11) 33, 8, 41, 46, 21, 67, 72, 47, 119, 124, __

[IBM]

1) 484

2) 168

3) 99

4) 440

5) None of these

12) 100, 365, 24, 60, __

[IBM]

1) 48

2) 16

3) 60

4) 12

5) None of the

13) 1, 2, 3, 5, 7, 10, 13, 17, __

[IBM]

1) 21

2) 20

3) 24

4) 23

5) None of these

14) 30, 15, 12, 10, 6, __, 4, 2

[IBM]

1) 10

2) 12

3) 5

4) 15

5) None of these

15) 11.6, 2.3, 9.7, 11.3, 2.1, 9.6, 11, 1.9, 9.5, __

[IBM]

1) 10.3

2) 2.3

3) 10.7

4) 11

5) None of these

16) 9, 3, 24, 4, 9, 3, 36, 6, 9, 3, 30, __

[IBM]

1) 0

2) 3

3) 5

4) 6

5) None of these

17) 3, 7, 10, 8, 4, 12, 0, 5, 5, 3, 2, __

[IBM]

1) 10

2) 12

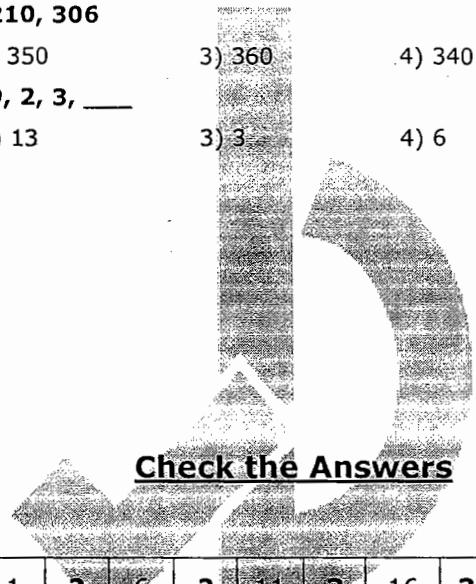
3) 5

4) 15

5) None of these



- 18) 5, 6, 6.5, 6.5, 8, 7, 9.5, ___ [IBM]**
 1) 11 2) 10.5 3) 5.5 4) 7.5 5) None of these
- 19) 1, 8, 11, 18, 80, 81, 82, ___ [INFOYSYS]**
 1) 240 2) 83 3) 80 4) 87 5) None of these
- 20) 2.3, 15.1, 3.3, 2.8, 15.9, 2.3, 3.3, 16.7, 1.3, 3.8, ___ 0.3 [IBM]**
 1) 17.2 2) 17.3 3) 17.4 4) 17.5 5) None of these
- 21) 1, 2, 3, 6, 11, 20, 37, 68, ___ [IBM]**
 1) 124 2) 125 3) 128 4) 129 5) None of these
- 22) 7, 4, 6, 3, 4.5, 1.5, 2.25, -0.75, ___ [IBM]**
 1) -0.25 2) -1.125 3) 1.125 4) -1.5 5) None of these
- 23) 2, 7, 41, 3, 6, 81, 9, 5, 54, 3, 12, ___ [IBM]**
 1) 36 2) 60 3) 56 4) 63 5) None of these
- 24) 6, 30, 30, ___, 132, 2210, 306 [IBM]**
 1) 305 2) 350 3) 360 4) 340 5) None of these
- 25) 5, 1, 2, 8, 8, 1, 0, 9, 9, 2, 3, ___ [IBM]**
 1) 14 2) 13 3) 3 4) 6 5) None of these


Check the Answers

1	2	6	2	11	3	16	3	21	2
2	3	7	4	12	3	17	3	22	2
3	4	8	1	13	1	18	4	23	4
4	4	9	2	14	3	19	2	24	4
5	1	10	2	15	3	20	4	25	1



LETTER SERIES

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

This chapter deals with the series of letters in which terms follow a certain pattern throughout. The task involved here is to recognize the pattern and complete the given series with the most suitable consecutive terms.

The following are the different types of letter series.

Type – I (one lettered series)

Type – II (Two lettered series)

Type – III (Three lettered series)

Type-I (one lettered series)

In single letter series, each term contains of one letter. The given position proposes a certain property. The job is to identify the property and to apply the same throughout the series.

Example (1): What is the next letter in the series C, F, I, L, _____?

Explanation: By observing the letter series given above, it can be noticed that two letters of the alphabet are skipped between every two letters i.e.,

Term	1	2	3	4	Blank
Given	C ₃	F ₆	I ₉	L ₁₂	O ₁₅
Missing	D, E	G, H	J, K	M, N	

The next letter of the series is 'O'.

Example (2): What is the next letter in the series K, M, P, T, _____?

Explanation: The number of letters between the consecutive terms is increasing constantly.

Term	1	2	3	4	Blank
Given	K ₁₁	M ₁₃	P ₁₆	T ₂₀	Y ₂₅
Missing	L	N, O	Q, R, S	U, V, W, X	

The next letter is 'Y'.

Example (3): What is the next letter in the series A, Z, B, Y, C, X, _____?

Explanation: By observing the letter series given above it can be noticed that it is a combination of two sets of series.

Term	1	2	3	4	5	6	Blank
Set - 1 ↑	A		B		C		D
Set - 2 ↓		Z		Y		X	

The next letter is D.



Example (4): What is the next letter in the series G, C, H, B, I, A, J, _____?

Explanation: This is the combination of two sets of series. The letters in odd places form one series and the letters in the even positions form another series.

Term	1	2	3	4	5	6	7	Blank
Set - 1 ↑	G		H		I		J	
Set - 2 ↓		C		B		A		Z

The next letter is Z.

Type-II (Two lettered series)

In two lettered series, each term consists of two letters. Which are connected with a specific relation thereby propounds a particular property. Hence the job is to identify the property and apply the same throughout the series.

Example (1): CM, DN, EO, FP, _____

Explanation: In the above series each term consists of two letters. Their sequence is as in the table below.

Term	1	2	3	4	Blank
Set - 1 ↑	C	D	E	F	G
Set - 2 ↓	M	N	O	P	Q

The answer is 'GQ'

Example (2): FH, IK, LN, OQ, _____

Explanation: Observe the sequence of series in the following table.

The required position is 'RT'

Example (3): AB, ZY, CD, XW, EF, _____

Explanation: The letter series given above consists of two letters. This letter series is a combination of two series. The terms in odd positions form one series; the terms in even positions form the series. Thus we get:

Alternate Term	1	2	3	4	5	Blank
Set - 1 ↑	AB		CD		EF	
Set - 2 ↓		ZY		XW		VU

The required term is 'VU'.

Type – III (Three letter series)

In this letter series each term has three letters. The given terms satisfy a certain property. Identify the property and then apply the same throughout the series.



Example (1): JOT, KPU, LQV, _____

Explanation: The letter series given above consists of three letters.

Term	1	2	3	Blank
Position 1	J	K	L	M
Position 2	O	P	Q	R
Position 3	T	U	V	W

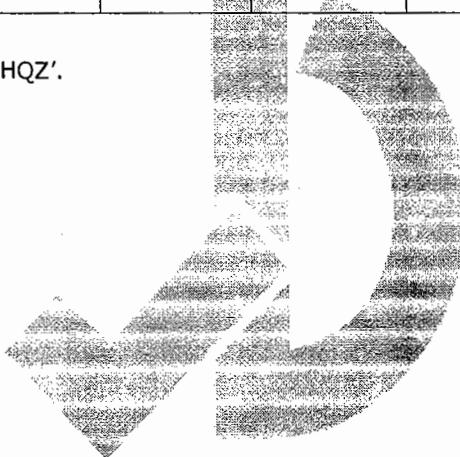
The required term is 'MRW'.

Example (2): BKT, DMV, FOX, _____

Explanation: In the letter series given above, each term consists of three letters. One letter is skipped between two consecutive terms.

Term	1	2	3	Blank
Position 1	B ₂	D ₄	F ₆	H ₈
Position 2	K ₁₁	M ₁₃	O ₁₅	Q ₁₇
Position 3	T ₂₀	V ₂₂	X ₂₄	Z ₂₆

The required term is 'HQZ'.



Classroom Exercise**1) D, H, L, P, T, ___**

- 1) X 2) Y 3) U 4) W

2) A, G M, S, ___

- 1) W 2) U 3) Y 4) Z

3) C, D, F, I, M, R, ___

- 1) W 2) X 3) Y 4) V

4) B, C, E, G, K, M, ___

- 1) O 2) P 3) Q 4) R

5) Z, Y, W, T, P, K, ___

- 1) M 2) F 3) G 4) E

6) Z, X, V, U, S, Q, P, ___

- 1) L 2) O 3) M 4) N

7) H, J, M, O, R, T, W, ___

- 1) Y 2) Z 3) A 4) B

8) A, A, B, D, C, I, D, P, E, ___

- 1) T 2) Y 3) X 4) H

9) A, A, B, F, X, ___

- 1) M 2) W 3) T 4) P

10) C, B, E, M, L, Y, R, D, V, F, K, ___

- 1) Q 2) R 3) M 4) P

11) AM, N, HI, Q, BJ, L, FM, ___

- 1) T 2) S 3) V 4) U

12) GM, JJ, MG, PD, SA, ___

- 1) PK 2) VX 3) VW 4) UX

13) ZA, YB, XC, WD, ___ UF

- 1) VE 2) SH 3) EV 4) HS

14) IW, JV, LT, OQ, SM, ___

- 1) XI 2) XJ 3) XH 4) VH

15) AY, CV, ES, GP, IM, ___

- 1) JJ 2) II 3) KI 4) KJ

16) NAO, LYQ, JWS, HUU, ___

- 1) FOU 2) FSW 3) FUS 4) FVS

17) CJH, GNL, KRP, ___

- 1) OVT 2) PSU 3) NVT 4) OVU

18) CNL, BLI, AJF, ZHC, ___

- 1) XDY 2) XFY 3) YFZ 4) YFA

19) XUW, TQS, PMO, ___ HEG

- 1) LKI 2) LIK 3) LQR 4) LOB

20) PMT, OOS, NQR, MSQ, ___

- 1) LUP 2) LVP 3) LVR 4) LWP

21) ABD, DGK, HMS, MTB, ___

- 1) SBM 2) RBL 3) SCL 4) SBL

22) bei, dhk, hmn, nts, vcz, ___

- 1) fnk 2) gnl 3) hmk 4) hml



23) BAD, DBE, HEC, NJF, _____

- 1) VQB 2) VQA 3) VQC 4) VQP

24) YSR, UPP, QMN, _____

- 1) MJL 2) MLJ 3) MJO 4) MQL

25) YEB, WFD, UHG, SKI, _____

- 1) QOL 2) QGL 3) TOL 4) QNL

26) A, CD, GHI, _____, UVWXYZ

- 1) LMNO 2) MNO 3) MNOP 4) NOPQ

27) AMOD, BJSD, CGXD, DDDD, _____

- 1) EAKD 2) EBJD 3) EAKF 4) IEAJD

28) KUG, MRL, OQO, _____, SIA, UFF

- 1) QMW 2) RLU 3) QLV 4) RKV

29) S, M, T, W, T, _____

- 1) G 2) W 3) F 4) T

30) K, P, H, S, Q, J, I, R, G, _____

- 1) M 2) T 3) U 4) L

31) C, X, M, N, V, E, F, U, D, _____

- 1) R 2) V 3) U 4) W

32) G, T, I, R, D, W, F, U, N, M, P, _____

- 1) I 2) M 3) H 4) K

33) IM, RN, KL, PO, TU, GF, CW, _____

- 1) ZD 2) XW 3) XD 4) DX

34) MS, NH, RO, IL, KM, _____

- 1) PN 2) MK 3) NJ 4) NP

35) HMJ, JOK, LQL, NSM, PUN, _____

- 1) RVO 2) RUO 3) RWO 4) RWP

36) ABC, F, HJB, T, CMC, S, DDT, _____

- 1) C 2) B 3) A 4) E

37) B₂CD, _____, B₃CD, B₅CD, B₆D

- 1) B₃CD 2) BC₃D 3) BCD₄ 4) BC₂D

38) DEF, DEF₂, DE₂F₂, _____, D₂E₂F₃, D₂E₃F₃

- 1) DE₂F₂ 2) D₂E₂F 3) D₂E₂F₃ 4) D₂E₂F₂

39) J, F, M, A, M, J, _____

- 1) J 2) A 3) S 4) O

40) 3O, 3T, 5T, 4F, 4F, 3S, 5S, 5E, _____

- 1) 5T 2) 5E 3) 5N 4) 4N

41) ZYX, WVU, _____ QPO, NML, KJI

- 1) RST 2) SRT 3) TSR 4) TRS

42) A1, B4, C9, D16, _____

- 1) E27 2) F25 3) E25 4) F36

43) A2B, B6C, C12D, D20E, _____ F42G

- 1) E36F 2) E30F 3) F25E 4) F30E

44) 10J1, 9R2, 8X3, 7B4, _____

- 1) 6D5 2) 5Y5 3) 6E5 4) 6F6



45) Q23F, P24H, E25T, M26M, _____

- 1) S27G 2) S27H 3) T27H 4) Y28A

46) 16K5, 14G7, 12C9, 10A11, _____

- 1) 8B12 2) 8C13 3) 8E13 4) 9E12

47) BD, 8, CD, 12, KL, 132, JM, _____

- 1) 140 2) 130 3) 120 4) 110

48) D, 23, T, 7, L, 15, U, 6, P, _____

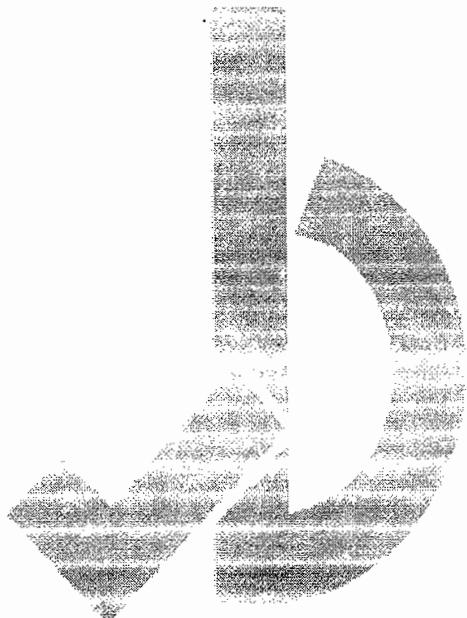
- 1) 11 2) 12 3) 13 4) 14

49) 2E3, 3H5, 5L7, 7R11, _____

- 1) 11T12 2) 11X13 3) 11W13 4) None

50) H10B, I23N, G11D, C14K, A25X, _____

- 1) S21C 2) Q20D 3) P24H 4) W25A



Practice Exercise**1) BT, 40, DL, 48, MC, 39, DK, 44, EC, _____**

- 1) 16 2) 25 3) 15 4) 20

2) 5J2, 3L4, 5T4, 2R9, 4P4, _____

- 1) 3S6 2) 6W4 3) 5Y5 4) 4U5

3) C, E, I, O, W, _____

- 1) G 2) H 3) I 4) F

4) A, A, A, B, C, E, G, J, _____

- 1) L 2) N 3) M 4) K

5) A, G, M, S, _____

- 1) U 2) Y 3) X 4) V

6) B, C, E, G, K, M, Q, _____

- 1) T 2) U 3) S 4) W

7) Z, Y, W, T, P, K, _____

- 1) D 2) F 3) G 4) E

8) H, J, M, O, R, T, W, _____

- 1) Z 2) Y 3) A 4) B

9) A, C, D, E, M, R, K, L, W, F, M, _____

- 1) U 2) R 3) T 4) S

10) Q, O, M, L, J, H, G, E, C, _____

- 1) B 2) A 3) Z 4) W

11) Z, X, U, S, P, N, K, _____

- 1) G 2) H 3) I 4) J

12) A, B, D, F, I, L, O, S, _____

- 1) V 2) W 3) X 4) U

13) A, D, I, P, Y, _____

- 1) L 2) M 3) J 4) K

14) BU, GS, LQ, QO, _____, AK

- 1) VM 2) UM 3) VN 4) UX

15) MZ, OX, QV, ST, UR, _____

- 1) WQ 2) WP 3) WS 4) VP

16) XI, TM, PQ, LU, HY, _____

- 1) DD 2) DM 3) DC 4) CC

17) SAT, TZR, UYP, VZN, WWL, _____

- 1) XVJ 2) XVI 3) XWJ 4) YVJ

18) ABC, BDF, CFI, DHL, EJO, _____

- 1) ELR 2) FLQ 3) FLR 4) FLS

19) BKB, DMZ, HQV, NSP, _____

- 1) WWH 2) VVH 3) VUH 4) VWH

20) CNL, BLI, AJF, ZHC, _____

- 1) XDY 2) XFY 3) YFZ 4) YFA

21) XUW, TQS, PMO, _____, HEG

- 1) LKI 2) LIK 3) LQR 4) LOB



22) PMT, OOS, NQR, MSQ, _____

- 1) LUP 2) LVP 3) LVR 4) LWP

23) KWC, HZE, ECG, BFK, YIM, _____

- 1) VLN 2) VLQ 3) VLS 4) VMQ

24) A, CD, GHI, MNOP, _____

- 1) UVWXY 2) UVWX 3) UVWXYZ 4) None

25) H, S, M, N, L, O, K, P, G, _____

- 1) M 2) S 3) T 4) Q

26) C, X, I, R, S, H, U, F, J, _____

- 1) I 2) R 3) S 4) Q

27) SI, HR, LK, OP, CM, XN, KG, _____

- 1) TP 2) PO 3) PT 4) TM

28) COW, XLD, BOY, YLB, HUT, SFG, FIR, _____

- 1) URI 2) VRI 3) LRI 4) URJ

29) B, 0.5, D, 0.25, E, 0.2, J, _____

- 1) 1 2) 0.1 3) 0.2 4) 0.5

30) A, 1, B, 8, F, 216, K, 1331, H, _____

- 1) 343 2) 512 3) 125 4) 216

31) A3B, C7D, E11F, D12H, _____

- 1) C6B 2) M19E 3) P18B 4) T22C

32) J₁K₂L₄, J₃K₄L₆, J₅K₆L₈, _____, J₉K₁₀L₁₂

- 1) J₆K₇L₉ 2) J₇K₈L₉ 3) J₇K₈L₁₀ 4) J₆K₇L₉

33) ZA₅, Y₄B, XC₆, W₃D, _____, U₂F

- 1) VE₇ 2) V₈E 3) V₆E 4) V₇E

34) 23U2, 19K8, 12D8, 11G4, 15J5, _____

- 1) 18P1 2) 16M3 3) 16M4 4) 5C3

35) 4H2, 6R3, 1D4, 3L4, 5Y5, _____

- 1) 6W4 2) 6S3 3) 6K6 4) 7U3

Check The Answers

1	3	6	3	11	3	16	3	21	2	26	4	31	3
2	3	7	4	12	2	17	1	22	1	27	3	32	3
3	1	8	2	13	3	18	3	23	2	28	1	33	1
4	3	9	4	14	1	19	4	24	1	29	2	34	2
5	2	10	1	15	2	20	3	25	3	30	2	35	4



CODING & DECODING

Coding – Decoding primarily deals with secret messages in defence services and others. In coding a word is coded by using various patterns. Task is to understand the pattern and thereby decipher the code. In decoding, the inverse process has to be followed.

Coding and decoding can be classified as below.

1. Jumbled pattern
2. Substitution pattern
3. Shifting pattern
4. Miscellaneous

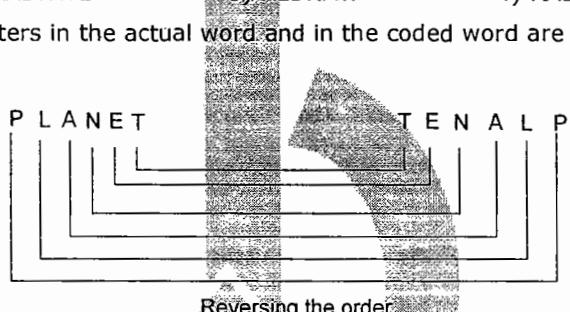
1. JUMBLED PATTERN:

In the questions of this pattern letters in the given word are jumbled following a specific pattern, that pattern should be applied to the other words.

Ex: In a certain code language, PLANET is coded as TENALP. How is WANDER coded in that language?

- 1) RNDWEA 2) RADNWE 3) REDNAW 4) RADENW

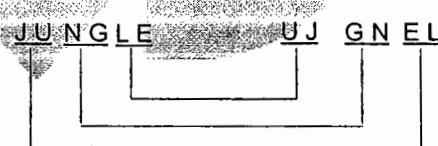
Explanation: Here, the letters in the actual word and in the coded word are same, but they are jumbled following a specific pattern.



Similarly, the code of WANDER is REDNAW.

Ex: In a certain code language, JUNGLE is coded as UJGNEL. How is FOREST coded in that language.

- 1) TSETOF 2) OFERTS 3) ROFTSE 4) TFSOER



The code of FOREST is OFERTS.

2. SUBSTITUTION PATTERN: f BLOOD RELATIONS

In this type of questions, a letter or a word is substituted by a number or a letter or a word. These coded letters or words or numbers may be or may not be at the same position as the actual letters and words.

Ex: In a certain code language, PAPER is coded as 1 2 4 3 4 and NOMINEE is coded as 3 6 7 8 5 3 7.

How is PEN coded in that language?

- 1) 657 2) 584 3) 374 4) 284

Explanation: In this pattern the repeating letters will have repeating code signs, as:



Word	Code	
(P) A (P) E R	1 2 (4) 3 (4)	$\Rightarrow P = 4$
(N) O M I (N) E E	3 6 (7) 8 5 3 (7)	$\Rightarrow N = 7$
		$\Rightarrow E = 3$

$$\therefore P E N = 4 3 7$$

\therefore P is 4, N is 7 and E is 3. The code of PEN in the given choice is 374. Choice (3)

Ex: In a certain code language 'Water is good' is coded as 'mad tad gad' and 'Food is good' is coded as 'gad wad mad'. How is 'water' coded in that language?

- 1) tad 2) mad 3) gad 4) wad

Explanation: The words common to both 'water is good' and 'Food is good' are 'Is' and 'Good' and common in their codes are 'gad' and 'mad'. The code of water is tad.

3. SHIFTING PATTERNS:

In this type of questions every letter is written as another letter following a definite patterns. The important types of this pattern are

- Normal shifting pattern: In this type of questions, the letters of the word follow a unique shifting pattern or alternate shifting pattern.

Ex: In a certain code language, PUBLIC is coded as RWDNKE. How is MARGIN coded in the language?

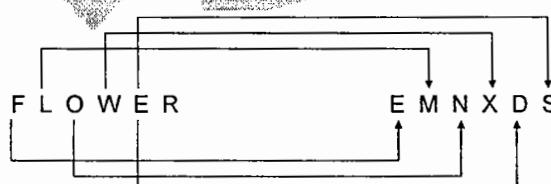
- 1) NBSHJO 2) QDSJKN 3) OCTIKP 4) LZQFHM

Explanation: Here, every letter is shifted two places forward in the coding. Hence, the code of MARGIN is OCTIKP.

Ex: In a certain code language FLOWER is coded as EMNXDS. How is TARGET coded in the language?

- 1) SBSIDV 2) UBSHFU 3) SBQHDU 4) UBQHDU

Explanation: Here, every alternate starting from first letter is shifted one place backwards and every alternate letter starting from the second letter is shifted one place forward.



Similarly, the code of TARGET = SBQHDU

- R-type: In this type of pattern, a letter is guided as r^{th} letter. That r^{th} letter is coded in a specific pattern which is applicable to every other letter also.

Ex: Direction for the examples from 1 to 7: In a certain code language, Every r^{th} letter, for $r=1, 2, 3, \dots, 12, 13$, is shifted to $(r + 13)^{\text{th}}$ letter.



Classroom Exercise

- 1) In a certain code, "GOODNESS" is coded as HNP CODTR. How is GREATNESS coded as ?**
 a) HQFZUFRTRT b) HQFZUMFRT c) HQFZUODTR d) FSDBSODTR
- 2) If "TRAILER" is coded as VPCGNCT then "TEETH" is coded as?**
 a) VGGVJ b) VCRGJ c) VCGRJ d) VGCJR
- 3) If MASCULINE is SAM LUCENI, then DIRECTION is**
 a) RINDECIO T b) DOITCERIN c) RIDTCEION d) RIDTCENO I
- 4) If the word PEOPLE is coded as ELPOEP, how is REASONING coded in that language?**
 a) SEAROGNIN b) GNINOREAS c) SEARGNINO d) GNINOSAER
- 5) If NATIONAL is written as ODYPXYNA, how is SELECT coded in that language?**
 a) THQLLE b) THPLME c) TCELES d) THQMLE
- 6) If "PORTER" is coded as "QNSSFQ" then "BRIGHT" would be coded as?**
 a) CQJFIS b) CNJHIS c) CQJFGS d) CQJFJS
- 7) If the word PENCIL is coded as CEILNP, then the word MANAGER is coded as?**
 a) AAEGNRM b) MRRAAEG c) EGAMNRA d) AAEGMNR
- 8) If LENGTH is coded as MCQCYB, how is AREA ?**
 a) BPGX b) BQGX c) BPHW d) BPWG
- 9) If DELHI is coded as CCIDD then word BHUJ is**
 a) CIVK b) AFRF c) AERF d) AFSF
- 10) If FEMALE is UVNZOV, then WOMEN is**
 a) CKNZN b) DLNZM c) CKMOQ d) DLNVN
- 11) If in a certain code language GREEN is coded as GSIND. How is BLUE coded in that language?**
 a) BLYN b) CMYN c) BMZN d) BMYN
- 12) In a certain code language, if the word "GENERATION" is coded as "EEAINGNRTO". how is "TERMINATION" coded in that language?**
 a) EIAIOTRMNTN b) EMNTOTRIAIN c) TRMNTNEIATI d) EMNOTAIINR
- 13) If in a certain code language;**
"sim min tin" means "wild animal dangerous". "min ken pit" means "one pet animal" and "kim pin pit" means "pet and will", then how will "ken" be coded in that language?
 a) Pet b) Animal c) One d) and
- 14) In a certain code language;**
"Rose is Red" is coded as "bil kil ril", "Milk is White" is coded as "ril pil dil" and "Red White Green" is coded as "mil dil kil" then what is the coded for "Milk is Rose"?
 a) mil ril bil b) ril kil dil c) pil ril bil d) pil kil bil
- 15) In a certain coding language;**
'Sun shines brightly' is written 'ba lo sul'; 'Houses are brightly lit' is written as 'kado udo ar i ba'; and 'Light comes from sun' as 'dapi kup lo nro'. What are codes for 'sun' and 'brightly'?
 a) lo, ba b) ba, lo c) sul, lo d) ba, sul

- 16) In a certain code "LAP" is coded as 312. "APPLE" is coded as 23125, "CAP" is coded as 241 then LEAP =?
 a) 5321 b) 3512 c) 5324 d) 5342
- 17) In a certain code "APPLE" is coded as 21561. "LEVEL" is coded as 92552, "TAPE" is coded as 2671 then PLATE =?
 a) 15627 b) 15927 c) 15672 d) 15692
- 18) In a certain code "BREAK" is coded as \$@*%*. "RANKS" is coded as @*Δ%+, BEARS then =?
 a) \$*@@+ b) \$@*+@ c) \$@*@+ d) @*\$@+
- 19) In a certain code "XEROX" is coded as 52315. "WIDEN" is coded as 46720, then OXEN=?
 a) 1502 b) 1520 c) 5210 d) 5102
- 20) If in a certain code "TWENTY" is coded as 74221372; how is "NINE" coded as?
 a) 13181322 b) 149245 c) 12161221 d) 1510156
- 21) In a certain look TOM = 48; DICK = 27, then HARRY will be ____?
 a) 63 b) 70 c) 69 d) 72
- 22) In a certain code BLUE = 68; FLY = 38 then SPICE will be?
 a) 80 b) 79 c) 83 d) 94
- 23) In a certain code language if the word DEAR = 7, BEARS = 9, then WAX=? [INFOSYS]
 a) 14 b) 13 c) 15 d) 16
- 24) If FAN is coded 441 then EAR will be ____?
 a) 625 b) 144 c) 576 d) 256
- 25) In a certain code language if the word GRASS = 64, SQUARE = 81, then PICTURE =?
 a) 25 b) 81 c) 96 d) 92
- 26) In a certain code language if the word FAN = 7, STATE = 13, then SHOPPING = ?
 a) 11 b) 13 c) 10 d) 16
- 27) If 'blue' is called as 'green', 'green' means 'white', 'white' means 'yellow', 'yellow' means 'black', 'black' means 'red' and 'red' means 'brown', then what is the colour of the milk?
 a) red b) white c) black d) yellow
- 28) If 'clock' is called as 'radio', 'radio' means 'computer', 'computer' means 'oven', 'oven' means 'television', 'television' means 'book', then In which a lady bake?
 a) oven b) television c) radio d) book

Practice Exercise II

- 1) In a certain code language, if BATTERY is written as TABTYRE, then the word CULTURE will be written as**
- 1) CULTERU 2) LUCTERU 3) LUCERUT 4) LCUTERU
- 2) In a certain code language, if DUCK is written as 93, HEN is written as 72, then the word PARROT will be written as**
- 1) 85 2) 86 3) 88 4) 78
- 3) In a certain code language, if MADE is coded as 529, BAG is coded as 100, then the word BACK will be coded as**
- 1) 324 2) 270 3) 289 4) 400
- 4) In a certain code language, if HOT is coded as 34, COOL is coded as 54, then the word MILD will be coded as**
- 1) 38 2) 83 3) 84 4) 48
- 5) In a certain code language, if MANAGER is written as AAEMNGR, then the word EMPLOYEE will be written as**
- 1) EPEOMLYE 2) EPOELMEY 3) EPOEMLYE 4) MLOEEPOE
- 6) In a certain code language, if HOCKEY is written as INEIHV, then the word KARATE will be written as**
- 1) LZTYWC 2) LZUYWB 3) LZTYWB 4) LYTYWB
- 7) In a certain code language, if SUPERMAN is written as SPRAUEMN, then the word SPIDERMAN will be written as**
- 1) SIEMNDPAR 2) SIENMPDRA 3) SIEMPNDRA 4) SIEMNPDR
- 8) In a certain code language, if CARTOON is coded as RACTNOO, then the word NETWORK will be coded as**
- 1) TENWRKO 2) TENWKRO 3) NETWKRO 4) TENKWR
- 9) In a certain code language, if HUT is written as 49, HOME is written as 41 then the word HOUSE will be written as**
- 1) 70 2) 68 3) 71 4) 69
- 10) In a certain code language, if RADIO is coded as QCAMJ, then the word LAPTOP will be coded as**
- 1) KCMXJV 2) KCNXJU 3) KCMXJU 4) KBMXJU
- 11) In a certain code language, if BANANA is written as 33, CARROT is written as 57 then the word POTATO will be written as**
- 1) 88 2) 78 3) 97 4) 88
- 12) In a certain code FAME is coded 9-4-16-8 then SONY will be**
- 1) 22-17-18-28 2) 21-18-17-28 3) 22-18-17-28 4) 22-18-16-29
- 13) In certain code HALF is coded IBMG; TWICE is coded UXJDF then HAEMATIN will be :**
- 1) IBFNUOJ 2) ICFNBUJO 3) IBFNUJO 4) IBFBNUJO
- 14) In certain code SUMMER is coded HFNNVI; WINTER is coded DRMGVI then SPRING will be:**
- 1) HKIRMT 2) HKIRTN 3) HKIRMU 4) HKIGMT
- 15) If "CAB" is coded as "WUV", how is "DEAF" coded in the language?**
- 1) XYUZ 2) UWYV 3) XWUY 4) UYXZ
- 16) If DQPTFTF is called as COMPANY then HGQIWGS will be called as?**
- 1) GENERAL 2) GENERAE 3) HARYANA 4) POINTER

17) In a certain language, if **CHAMBER** is written as **CRHEABM**, then how is **CREATOR** written as in that language?

- 1) CRROTEA 2) CRROETA 3) CRORETA 4) CRROTAE

18) In a certain code language, if **BIRD** is coded as **5F21A**, then the word **ANIMAL** will be coded as

- 1) 4L12J4I 2) 4K14J4J 3) 4K12J4I 4) 4K12J24I

19) In a certain code language

'do re me' means 'he is late', whereas

'fa me la' means 'she is early' and

'so it do' means 'he leaves soon', which word in that language means 'late'?

- 1) la 2) do 3) me 4) re

20) In a certain code language

'te da ka ni' means 'intelligence is in genes',

'se po lo ni' means 'genes are not responsible'

'ba da fu te' means 'intelligence is through experience',

What does 'ka' stand for in that code language

- 1) genes 2) through 3) intelligence 4) in



Check the Answers

1	2	6	3	11	2	16	1
2	3	7	4	12	3	17	2
3	3	8	2	13	3	18	3
4	2	9	2	14	1	19	4
5	3	10	3	15	1	20	4



BLOOD RELATIONS

In the questions on Blood Relations, a chain of relationships is given in the form of information. On the basis of this, we have to find relationship between any two persons. For this we must be familiar with the relationships within a family.

In solving such kind of questions the following chart becomes very useful.

Mother's or Father's son	Brother
Mother's or Father's daughter	Sister
Child of Mother or Father	Sibling (could be brother or sister)
Mother's or Father's brother	Uncle
Mother's or Father's sister	Aunt
Mother's or Father's Mother	Grand Mother
Mother's or Father's Father	Grand Father
Grandmother's or Grandfather's brother	Grand uncle
Grandmother's or Grandfather's sister	Grand Aunt
Son's wife	Daughter-in-law
Daughter's husband	Son-in-law
Brother's wife	Sister-in-law
Sister's husband	Brother-in-law
Husband's or wife's sister	Sister-in-law
Husband's or wife's brother	Brother-in-law
Sister's or brother's son	Nephew
Sister's or brother's daughter	Niece
Uncle's or Aunt's son / daughter	Cousin
Son's or daughter's daughter	Grand daughter
Son's or daughter's son	Grandson
Husband or wife	Spouse

For solving the questions on Blood relations, it is required to draw the family tree by using the given information. The convenient method of drawing a family tree is

- Put a square box for a male mark a single line and a square box with double marks to represent a female.

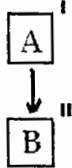
e.g : If A is a male, then represent it as



If B is a female, then represent it as

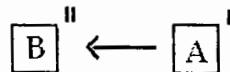


- If we do not know whether C is a male or a female, then simply represent it as C.



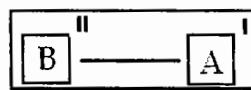
e.g: If B is the daughter of A, then it is

- Use a vertical arrow to represent the brother sister relationship.



e.g: If B is a sister of A, then

- Use a horizontal line to represent Husband – wife relationship and enclose them in a box.



e.g: If A is the husband of B, then

The commonly used confusing terms in the questions are:

Sister's or Brother's Father	Father
Sister's or Brother's mother	Mother
Father's or Mother's Son	Himself or Brother
Father's or Mother's daughter	Herself or sister
Mother's husband	Father
Father's wife	Mother
Mother's or Father's only child	Himself or herself
Brother's or sister's only sibling	Himself or herself

Classroom Exercise

- 1) How is my father's brother's father's daughter's child is related to me?**
 1) Sister 2) Nephew 3) Cousin 4) Brother
- 2) How is my father's mother's only child's son's mother related to my father?**
 1) Sister 2) Mother 3) GrandMother 4) Wife
- 3) How is my mother's brother's only sibling related to me?**
 1) Mother 2) Aunt 3) Niece 4) Either 1 or 2
- 4) How is my sister's husband's mother-in-law's mother's only son-in-law related to me?**
 1) Uncle 2) Father 3) GrandSon 4) Nephew
- 5) Eshwar's cute little sister's father's wife's brother's wife's son is related to E as?**
 1) Brother 2) Cousin 3) Sister 4) None
- 6) C is brother of A, B is daughter of A, E is the sister of C and D is the brother of B. Who is the uncle of D?**
 1) A 2) B 3) C 4) E

Directions [7-8] : Amar goes to the house of his sister Seeta, who is the neighbor of Geeta. Geeta has a daughter Meera. Ashu is the father of Amar and is married to Anjali and has a sister, who is Geeta.

- 7) How is Geeta related to Amar?**
 1) Aunt 2) Sister 3) Cousin 4) Mother
- 8) How is Ashu related to Seeta?**
 1) Brother 2) Uncle 3) Cousin 4) Father

Direction for the questions [9 – 11] :

Read the information given below and answer the following questions given below.

- (i) B is the son of A, whose sister is E.
 - (ii) C is daughter of D.
 - (iii) There are 3 males belonging to 3 generations and a married couple.
- 9) How is E related to C?**
 1) Sister-in-law 2) Brother-in-law 3) Cousin 4) Sister
 - 10) Which of the following pairs is are married couple?**
 1) DA 2) BE 3) AC 4) Can't Say
 - 11) How is D related to B?**
 1) Grandmother 2) Grand Father 3) Father 4) Grandson

Directions for questions [12 to 16]: Study the following information Assume that the persons A, B, C, D, E and F are members of a family.

- i) C is the sister of F.
- ii) D is the father of A and grandfather of F.
- iii) B is the Brother of E's husband.
- iv) There are two fathers, one mother, one daughter-in-law & 3 brothers in the family.

- 12) How many male members are there in the group?**
 1) 1 2) 2 3) 3 4) 4
- 13) How 'F' is related to E?**
 1) Uncle 2) Husband 3) Daughter 4) Son
- 14) Who are the group of brothers?**
 1) ABF 2) ABD 3) BFC 4) BDF



15) Who is the mother?

- 1) A 2) B 3) D 4) E

16) Who is E's husband?

- 1) B 2) A 3) C 4) F

Direction [17 – 18] In a certain coding language if

- A \$ B means A is the wife of B
A + B means A is the father of B
A * B means B is the brother of A
A # B means B is the mother of A

17) If " T + R # S * Q * P ". How is T related to P?

- 1) Father 2) Brother-in-law 3) Sister-in-law 4) brother

18) If " M # N \$ K * J + W ". Which of the following is true?

- 1) J is the brother-in-law of N 2) M is the cousin of W
3) K is the Uncle of W 4) All of the above.

19) Showing a photograph a man said, "This boy in this photograph is a son of my parents only daughter-in-law." How is the man related to the boy?

- 1) Father 2) Son 3) Uncle 4) Either 1 (or) 2

20) Pointing out to a lady, a girl said, "She is the sister of the father of my father's only son".

How is the lady related to the girl?

- 1) Sister-in-law 2) Aunt 3) Mother-in-law 4) Mother

21) Pointing to Akash, father of Hari said "He is the son of the daughter of wife of father-in-law of mother of my son". How is Hari related to Akash?

- 1) Uncle 2) Brother 3) cousin 4) Nephew

22) Pointing to Priya, father of Pritu says, "She is the daughter of the daughter of the wife of the only son of the grandfather of my sister". How is Sushma related to Priya if Sushma is the sister of Pritu?

- 1) Mother 2) Aunt 3) Niece 4) Cousin

23) Looking at the portrait , a man said "I don't have brothers and sisters. That man's father is my father's son". Who is he looking at?

- 1) Father 2) Brother 3) himself 4) Son

24) In a family there are three fathers, three sons two grand fathers, two grandsons, one great Grandfather and one great Grandson. How many male members are in the family?

- 1) 8 2) 4 3) 5 4) 12

25) If the father of the son of the professor and the son of the father of the professor fight and the professor did not fight. Who fought? [INFOSYS]

- | | |
|-----------------------|------------------------|
| 1) Son and Father | 2) Son and Brother |
| 3) Husband and father | 4) Husband and Brother |



Practice Exercise

Choose the correct answer for the following questions.

- 1) X's father's wife's father's granddaughter's uncle will be related to X as?**
 1) Son 2) Uncle 3) Nephew 4) Grandfather
- 2) What is my mother's husband's father-in-law's son's daughter to me?**
 1) Niece 2) Aunt 3) Sister 4) Cousin
- 3) What is my father's wife's grandfather's only child's son's daughter to me?**
 1) Aunt 2) Niece 3) Sister 4) Cousin
- 4) How is my mother's sister's brother's wife's child related to me?**
 1) Brother 2) Uncle 3) Cousin 4) Nephew
- 5) A is the uncle of B. C is the wife of B. They have a son D-whose sister is E. What is A to E?**
 1) Uncle 2) Brother 3) Father 4) Grand Uncle
- 6) E's cute little sister's father's wife's brother's wife's son is related to E as?**
 1) Brother 2) Sister 3) Cousin 4) Uncle
- 7) How is X's mother's brother's daughter's mother's mother-in-law is related to X?**
 1) Aunt 2) Grand Mother 3) Mother 4) Grand Father
- 8) S's brother's wife's brother's mother's husband's only daughter's husband is related to S as?**
 1) Brother 2) Cousin 3) Father 4) Uncle
- 9) Pointing to a person, a man said to a woman, 'His mother is the only daughter of your father' How was the woman related to the person?**
 1) mother 2) son 3) Grandmother 4) Can't say
- 10) Pointing towards a man in the photograph, Archana said, "He is the son of the only son of my grandfather". How is the man related to Archana?**
 1) Cousin 2) Nephew 3) Brother 4) Son
- 11) Introducing a man, a woman said, 'He is the only son of my mother's mother. How is the woman related to the man?**
 1) Mother 2) Aunt 3) Sister 4) Niece
- 12) Pointing towards a lady Raman said, "This woman is the wife of my father's only son". How Raman is related to that woman?**
 1) Brother 2) Uncle 3) Husband 4) Son
- 13) If Manoj is the brother of Rashmi, Rashmi is the daughter of Anitha, Anitha is the sister of Kailash and Rashmi is the wife of Roshan, how is Manoj related to Kailash?**
 1) Uncle 2) Brother 3) Brother-in-law 4) Nephew
- 14) Pointing to a lady, a girl said, "She is the daughter-in-law of the grandmother of my father's only son. How is the lady related to the girl?**
 1) Sister-in-law 2) Mother 3) Aunt 4) Mother-in-law
- 15) If B says that his mother is the only daughter of A's mother, how is A related to B?**
 1) Son 2) Father 3) Brother 4) Uncle
- 16) If A is the mother of B and C; and D is the husband of C, then how is A related to D?**
 1) Mother 2) Son-in-law 3) Mother-in-law 4) Aunt
- 17) In a family of Six persons A, B, C, D, E and F there are two married couples. B is Grandmother of A and mother of D, C is wife of D and mother of F. F is the Granddaughter of E. Which of the following is true?**
 1) A is brother of F 2) F is sister of A
 3) B has two grandsons 4) D has two daughters

18) B is the son of C, D is C's sister has a son E and a daughter F, G is the maternal uncle of E.

How is B related to E?

- 1) Cousin 2) Nephew 3) Uncle 4) Brother

19) A and B are married couple, X and Y are brothers. X is the brother of A how is Y related to B?

- 1) Brother-in-law 2) Brother 3) Cousin 4) Uncle

Directions [20 to 24]: Read the following information and answer the questions that follow. In a family, there are six members A, B, C, D, E and F. A and B are a married couple, A being the male member. D is the only son of C, who is the brother of A. E is the sister of D. B is the daughter-in-law of F, whose husband has died.

20) How is F related to A?

- 1) Mother 2) Sister-in-law 3) Sister 4) Mother-in-law

21) How is E related to C?

- 1) Sister 2) Brother-in-law 3) Son-in-law 4) Daughter

22) Who is C to B?

- 1) Brother 2) Brother-in-law 3) Son-in-law 4) Nephew

23) How many male members are there in the family?

- 1) Two 2) Three 3) Four 4) Five

24) How is E's brother related to A's mother?

- 1) Son 2) Nephew 3) Grand Son 4) Grand Father

Directions for questions [25 to 29]: The following questions are based on the paragraph given below.

A, B, C, D, E, F and G are 7 people planning to go on an SCOT World Tour. A is the oldest person and has one son and a daughter. G's father is D, who is a businessman. D's wife, E is a social worker. C is a spinster. B, who is A's son and F are a newly married couple. Both the children of A are married and all stay together. G and C are siblings.

25) How is F related to A?

- 1) Daughter-in-law 2) Daughter 3) Son-in-law 4) Son

26) Who among the following is A's daughter?

- 1) E 2) D 3) C 4) B

27) How is G related to E?

- 1) Son 2) Daughter 3) Brother 4) Can't Say

28) How is F related to C?

- 1) Niece Uncle 2) Nephew 3) Uncle 4) Aunt

29) How is C related to A?

- 1) Grandson 2) Granddaughter 3) Son 4) Brother

Directions 30 to 34: Read the following information carefully and answer the questions given below:

All the six members of a family A, B, C, D, E and F are traveling together. B is the son of C but C is not the mother of B. A and C are a married couple. E is the brother of C. D is the daughter of A. F is the brother of B.

30) How many male members are there in the family?

- 1) 1 2) 3 3) 2 4) 4



31) Who is the mother of B?

- 1) D 2) F 3) E 4) A

32) How many children do A have?

- 1) One 2) Two 3) Three 4) Four

33) Who is the wife of E?

- 1) A 2) F 3) B 4) Can't Say

34) Which of the following is a pair of females?

- 1) AE 2) BD 3) DF 4) AD

Direction [35 to 37]: In a family, there are five members A, B, C, D and E belonging to three generations.

- a) A is the father of B.
- b) C and E are sisters.
- c) D is the child of C.
- d) There are exactly 3 males and 2 females.

35) How is A related to D?

- 1) Grandfather 2) Grandmother 3) Son 4) Granddaughter

36) How is E related to B?

- 1) Sister 2) Sister-in-law 3) mother 4) Cousin

37) Who among the following are couples?

- 1) AE 2) AC 3) BE 4) BC

Direction for questions [38 to 42]: Read the paragraph carefully and answer the questions below it.

[TECH MAHINDRA]

- (i) A, B, C, D, E and F are six members of a family.
- (ii) There are two married couples among them.
- (iii) C is the mother of A and F.
- (iv) E is the father of D.
- (v) A is the grandson of B.
- (vi) The total number of female members in the family is three.

38) Who is the wife of E?

- 1) B 2) C 3) F 4) Data Inadequate

39) Which of the following pairs is one of the married couples?

- 1) EF 2) BD 3) EB 4) AF

40) Which of the following is a group of female members?

- 1) BDE 2) AFB 3) DCF 4) BCF

41) How is F related to A?

- 1) Brother 2) Daughter 3) Son 4) Sister

42) How is B related to F?

- 1) Sister 2) Grand Mother 3) Wife 4) Data inadequate

43) In a family there are two mothers and two daughters, then how is the youngest person is related to the eldest person?

- 1) Grandmother 2) Great grandmother
3) Granddaughter 4) Great granddaughter

44) There is a family party consisting of two fathers, two mothers, two sons, one father-in-law, one mother-in-law, one daughter-in-law, one grandfather, one grandmother and one grandson. What is the minimum number of persons required so that this is possible?

- 1) 4 2) 8 3) 7 4) 5

Direction for questions [45 to 47]: Read the following information carefully and answer the questions given below it.

In a certain code language, some relationships are coded as shown below:

A + B means A is the sister of B.

A - B means A is the brother of B.

A × B means A is the father of B.

A © B means B is the mother of A.

A @ B means B is the wife of A.

A \$ B means B is the husband of A.

45) In a code "S - P © Q \$ R", how is S related to R?

- 1) Father 2) Husband 3) Son 4) None

46) Which of the following statement can be inferred from the code "J + k - L × M © N"?

- 1) J and N are sisters-in-law.
2) K is the uncle of M.
3) K and L are brothers of J, who is their sister.
4) All of the above.

47) Which of the following would be the code for "X and V are brothers-in-law"?

- 1) V \$ W × U © Y + X 2) U × V @ W © X \$ Y
3) U × V @ W + X × Y 4) None of these

48) Pointing to a boy a woman says "His father is a father-in-law of the person whose father is a father-in-law of mine." How is the boy related to woman?

- 1) Brother 2) Cousin 3) Father 4) Husband

49) Looking at the portrait, a man said "I don't have brothers and sisters. That man's father is my father's son". Who is he looking at? [MAHINDRA SATYAM]

- 1) Father 2) Brother 3) himself 4) Son

50) Read the instructions carefully and answer the questions given below it

i) B is mother of D but D is not daughter of B.

ii) A is son of M and brother of G.

iii) G is sister of D.

Which of the following cannot be referred from the given information?

- 1) B has 3 children 2) M has two sons
3) G is younger to B. 4) A is younger to D.

Check The Answers

1	2	11	4	21	4	31	4	41	2
2	4	12	3	22	2	32	3	42	2
3	4	13	4	23	2	33	4	43	3
4	3	14	2	24	3	34	4	44	4
5	4	15	4	25	1	35	1	45	3
6	3	16	3	26	1	36	2	46	4
7	2	17	2	27	4	37	4	47	3
8	1	18	1	28	4	38	1	48	1
9	1	19	1	29	2	39	3	49	4
10	3	20	1	30	4	40	4	50	4



DIRECTION SENSE

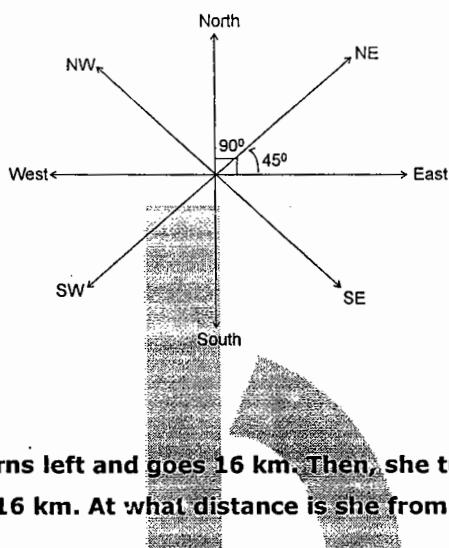
These questions are designed to judge the candidate's ability to trace his goal by applying a clear sense of direction. A successive follow up of directions leads to the final point by covering some distance between the initial and final points. Confusion is often caused with the frequent right and left turns in the journey.

The four main directions are

North (N) South (S) East (E) West (W)

and the four cardinal directions are

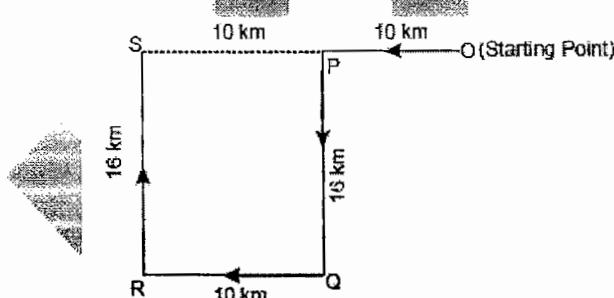
North East (NE) North West (NW) South East (SE) South West (SW)



Important:

Example:

Rati goes 10 km West, then turns left and goes 16 km. Then, she turns right and goes 10 km and then she turns right and goes 16 km. At what distance is she from the starting point now?



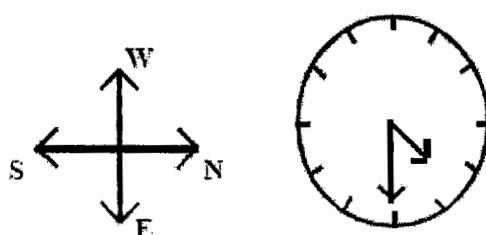
Explanation :

The required distance OS is $OP + PS$, whereas $PS = QR = 10 \text{ km}$.

Hence, $OS = 10 \text{ km} + 10 \text{ km} = 20 \text{ km}$. The answer is (d) 20 km

Example : A watch reads 4.30 if the minute hand points east, inwhat direction does the hour hand points?

Explanation : Clearly to show 4.30, the position of the minute and hour hands of the clock will be as shown, if the minute hand points east, the hour hand will point to the North-east direction



Classroom Exercise

- 1) Mani walks 10km towards North. From there, he walks 6 km towards south. Then he walks 3 km towards East. How far and in which direction is he with reference to his starting point?**
- 1) 7 km, East 2) 5 km, West 3) 5 km, North-East 4) 7 km, West
- 2) Badri started walking towards East. After moving a distance of 1 km, he turned southwards and walked 5 km. Again he turned to East and walked 2 km. Finally, he turned to the North and walked 9 km. How far is he from his starting point?**
- 1) 7 km 2) 5 km 3) 4 km 4) 3 km
- 3) Priya goes 30 mts North, then she turns right and walks 40 mts, again she turns right and walks 20 mts. She again turns right and walks 40mts. How many meters is she from her original position?**
- 1) 0 km 2) 10 km 3) 20 km 4) 40 km
- 4) Shiva went 15 kms to the west from his house, then turned left and walked 20 kms. He then turned east and walked 25 kms and finally turned left covered 20kms. How far was he from his house?**
- 1) 0 kms 2) 10 kms 3) 40 kms 4) 80 kms
- 5) A man went 40 kms south, turns right, travel 20 kms. Again he took 10 kms, 20 kms, 30 kms always taking left each time. In which direction and how far is he from the starting point?**
- 1) South, 30 kms 2) North, 20 kms 3) South, 20 kms 4) South-East, 20 kms
- 6) Rohit travelled 60 kms west and travelled 10 kms, 20 kms and 40 kms always taking right each time. In which direction and how far from the starting point?**
- 1) North-East, 50 kms 2) South-East, 50 kms
3) South-West, 50 kms 4) South, 40 kms
- 7) Latha started walking a distance of 40 kms towards South and took left 30 kms. Then she took left walking 40 kms and finally turned towards East walking further 35 kms. How far and which direction is she from the starting point?**
- 1) 60 kms, East 2) 65 kms, south 3) 65 kms, East 4) 65 kms, west
- 8) Ramu started towards East from his house travelling 50 kms and took left 30 kms. Again he travelled 20 kms, 30 kms and 40 kms always taking right each time. In which direction and how far is he from the starting point?**
- 1) East, 30 kms 2) East, 20 kms 3) West, 30 kms 4) West, 20 kms
- 9) Sunil traveled 5 kms towards south from his house and he turned right and travelled 8 kms again he took left turn covering a distance of 10 Km. How far is he from his house?**
- 1) 15 kms 2) 16 kms 3) 17 kms 4) 20 kms
- 10) From his office, Rahim walks 15 m in the South. He turns right and walks 9 m. He again walks 25 m by turning left. How far is he from his office?**
- 1) 40 m 2) 41 m 3) 45 m 4) 49 m
- 11) A person traveled straight from his house a distance of 2 km, he took right and traveled 1 km again he traveled 1 km in the right direction. If he is in the South – West direction from his house, in which direction did he begin the Journey?**
- 1) North 2) East 3) South 4) West

- 12) I started from my home and went 2 km straight. Then, I turned towards my right and went 1 km. I turned again towards my right and went 1 km. If I am North-West from my house, then in which direction did I start in the beginning?**
- 1) North 2) South 3) East 4) West
- 13) Ramya travelled 10 kms from her house and took right travelling 6 kms and she again took left 4 kms. If finally she is in south-east direction from her house. In which direction did she start from the house?**
- 1) South 2) North 3) East 4) West
- 14) Ravi walks North wards. After a while, he turns to his right and a little further to his left. Finally, after walking a distance of one km. he turns to his left again. In which direction is he moving now?**
- 1) North 2) South 3) East 4) West
- 15) Rahim went 15 km East from his house, he took left and travelled 22 km, he travelled 19 km, 19 km taking left each time. How far and in which direction is he from his house?**
- 1) 4 km; North-east 2) 7 km; North-east
3) 5 km; North-east 4) 5 km; North-west
- 16) Latha walked 60 km south, she took right covering a distance of 20 km. Again she took left travelling 15 km, 20 km and 40 km taking left each time. How far and in which directions is she from the starting point?**
- 1) 30 km; North 2) 35 km; North 3) 35 km; South 4) 40 km; South
- 17) Suleman's house is located 12 km away an exactly towards southern direction from Ramu's house. Gopal's house is located 5 km away and exactly towards west from Ramu's house. What is the distance between Gopal's house and Suleman's house?**
- 1) 14 km 2) 17 km 3) 13 km 4) 12 km
- 18) From his office, Ram, Raju went 15 km to the north, then he turned west and covered 10 km. Then, he turned south, covered 5 km and finally turning to east, he covered 10 km. In which direction is he from his office?**
- 1) South 2) North 3) West 4) East
- 19) Raghu went 4 kms North from his house, he took left covering a distance of 4 kms, he took right travelling 2 kms, finally he took left travelling 4 kms. How far is he from the starting point?**
- 1) 17 kms 2) 15 kms 3) 10 kms 4) 14 kms
- 20) Sowmya went 25 kms south and took right travelling 10 kms further. Finally she turned right travelling 55 kms. Now she started travelling towards the starting point. In which direction is she moving now?**
- 1) North-West 2) North 3) South-East 4) South-West
- 21) The time on the clock is 11.25 pm. If the minutes hand is pointing towards North, then the hours hand point towards which direction?**
- 1) South 2) South-West 3) South-East 4) North-West
- 22) A clock is so placed that at 2 p.m. the minute hand points towards north-west. In which direction does the hour hand point at 6.00 p.m.?**
- 1) North-West 2) West 3) North-East 4) South-East
- 23) A watch shows 8.30. If the minute hand points towards east, in what direction will the hour hand point?**
- 1) South-West 2) South-East 3) West 4) North-West

- 24) A river flows West to East. After some time it takes a left turn and flows further. Then it takes a semicircular path to its right because of a mountain and then flows to its left. In which direction is the river flowing?**
- 1) North 2) South 3) East 4) West
- 25) Vikram, who is facing South, turns 135° in clockwise and then 180° in anticlock wise direction, In which direction is he facing now?**
- 1) South 2) South-West 3) South-East 4) East
- 26) Mr East, Mr West, Mr North and Mr South have to escape in four different directions. Standing at a junction. Mr East and Mr West did not take South direction. Mr East did not take West and they should not go according to their names. In which direction Mr East and Mr North go?**
- [INFOSYS]
- 1) North and East 2) East and North 3) South and East 4) North and South
- 27) If east is called west, north is called south, then north – east is _____?**
- 1) North-West 2) North 3) South-West 4) South – East
- 28) One evening, two friends A and B- were sitting in a lawn, facing each other. If A's shadow was falling exactly on her left, them which direction was B facing?**
- 1) North 2) South 3) East 4) West
- 29) One morning, Rahul and Kamal are standing in a lawn facing in the opposite direction. If Rahul's shadow falls to his right, then which direction was Kamal facing?**
- 1) South 2) North 3) East 4) South-East
- 30) One morning Ranjith and Rekha were sitting in a lawn facing each other and the shadow of Rekha is to her right hand side. Then in which direction is Ranjith facing now?**
- 1) East 2) West 3) North 4) South
- 31) One morning Rahul and Ramya, were sitting in a park being their backs touching each other and the shadow of Rahul is in his left hand side then in which direction is Ramya facing?**
- 1) West 2) North 3) East 4) South
- 32) One evening two friends Anitha and Vijaya were talking to each other face to face. If Vijaya's shadow was exactly to her right side, which direction was Anitha facing?**
- 1) North 2) South 3) West 4) Data inadequate
- 33) A is to south of B, who is to the west of C. In which direction is C with respect to A?**
- 1) South-West 2) South-East 3) North- East 4) Data inadequate
- 34) Of the five villages P, Q, R, S and T situated close to each other, P is to the west of Q. S is to the south of P, T is to the north of Q and R is to the east of T. then T is in which direction with respect to S?**
- 1) South-West 2) South-East 3) North- West 4) North-East
- 35) Four cities A, B, C and D are located such that D is 10 km to the North of B, A is 14 km to the South of C, B is 7 km to the east of C. What is the distance between the city A and D?**
- 1) 24 km 2) 25 km 3) 26 km 4) 30 km
- 36) Four pillar A, B, C, D are situated in such a way that pillar A is to the south of pillar C and to the west of pillar B. Pillar D is to south of pillar B. In which direction is D from C?**
- 1) North 2) North-East 3) North-West 4) South-East
- 37) Mohan and Sohan started walking from the same point with the same speed. Mohan walked 5 kms, turned left and walked further 10 kms, turned left and further walked 10 kms and stopped. Sohan also walked the same distances, but always took a right turn. If initially Mohan walked North and Sohan walked East then what is the distance between them at the time they stopped?**
- 1) $25\sqrt{2}$ kms 2) 5 kms 3) $5\sqrt{2}$ kms 4) 10 kms
- 38) A person starts from his house, then travels 6 km towards the east, 12 km towards the left, 6 km towards the right, 7 km to the south, 4 km towards the left, 10 km towards the left and**

finally travels 4 km towards the right in the given order. Where is he now in with reference to the order. Where is he now in with reference to the starting point?

- 1) 25 km to the north-east 2) 44 km to the north
 3) 27 km to the north-east 4) 32 km to the south-west

39) One day Rajesh and Sheetal were starting at a fixed point. Rajesh went towards east and took left, then again right and finally left. Sheetal started towards south and took right, then left. If they covered 20 kms for each turn. What is the final distance between them?

- 1) 60 kms 2) 80 kms 3) 90 kms 4) 100 kms

40) One day A and B were standing at a fixed point, A travelled 10 kms, 20 kms, 20 kms, 10 kms always taking left at each time, whereas B covered the same distances but always taking right each time. If both A and B started towards east. What is the final distance between them?

- 1) 10 kms 2) 15 kms 3) 30 kms 4) 20 kms

41) In above mentioned problem, if A started his journey towards east and B started his journey towards south. What is the final distance between them?

- 1) 20 kms 2) 0 kms 3) 5 kms 4) 10 kms

42) On a highway, two cars P and Q were 150 kms apart from each other, they started travelling towards each other. Car P travelled 40 kms on the highway and took right covered 30 kms, from there it covered 40 kms taking left, whereas Car Q travelled 40 kms on the highway and took right covering a distance of 10 kms. What is the final distance between them?

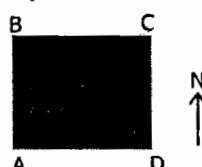
[ACCENTURE]

- 1) 40 kms 2) 50 kms 3) 30 kms 4) 60 kms

43) The houses of A and B face each other on a road going north-south, A's being on the western side. A comes out of his house, turns left, travels 5 km, turns right, travels 5 km to the front of D's house. B does exactly the same and reaches the front of C's house. Which of the following statements is correct?

- 1) C and D live on the same street 2) C's house faces south
 3) The houses of C and D are less than 20 km apart 4) None of the above

44) A, B, C and D are standing on the four corners of a square field as shown in the figure. From the positions shown in the figure, A walks to North position and B walks to the East position while C decides to walk two sides in anticlockwise direction. D walks to North and then changes his mind to take the previous position. Identify the choice with correct positions.



- 1) A & B occupy the same position. 2) C & D occupy the same position.
 3) D & B are in their original positions. 4) B & C are diagonally opposite positions.

45) There are 5 buildings A, B, C, D and E on a campus. The following instructions are given below:

- (i) To reach A from B, go 1 km North and 2 km East.
- (ii) To reach C from A, go 2 km South and 1 km East.
- (iii) To reach D from B, go 1 km West and 1 km South.
- (iv) To reach E from D, go 1 km East.

Which of the following is false?

- 1) B is 1 km North of E.



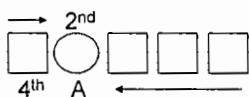
- 2) C is 3 km East of E.
- 3) The distance from B to D is 3 km.
- 4) The distance from B to E is same as the distance from D to E.

Check The Answers

1	3	11	3	21	2	31	4	41	2
2	2	12	4	22	4	32	2	42	2
3	2	13	3	23	2	33	3	43	3
4	2	14	4	24	3	34	4	44	4
5	3	15	4	25	3	35	2	45	3
6	3	16	3	26	4	36	4		
7	3	17	3	27	3	37	3		
8	1	18	2	28	1	38	1		
9	3	19	3	29	2	39	4		
10	2	20	3	30	3	40	4		

SEATING ARRANGEMENT

Out of 5 students, If A is 2nd from left end then he will be 4th from right end.

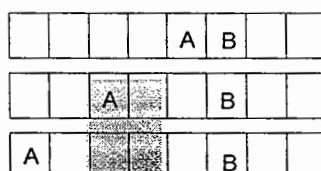


$2 + 4 = 6$ which is (total + a)

$$\therefore L + R = T + 1$$

i.e, left position + right position = Total students + 1

→ A is to the left of B implies the immediate left, somewhere to the left or the extreme left end.



Note: First place B then place A to the immediate left or somewhere to the left or to the extreme left end.

→ Same is the case when the word 'right' is used.

→ Adjacent means by the side of or one next to the other, either on the left or on the right

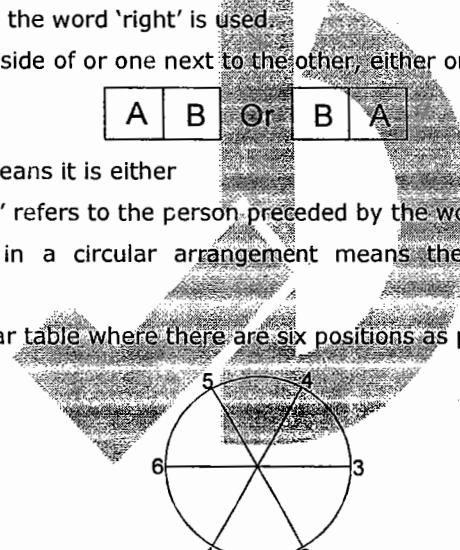


Ex: P and Q are adjacent means it is either

Note: In the questions who' refers to the person preceded by the word 'who'.

Left or right when used in a circular arrangement means the immediate left and immediate right respectively

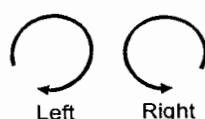
→ Let us consider a circular table where there are six positions as per the following diagram



To get the position or to find out the position to the left of any given position we need to move in clockwise direction.

To find out the position to the right of any given position we need to move in anticlockwise direction.

Ex: Let us take A is at 5th position. If we want to place B to the left of A we need to move one position in clockwise direction and place B at 4th position. If B is to be placed to the right of A we need to move one position in anticlockwise direction and place B at 6th position.



Classroom Exercise

- 1) There are five students P, Q, R, S and T who are sitting on a bench. T & Q are sitting together, T & R are sitting together, P is on the extreme left, Q is second from extreme right.
Who is sitting between P and Q?

a) Q & R b) R & T c) R & P d) R & S

- 2) Five persons are standing in a line. One of the two persons at the extreme ends is a professor and the other is a businessman. An advocate is to right of a student. An author is to the left of the businessman. What is the position of advocate from the left?

a) 2nd b) 3rd c) 4th d) 1st

- 3) Five children are sitting in a row. S is sitting next to P but not T. K is sitting next to R, who is sitting on the extreme left and T is not sitting next to K. Who are sitting adjacent to S?

a) K and P b) R and P c) Only P d) Can't Say

Direction for questions [4-6]:

A, B, C, D, E, F and G are sitting in a row.

- i) C is to the immediate right of D.
- ii) B is at the extreme end and has E as his neighbor.
- iii) G is between E and F.
- iv) D is sitting third from the right.



- 4) Who is sitting to the right of E?

a) Q b) G c) R d) S

- 5) Who are sitting at the extreme ends?

a) BA b) CA c) DA d) EA

- 6) Who is sitting between A and D?

a) C b) B c) D d) S

Direction for questions [7-9]:

A, B, C, D, E, F and G are sitting in a row

- i) F is to the immediate right of E.
- ii) E is 4th to the right of G.
- iii) C is the neighbor of B and D.
- iv) D has equal number of members on either end of the row.

- 7) What is the position of A?

a) Extreme Left b) Extreme right c) Exactly middle d) None of these

- 8) Who are to the left of C?

a) G and B b) E and B c) C and F d) B and D

- 9) Who are the neighbours of B?

a) E and B b) F and G c) C and G d) None of these



Directions for questions [10 to 14]: These questions are based on the following Data.

A, B, C, D, E, F, G, H and I are nine persons sitting in a row facing the north. H has an equal number of persons on either side of him. F is to the immediate right of B, E is to the immediate left of I and D is to the immediate left of B. There is exactly one person between G and C.

10) Who are the immediate neighbours of H?

- a) F and A b) G and C c) F and G d) Can't Say

11) If A is at the extreme left, then who will be at the extreme right?

- a) E b) F c) D d) G

12) If the number of persons between G and F is two, then what is the number of persons between C and D?

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

13) If C is to the right of H, then how many people will be always between C and F?

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

14) What is the total number of possible arrangements?

- a) 6 b) 4 c) 8 d) 16

Direction for questions [15-17]:

Seven varsity basketball players (A, B, C, D, E, F, and G) are to be honoured at a special luncheon.

The players will be seated on the dais in a row.

A and G have to leave the luncheon early and so must be seated at the extreme right. B will receive the most valuable player's trophy and so must be in the centre to facilitate presentation. C and D are bitter rivals and therefore must be seated as far apart as possible.

15) Which of the following cannot be seated at either end? [CAPGEMINI, INTELLIGROUP]

- a) C b) D c) G d) F

16) Which of the following pairs cannot be seated together?

- a) B & D b) C & E c) D & G d) E & A

17) Which of the following pairs cannot occupy the seats on either side of B?

- a) F & D b) D & E c) E & G d) C & F

Direction for questions [18-19]:

A, B, C, D, E, and F are sitting in a circular manner facing at the center.

- i) E is the neighbor of A and D.
- ii) B is not between F and C.
- iii) F is to the immediate right of A.

18) Who is sitting opposite to A?

- a) A b) B c) F d) C

19) Who is to the second right of A?

- a) E b) C c) D d) B

20) A, B, C, D, E, and F are sitting in a circular manner facing at the center. D is between F and B,

A is second to the left of D and second to the right of E. Who is facing A?

- a) B b) F c) D d) B or F

21) Six friends are sitting in a circle and are facing the centre of the circle. Hari is between Prakash and Pankaj. Priti is between Mukesh and Lalit. Prakash is to the left of Mukesh. Who is to the second right of Hari?

- a) Lalit b) Mukesh c) Prakash d) None of these



22) Six people P, Q, R, S, T and U are sitting in a circular manner facing towards the center.

- i) P and Q are opposite to each other,
- ii) R is to the left of P
- iii) T and S are opposite to each other.
- iv) U is to the right of S.

then who is to the left of Q?

- a) U
- b) T
- c) Q
- d) S

Direction for questions [23-24]:

Six people P, Q, R, S, T and V are sitting in a circular manner facing towards the center.

- a) T is not between Q and S but some other one.
- b) P is to the left of V
- c) R is 4th to the right of P.

23) Who is sitting to the right of V?

- a) S
- b) R
- c) T
- d) Q

24) Who among them are opposite to each other?

- a) P and S
- b) T and S
- c) R and V
- d) Q and S

25) Six people A, B, C, D, E and F went to a restaurant and sat around a table for dinner. Since A does not like C, he doesn't sit either opposite or beside C. B and F always like to sit opposite each other. If A is beside F then who are the two neighbors' of B? [WIPRO]

- a) D & C
- b) E & C
- c) D & E
- d) Can't Say

Directions for the question [26-28]:

Read the information given below and answer the following questions.

Four boys Chandu, Dharani, Bharat, Anil and four girls Ramya, Soumya, Uma and Veena sit around a circular table, such that Exactly two boys have girls in opposite chairs and exactly two boys have girls sitting in the adjacent chairs. Anil is sitting between two girls and opposite to Bharat. Ramya is not adjacent to Anil or Bharat and is sitting opposite to a boy. Uma is not sitting immediately next to Anil but is sitting next to Chandu.

26) Who is sitting opposite to Ramya?

- a) Chandu
- b) Dharani
- c) Veena
- d) Can't Say

27) Who is sitting opposite to Uma?

- a) Chandu
- b) Dharani
- c) Veena
- d) Can't Say

28) Who is sitting adjacent to Bharat?

- | | |
|---------------------|--------------------------------|
| a) Uma and Chandu | b) Uma and Sowmya or Veena |
| c) Dharani and Uma. | d) Soumya or Veena and Dharani |

Direction for Question 29-30:

Eight persons -A, B, C, D, E, G, H and L are sitting around a circular table. A and D are opposite to each other. B is to the left of L. C is opposite to H. H is to the left of G.

29) Who is to the left of E?

- a) D
- b) B
- c) C
- d) G

30) If A is to the left of C, then which of the following is the correct arrangement?



- a) C A E G H D B L b) C A E G H L B D c) C A E G H D L B d) C A E G H B L D

Direction for Question 31-32: Read the information carefully the answer the questions.

Four Men – A, B, C and D and four Women – P, Q, R and S are sitting around a circular table. No two males sit adjacent to each other. D sits two places to the right of A and adjacent to S, who is two places to the left of P, who is adjacent to B, who in turn is not opposite to A.

31) Who is sitting opposite to S?

- a) Q b) R c) A d) Can't say

32) If Q sits three places away from C and B, the who sits three places to the left of D?

- a) P b) R c) B d) S

33) Each team out of three teams A and D, B and F, C and E all sit along a triangular table. D sits immediate right of F and C sits immediate to the right of A. who among the following have the same number of persons between them as those between A and F?

- a) D and E b) A and B c) C and F d) E and F

Direction for Questions [34-35]:

Eight people – A, B, C, D, E, F, G and H – sat around the rectangular table not in the same order. One person sits along the shorter side and three persons sit along the longer side.

A and G are sitting diagonally opposite to each other. D and E are sitting opposite to each other. A is sitting immediate left of F, who is sitting at one of the shorter sides of the table.

34) If C is sitting to the immediate right of H, then who is sitting opposite of F?

- a) B b) C c) H d) Can't Say

35) If C is sitting opposite of A, then who among the following must be sitting on the same side as C?

- a) G and E b) G and D c) G d) H or B

Practice Exercise

Instructions for the questions [1-3]

Six persons A, B, C, D, E and F are seated in a row,

- i) C does not sit adjacent to D.
- ii) A sits three places to the left of D.
- iii) B sits immediately to the right of F, who is at one of the end.

1) Who are the neighbours of A?

- a) B & F
- b) C & F
- c) B & C
- d) E & D

2) Who is sitting at the extreme right?

- a) F
- b) C
- c) E
- d) D

3) Which one of the following is to immediate left of E?

- a) D
- b) C
- c) F
- d) A

4) Five friends are seated on a bench for a photograph, Imran sits to the immediate right of Ravi, who is not beside Hari. Latha sits to the immediate left of Suresh and is at the corner of the bench. Who among the following is sitting at to the right of Suresh?

- a) Imran
- b) Hari
- c) Ravi
- d) Can't Say

Instructions for the questions [5-7]

Seven persons K, L, M, N, O, P and Q are seated in a row.

- i) N sits immediately to the left of M.

- ii) K sits 4 places to the left of P.

- iii) Q is between P and M.

- iv) L is sitting 3 places to the right of Q.

5) Who is sitting at the extreme ends?

- a) K & O
- b) K & L
- c) L & N
- d) Can't Say

6) Who is sitting immediately to the right of P?

- a) O
- b) L
- c) M
- d) N

7) If N and P interchange their places, then who is two places left of L?

- a) O
- b) M
- c) N
- d) Q

8) Five persons sits in a row. Hari is not next to Kamal, Girish sits two places to the right of Javed. If Mohan is sitting two places from the extreme right, then who sits at the extreme left end of the row?

- a) Hari
- b) Mohan
- c) Kamal
- d) Javed

Instruction for the questions [9-10] Read the information carefully and answer the following questions. Six persons sits in a row.

- i) Pankaj is seated to the right of Wasim.

- ii) Eshwar sits four places to the left of Ranjit.

- iii) Nilesh is seated two places away from Kiran, who is at one of the end.

9) If Kiran is sitting on the extreme right, then who sits on the extreme left?

- a) Nilesh
- b) Eshwar
- c) Pankaj
- d) Ranjit

10) Who among the following cannot be seated at either end of Ranjit?

- a) Pankaj
- b) Nilesh
- c) Kiran
- d) Eshwar



11) Six friends were sitting around a circular table facing the center Amar, Kiran, Jeetu, Hemanth, Dhawan and Manjeet. Jeetu is sitting 2 places to the left of Amar and opposite to Kiran. If Dhawan and Manjeet are opposite to each other. Who is sitting left of Jeetu?

- a) Dhawan b) Manjeet c) Kiran d) Hemanth

12) Six friends were sitting around a circular table facing the center A, B, C, D, E and F. B is not adjacent to A, but is opposite to D. A is opposite to F. If E is not adjacent to B, then who is opposite to E?

- a) A b) B c) C d) D

13) P, Q, R, S, T and U are seated around a circular table. Q is the neighbor of R and U, T is the neighbor of S and P. If S is to the left of R, then who is 2 places to the right of U?

- a) S b) P c) T d) None

14) Ankit, Manu, Chetan, Babita, Pinky and Shekar were sitting around a circular table. Pinky is neither adjacent to Shekar nor Babita. Shekar is 4 places to the left of Babita. If Chetan and Ankit are adjacent to Shekar, then who is opposite to Manu?

- a) Shekar b) Pinky c) Babita d) Ankit

Directions for the questions [15-17]: Read the information and answer the following questions.
Eight friends Anvesh, Bobby, Chirag, Daniel, Emanuel, Fatima, George and Harish were sitting around a circular table for dining at a restaurant.

i) Daniel is opposite to Emanuel, but neither of them are adjacent to Fatima or George.

ii) Bobby is sitting to the left of George.

iii) Chirag is to the left of Daniel and is opposite to Anvesh.

15) Who among the following is opposite to each other?

- a) Harish & George b) Fatima & George
c) Fatima & Harish d) Can't Say

16) If Harish is sitting right of Emanuel, then who among the following is right of Daniel?

- a) Bobby b) Emanuel c) Anvesh d) Chirag

17) Which of the following is definitely true?

- a) George is sitting left of Chirag b) Fatima is sitting to the right of Daniel
c) Chirag sits opposite to Harish d) None of these

18) Eight friends A, B, C, D, E, F, G and H were sitting around a circular table. C sits opposite to A and they don't like D and H, So they are neither adjacent nor opposite to them, then who among the following is opposite to each other?

- a) B and F b) E and H c) D and H d) Cannot be determined

Directions for the questions [19-21]: Read the information and answer the following questions.

Eight persons M, N, O, P, Q, R, S and T were sitting in a row facing towards North.

i) P and Q were sitting at the extreme ends of the row.

ii) M and S were sitting in the middle of the row.

iii) N and O always sit adjacent to each other.

19) If R is to the immediate left of P, then who among the following cannot be adjacent to each other?

- a) S & N b) M & O c) S and R d) T and S

20) If N is three places to the left of M, then who among the following must always sit together?

- a) Q & O b) M & T c) M & R d) R and T



21) If R is sitting 2 places away from Q and S, then who are the neighbours of T?

- a) R & Q b) P & Q c) R and S d) Cannot be determined

Directions for the questions [22-23]: Read the information and answer the following questions.

Eight persons Ajit, Bhanu, Chetan, Dharam, Esha, Feroz, Ganga and Harmeeth were sitting on a square table, two on each side of the table.

- i) Harmeeth and Dharam are sitting opposite to each other.
- ii) Bhanu is sitting left of Esha, who is diagonally opposite to Feroz.
- iii) Ajit is sitting diagonally opposite to Chetan and is left of Ganga.

22) Who is sitting opposite to Ajit?

- a) Feroz b) Esha c) Bhanu d) Cannot be determined

23) Who is sitting two places to the right of Esha?

- a) Feroz b) Dharam c) Ganga d) Cannot be determined

Directions for the questions [24-25]: Read the information and answer the following questions.

Ten friends A, B, C, D, E, F, G, H, I and J were sitting around a rectangular table, four on the longer and one on the shorter side of the table.

- i) D and J are opposite to each other.
- ii) E and I are opposite to each other.
- iii) F is sitting opposite to A and is the neighbor of G and C.
- iv) B is two places left of E, who is at one of the shorter side, and is neither opposite to F nor C.

24) Who are the neighbours of A?

- a) D and H b) B and H c) B and I d) Cannot be determined

25) Which of the following is definitely true?

- a) D is left of E b) J is left of E c) H is opposite to C d) both (a) & (c)

Check The Answers

1	C	6	A	11	D	16	A	21	A
2	D	7	C	12	C	17	D	22	A
3	B	8	D	13	C	18	C	23	C
4	C	9	B	14	A	19	C	24	B
5	B	10	D	15	B	20	D	25	C

TIME SEQUENCING & RANKING

- 1) If the day after tomorrow is Wednesday. What will be day before yesterday?**
 a) Sunday b) Saturday c) Tuesday d) Friday
- 2) If the day before yesterday is Monday, when will be Thursday?**
 a) Yesterday b) Tomorrow c) Day After Tomorrow d) Day before Yesterday
- 3) If the seventh day of a month is three days earlier than Friday, what day will it be on the 22nd day of that month?**
 a) Sunday b) Monday c) Tuesday d) Wednesday
- 4) Adarsh went to market nine days ago. He goes to the Market only on Friday. What day of the week is today?**
 a) Tuesday b) Wednesday c) Saturday d) Sunday
- 5) If the day before two days after the day before tomorrow is Monday what is today?**
 a) Sunday b) Monday c) Tuesday d) Saturday
- 6) If today is Wednesday, what is one day before, after the day, three days after the day before yesterday?**
 a) Thursday b) Friday c) Tuesday d) Monday
- 7) If two days before, three days after, two days before tomorrow is Saturday. What is tomorrow?**
 a) Sunday b) Monday c) Tuesday d) Saturday
- 8) If two days after, two days earlier, a day before day after tomorrow is Wednesday. What is today?**
 a) Wednesday b) Thursday c) Friday d) Tuesday
- 9) If 3 days later, 2 days before, one day after, day before tomorrow is Sunday. What was yesterday?**
 a) Monday b) Saturday c) Thursday d) Sunday
- 10) At a Railway Station a man said to Kiran, "A train leaves for 'Vijayawada' for every 65 minutes. The last train has already left 10 minutes ago and the next train will leave at 9.35 a.m. At what time did the enquiry clerk give this information to the passenger?**
 a) 7:55 p.m. b) 8:50 p.m. c) 8:40 a.m. d) 7:35 a.m.
- 11) After reaching the place of meeting on Thursday 20 minutes before 9.30 a.m, Arun found himself 30 minutes earlier than the man who was late by 45 minutes. What was the scheduled time of the meeting?**
 a) 8:45 a.m. b) 9:10 a.m. c) 8:55 a.m. d) 9:35 a.m.

Directions for questions 12 to 16: These questions are based on the following information.

Eight persons – A, B, C, D, E, F, G, H – are participating in a race.

F finished before A and after C.

G finished before E and after B.

B finished 1st or 6th.

C finished 3rd or 5th.

D finished 4th or 1st.

H finished 7th or 2nd.

- 12) If D finished 1st, then who finishes 8th?**

a) A b) F c) E d) H

- 13) If D finished 1st, then who finishes 5th?**

a) H b) A c) D d) F

- 14) If E finished 3rd, then who finishes second?**

a) A b) G c) C d) B

- 15) If E finished 3rd, then who will finish last?**

a) F b) D c) H d) A

- 16) If F finishes 7th, then how many different configurations of the end results are possible?**



- a) 8 b) 4 c) 2 d) 6

Direction 17-21: Seven persons J, K, L, M, N, O and P participated in the series of swimming races in which the following are always true of the results:

- a) K finishes ahead of L.
- b) N finishes directly behind M.
- c) Either J finishes first and O last, or O finishes first and J last.
- d) There are no ties in any race, and everyone finishes each race.

17) If exactly two swimmers finish between J and L which of the following must be true?

- a) J finishes first b) O finishes first c) K finishes second d) M finishes fifth

18) Which of the following cannot be true?

- a) K finishes third b) K finishes sixth c) M finishes second d) N finishes fourth

19) If N finishes directly ahead of K, then which of the following is a complete and accurate listing of the positions in which M could have finished?

- a) Second b) Third
c) Second, Third d) Second, Third, Fourth

20) If O and K finish so that one is directly behind the other, which of the following must be true?

- a) K finishes sixth b) O finishes seventh c) J finishes seventh d) L finishes third

21) If J finishes first, and if L finishes ahead of N, in how many different orders is it possible for the other swimmers to finish?

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

22) In a class, Satisch is 19th from the left and 16th from the right. How many students are there in the class?

- a) 35 b) 34 c) 33 d) 32

23) In a class of 50 students, Hari is 22nd from the top, what is his bottom rank?

- a) 29 b) 30 c) 31 d) 28

24) In a class of 20 students Mahesh shifts five places to his left and becomes 13th from left. What is his previous position from the right end?

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

25) In a group of 40 girls, when Latha was shifted by four places towards her right, she became 12th from the left end. What was her earlier position from the right end of the row?

- a) 33rd b) 32nd c) 31st d) 30th

26) Sam and George are 6th from left and 13th from right in a row respectively. When they interchange, Sam becomes 20th from the left. How many people are there in all? What is the new position of George from the right end?

- a) 32, 27 b) 32, 28 c) 33, 27 d) 33, 27

27) Ravi and Rohan are 7th from the left and 8th from the right respectively in a row. If they interchange their positions Ravi goes to 13th from the left end. How many people are there in all? What is the new position of Rohan from the right end?

- a) 20, 15 b) 20, 14 c) 21, 14 d) 21, 15

28) Raju is 10th from left and Swami is 25th from right. Latha is standing exactly in the middle of Raju and Swami. If the total number of students is 50. What is the rank of Latha from the left?

- a) 20 b) 18 c) 15 d) 19

29) Vidya is 7th from the top, Divya is 7 ranks ahead of Medha and 3 ranks behind Vidya, Sushma is 4th from the bottom and 32 ranks behind Medha. How many are there in the class?

- a) 51 b) 52 c) 53 d) 54

30) In a row of 21 children facing North Nitin is third to the right of Shikha who is ninth from the right end of the row. What is Nitin's position from the left end?

- a) 16th b) 15th c) 6th d) 12th



- 31) In a row of girls facing north, Harika is 10th to the left of Pinky, who is 21st from the right end. If Minky, who is 17th from the left end, is 4th to the right of Harika, how many girls are there in the row?
 a) 44 b) 37 c) 43 d) Data Inadequate
- 32) In a school drill, a number of children are asked to stand in a circle. They are evenly spaced and the 6th child is diametrically opposite the 16th child. How many children are made to stand in the circle?
 a) 16 b) 20 c) 22 d) None of these
- 33) In a row at a bus stop, A is 7th from the left and B is 9th from the right. They both interchange their positions. A becomes 11th from the left. How many people are there in the row?
 a) 18 b) 19 c) 20 d) 21
- 34) Some children are standing in a row. All the children are facing North. There are twice as many girls in the row as there are boys. From the west end of the row, Ajay is 8th among the boys and 17th among all the children from the east end of the row he is 20th among all the children. How many boys are there to the right of Ajay?
 a) 9 b) 4 c) 16 d) Can't Say

Directions for questions 35 to 38 :-The following questions are to be considered based on the alphabet series,

A, B, C, D, E to Z

- 35) Which letter is seventh to right of thirteenth letter from the left end of the alphabet?
 a) T b) F c) Q d) L
- 36) Which letter is 10th to left of 15th letter from the left end of the alphabet?
 a) E b) F c) D d) V
- 37) Which letter is fourth to right of fifteen letter from the right end of the alphabet?
 a) T b) Z c) P d) S
- 38) Which letter is 12th to left of 10th letter from the right end of the alphabet?
 a) B b) E c) O d) V

Directions 39-43: Study the following arrangement and answer the questions given below:

R 4 T M 7 W % J 9 5 I # 1 P B 2 T A 3 D \$ 6 E N F 8 U H @

- 39) How many such vowels are there in the above arrangement, each of which is immediately preceded by a number and not immediately followed by a consonant?
 a) None b) One c) Two d) Three
- 40) What should come in place of the question mark (?) in the following series based on the above arrangement?
 T M %, 9 5 1, B 2 3, ____
 a) \$ E F b) \$ 6 F c) D \$ N d) \$ E 8
- 41) How many such consonants are there in the above arrangement, each of which is neither preceded by a number nor followed by a consonant?
 a) None b) One c) Two d) More than three
- 42) Four of the following five are alike in a certain way based on their positions in the above arrangement and so form a group. Which is the one that does not belong to that group?
 a) 5 J 1 b) 7 T J c) 8 N @ d) 3 2 \$
- 43) Which of the following is sixth to the right of the fourteenth from the right end?
 a) 5 b) 6 c) I d) \$

Directions 44-48: These questions are based on the following letter / number /symbol arrangement. Study it carefully and answer the questions.

Z \$ 3 H @ 8 B 1 # A 7 C L J U S K * E W I 2 F % T

- 44) If all the vowels in the above arrangement are replaced by the letter following it in the English alphabetic series, how many alphabets will appear twice in the given arrangement?
a) None b) One c) Two d) Three

45) Which of the following elements is the sixth to the right of fourteenth from the right?
a) 8 b) # c) J d) *

46) How many such numbers are there in the above arrangement, each of which is immediately preceded by a vowel and also immediately followed by a consonant?
a) None b) One c) Two d) Three

47) Four of the following five are alike in a certain way based on their position in the above arrangement and so form a group. Which is the one that does not belong to the group?
a) B A # b) # 7 A c) 5 * K d) W 2 I

48) If the first eight digit/symbols/letters from the left are interchanged in a way that the first component is exchanged with the eighth, the second with the seventh and soon, which of the following would be the sixth from the left?
a) @ b) 3 c) H d) B

Directions 49-55: These questions are based on the following arrangement of letters, numbers, and symbols.

7 B = E N 8 ? L Y H @ 4 P R 3 6 D 5 T V 1 £ © F 9

- 49) How many such symbols are there in the arrangement each of which is immediately followed by letter?
a) Three b) Two c) One d) Four

50) How many such letters are there in the arrangement each of which is immediately preceded by a number?
a) Three b) Four c) One d) Two

51) If all the symbols are deleted from the arrangement, then which element will be 7th to the left of 13th element from the left end?
a) Y b) 8 c) L d) N

52) Four of the following five are alike in a certain way based on their elements position in the arrangement and hence, form a group. Which one does not belong to the group?
a) @ Y 4 b) V 5 1 c) ? N L d) 4 Y H

53) If all the numbers are deleted from the arrangement then which element will be 9th to the right of the 16th element from the right end?
a) P b) @ c) D d) R

54) '7 E =' is to 'B N E' in the same way as 'P 6 3' is to?
a) 3 E D b) B 6 3 c) B D C d) D 1 V

Directions 56-60: These questions are based on the following arrangement. Study it carefully and answer the questions that follow.

T 6 # I J 1 % L E 3 K 9 @ A H 7 B © D 2 U \$ R 4 * 8

- 56) Four of the following five are alike in a certain way on the basis of their position in the above arrangement and so form a group. Which is the one that does not belong to the group?
- a) J I 1 b) E L 3 c) @ 9 A d) R 4 \$
- 57) What will come in place of the question mark (?) in the following series based on the above arrangement? 6 I J, % E 3, 9 A H, ___?
- a) B © 2 b) 7 © D c) 7 B D d) B D 2
- 58) If all the vowels are removed from the above arrangement which element will be sixth to the right of fourth element from the left?
- a) 9 b) K c) 3 d) @
- 59) How many such symbols are there in the above arrangement each of which is immediately preceded by a number?
- a) None b) One c) Two d) More than three
- 60) Which element is fifth to the right of eleventh from the right end?
- a) @ b) U c) 1 d) 3
- 61) Suresh is taller than Prabhu but shorter than Ram, Prabhu is as tall as Neeraj but taller than Nilesh. Which of the following statement is definitely true for Neeraj?
- a) Neeraj is shorter than Nilesh b) Neeraj is the tallest
c) Neeraj is the shorterest d) Neeraj is taller than Nilesh
- 62) Five friends Amit, Sumit, Latha, Bhaskar and Rohan are of different ages. Rohan is older to Latha but not to Amit. Bhaskar is younger to Latha and is not the youngest of all. Who is the second eldest?
- a) Amit b) Sumit c) Rohan d) Latha
- 63) Raju is taller than Girish, but not as tall as Alok. Hari is shorter than Rakesh, but not as short as James. If Girish is taller than Rakesh, then who is the shortest of all?
- a) Alok b) Hari c) James d) Can't Say
- 64) P is heavier than Q but lighter than R. Q is heavier than T. S is heavier than P but lighter than V. Who among them is the lightest?
- a) V b) S c) T d) R
- 65) Four friends Ajay, Anand, Bimal and Chandra are of different heights. Anand is taller than Ajay and Chandra is taller than Bimal. Ajay is not the shortest. Who among the four is the shortest?
- a) Bimal b) Ajay c) Anand d) Chandra
- 66) Five boys Lalit, Mohan, Naveen, Omi and Pavan- are compared with each other in terms of their heights. Lalit is taller than Mohan but shorter than Pavan, who is shorter than Naveen, who is taller than Omi. Who is the second tallest?
- a) Omi b) Pavan c) Naveen d) Can't Say

Directions for the questions [67-68]:

Among Anil, Bibek, Charu, Debu, and Eshwar, Eshwar is taller than Debu but not as fat as Debu. Charu is taller than Anil but shorter than Bibek. Anil is fatter than Debu but not as fat as Bibek. Eshwar is thinner than Charu, who is thinner than Debu. Eshwar is shorter than Anil.

67) Who is the thinnest person?

- a) Bibek b) Charu c) Debu d) Eshwar

68) Who is the tallest person?

- a) Bibek b) Charu c) Eshwar d) Debu

Directions for the questions [69-70]:

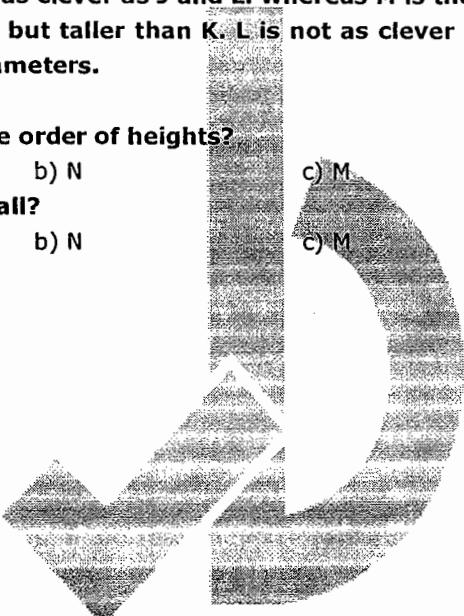
J, K, L, M and N are five boys in a class. They are ranked in the order of heights and intelligence. K is taller than N, but not as clever as J and L, whereas M is the cleverest of all but shorter than J. While L is shorter than M but taller than K. L is not as clever as J. No two persons got the same ranks in any of these parameters.

69) Who is the third in the order of heights?

- a) K b) N c) M d) L

70) Who is the dullest of all?

- a) K b) N c) M d) J

**Check The Answers**

1	B	11	C	21	C	31	C	41	D	51	C	61	D
2	B	12	C	22	B	32	B	42	D	52	D	62	C
3	D	13	B	23	A	33	B	43	B	53	D	63	C
4	D	14	B	24	B	34	B	44	D	54	C	65	C
5	A	15	D	25	A	35	A	45	D	55	C	65	A
6	A	16	B	26	A	36	A	46	D	56	D	66	D
7	A	17	D	27	B	37	C	47	A	57	D	67	D
8	D	18	B	28	B	38	B	48	B	58	A	68	A
9	C	19	B	29	B	39	B	49	A	59	D	69	D
10	C	20	C	30	A	40	B	50	B	60	B	70	A



DEDUCTIONS

Deduction means drawing a conclusion from the given statements. Typically, here each question consists of two statements – on the basis of which a deduction has to be made. The answer has to be chosen from the given choices and that will be made the deduction made.

The two statements given in the question are called 'premises' and the answer, 'the conclusion'.

Eg: All rats are cats.(i)

All cats are dogs....(ii)

All rats are dogs....(iii)

In the given above example.... (i) and (ii) are said to be premises and (iii) is called as conclusion.

The premises normally start with the words All, No, Some and Some-Not.

The word 'All' has its synonyms as – Every, Any, Each, whereas the word 'Some' can also be replaced by Many, Few, A little, Most of, Much of, More etc.

These words are referred to as qualifier (also termed as quantifiers).

A premise consists of a subject and a predicate wherein the first term in (i) rats is the subject and the cats is called as predicate.

Similarly in (ii), the first term cats is called as subject and the second term dogs is called as predicate.

The word that occurs in both the premises is called as middle term or common term. (In the above example cats is the middle term).

The premises are divided into:

- a) Universal statements and
- b) Particular statements

This classification of the premises into the above categories is dependent on the qualifier used in the premise. For example, the statements where "All" is used are called Universal statements and the statements where "Some" is used are called Particular statements.

Premises can also be divided into.

- i) Positive(affirmative) statements and
- ii) Negative statements.

If there is a negative term like "Not" or "No" in the statement, it is called a negative premise.

Otherwise it is called a positive premise or an affirmative statement.

The combination of the two different categories of classifications leads of four different premises as given Table I below.

Universal affirmative	All rats are cats
Particular affirmative	Some rats are cats
Universal Negative	No rat is cat.
Particular Negative	Some rats are not cats.



The subject or the predicate can be either distributed or not distributed in the given premise.

The subject and the predicate are either distributed (✓) or not distributed (✗) depending on what kind of a statement it is (particular affirmative etc.) Table II shows the distribution pattern of the subject and the predicate.

	Subject	Predicate
Universal affirmative(UA)	✓	✗
Particular affirmative(PA)	✗	✗
Universal Negative(UN)	✓	✓
Particular Negative(PN)	✗	✓

Note : ✓ - indicates distributed

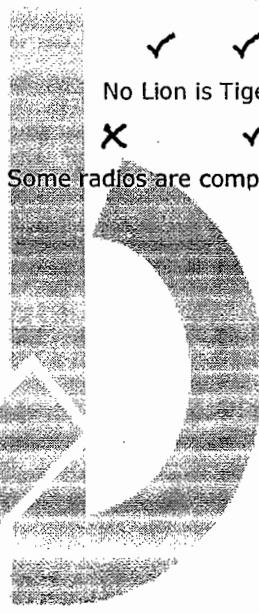
✗ - indicates undistributed.

✓ ✗

Ex: All cars are buses.(UA)

✗ ✗

Some apples are Bananas.(PA)



No Lion is Tiger.(UN)

✗ ✓

Some radios are computers. (PN)

Classroom Exercise

Direction for questions 1 to 14:- The questions given below have two statement. Which of the following options logically follows these statements.

1) All horses are goats. All goats are animals.

- 1) All animals are goats.
- 2) All horses are animals.
- 3) No horse is animal
- 4) Both (1) & (2).

2) All cabs are vehicles.

Some cabs are cars.

- 1) All cabs are cars.
- 2) No cab is car.
- 3) All cabs are cars.
- 4) None of these.

3) No plane is scooter.

No scooter is cycle.

- 1) No cycle is train.
- 2) No train is cycle.
- 3) Both (1) & (2).
- 4) None of these.

4) All mothers are sisters.

All sisters are goddess.

- 1) All mothers are goddess.
- 2) Some mothers are not goddess.
- 3) Many mothers are goddess.
- 4) Both (1) & (2).

5) All cats are dogs. No dogs are rats.

- 1) All cats are rats.
- 2) Some cats are rats.
- 3) No cat is rat.
- 4) None of the above

6) No actor is hero. All men are hero

- 1) All actors are men.
- 2) Some actors are men.
- 3) No actor is men.
- 4) None of the above

7) Some hammers are tools.

All tools are made up of iron.

- 1) Some hammers are made of iron.
- 2) Some hammers are not made of iron
- 3) No hammer is made of iron.
- 4) None of the above.

8) No Negro is fair. Some Europeans are fair.

- 1) No Negro is European.
- 2) Some Negros are Europeans
- 3) All European People are Negros.
- 4) None of the above.

9) Some metals are not objects.

All metals are made of iron.

- 1) Some objects are made of iron
- 2) All objects are not made of iron.
- 3) Some things made of iron are not objects
- 4) None of the above.

10) Some tigers are lions.

All lions are cheetahs.

- 1) No tigers are cheetahs
- 2) Some tigers are cheetahs
- 3) All tigers are cheetahs.
- 4) None of the above

11) All spoons are cups. No cups are plates.

- 1) All spoons are plates.
- 2) No spoon is plate.
- 3) Some spoons are plates.
- 4) All of the above

12) No chair is table. No table are television.

- 1) No chair is television.
- 2) Some chairs are televisions.
- 3) All chairs are televisions.
- 4) None of these

13) No tower is pillar. Some pillars are poles

- 1) Some poles are not towers.
- 2) No pole is tower.
- 3) Some towers are not poles.
- 4) None of the above

14) Some ducks are birds. No swan is a bird.

- 1) Some ducks are birds.
- 2) Some swans are not ducks.
- 3) Some ducks are not swans
- 4) Both (1) & (2).



Direction for questions 15 to 19:- The questions given below have four groups of three statements each. Find the groups where the third statement logically follows from the first two statements.

- 15) A:- All the books are novels. All the novels are pencils. All the books are pencils.
 B:- All the birds are cages. All the cages are peacocks. All the peacocks are birds.
 C:- All the hands are bangles. Some bangles are fingers. Some hands are fingers.
 D:- All the roses are flowers. No flower is a jasmine. No Jasmine is a rose.
 1) Only A & D follow 2) Only C & D 3) All follow 4) Only A, B & D follows

- 16) A:- Some pictures are movies. All movies are actors. Some actors are pictures.
 B:- No hero is a director. No director is an actor. No actor is a hero.
 C:- Some chains are keys. Some keys are locks. Some chains are locks.
 D:- Many girls are clever. All boys are clever. Many boys are girls.
 1) Only A follows 2) Only B follows 3) All follow 4) Only A & C follow

- 17) A:- No cinema is a picture. All boys are pictures. All cinemas are bags.
 B:- All colours are white. Some blacks are colours. Some white are blacks.
 C:- Few eyes are ears. All ears are noses. Few noses are eyes
 D:- All fruits are seeds. All seeds are plants. All plants are fruits.
 1) Only A follows 2) Only B & C follows 3) Only A & B follow 4) All follow

- 18) A:- All ships are boats. All boats are machines. All ships are machines.
 B:- No sea is a river. All rivers are oceans. No ocean is a sea.
 C:- Few goals are bad. All ropes are goods. Some bad are ropes.
 D:- All stones are statues. All statues are papers. All papers are stones.
 1) Only A & C follows 2) Only B & C follows 3) Only A & B follow 4) Only A follows.

- 19) A:- All nails are rings. All caps are chains. All nails are chains.
 B:- All dusters are boards. Some chalks are dusters. Some boards are chalks.
 C:- Many bags are not purses. No purse is a paper. No paper is a bag.
 D:- All factories are industries. No industry is a shop. No shop is a factory.
 1) Only B follows 2) Only C follows 3) Only B & D follow 4) Only C & D follows

Directions for questions 20 to 21:- Every question given below has five statements followed by four sets of three statements each. The set in which the third statement is drawn as a conclusion from the first two statements is your answer. Now select your answer.

- 20) A:- All magnets are prisms.
 B:- No novel is a magazine
 C:- All magazines are magnets
 D:- All prisms are covers.
 E:- Some novels are newspapers.
 1) B C D 2) A B E 3) C B D 4) None follows

- 21) A:- All institutes are universities.
 B:- No school is a college.
 C:- All Universities are schools.
 D:- No college is a university.
 E:- Some universities are institutions.



1) B C D

2) C D E

3) D E B

4) A E C

Directions (14 – 22): In each question below are given two statements followed by two conclusions numbered I and II. You have to take the given two statements to be true even if they seem to be at variance from commonly known facts. Read the conclusion and then decide which of the given conclusions logically follows from the two given statements.

Give answer (a) If only conclusion I follows;

Give answer (b) If only conclusion II follows;

Give answer (c) If either conclusion I or II follows;

Give answer (d) If neither conclusion I and II follows;

Give answer (e) If both conclusions I and II follow.

14) Statements: All pigs are dogs. All dogs are cats.

Conclusion: I. All pigs are cats. II. All cats are pigs

15) Statements: All pens are roads. All roads are houses.

Conclusion: I. All houses are pens II. Some houses are pens.

16) Statements: All bags are cakes. All lamps are cakes

Conclusion: I. Some lamps are bags II. No lamp is bag.

17) Statements: Some kings are queens. All queens are beautiful

Conclusion: I. All kings are beautiful II. All queens are kings.

18) Statements: All men are married. Some men are educated

Conclusion: I. Some married are educated II. Some educated are married.

19) Statements: Some books are tables. Some tables are mirrors.

Conclusion: I. Some mirrors are books II. No mirror is book.

20) Statements: Some papers are pens. Some pencils are pens.

Conclusion: I. Some pens are pencils II. Some pens are papers.

21) Statements: Some books are pens. All pens are pencils.

Conclusion: I. Some books are pencils II. No book is pencil.

22) Statements: No man is a donkey. Rahul is a man.

Conclusion: I. Rahul is not a donkey II. All men are not Rahul.

23) Statements: Some shirts are biscuits, No biscuit is book.

Conclusions: I. some shirts are books.
 II. some books are biscuits.

24) Statements: All branches are flowers. All flowers are leaves.

Conclusion: I. All branches are leaves II. All leaves are branches.
 III. All flowers are branches IV. Some leaves are branches.
a) None follows b) Only I and IV follow
c) Only II and III follow d) All follow

25) Statements: All politicians are honest. All honest are fair.

Conclusion: I. Some honest are politicians II. No honest is politician.
 III. Some fair are politicians IV. All fair are politician.
a) None follows b) Only I follows
c) Only I and II follow d) Only I and III follow.

26) Statements: All aeroplanes are trains. Some trains are chairs.

Conclusion: I. Some aeroplanes are chairs II. Some chairs are aeroplanes.



- III. Some chairs are trains. IV. Some trains are aeroplanes.
a) None follows b) Only I and II follow
c) Only II and III follow d) Only III and IV follow

27) Statements: Some bottles are drinks. All drinks are cups.

- Conclusion:** I. Some bottles are cups. II. Some cups are drinks.
III. All drinks are bottles. IV. All cups are drinks.
a) Only I and II follow b) Only II and III follow
c) Only II and IV follow d) Only III and IV follow. e) Only I and IV follow.

28) Statements: Some clothes are marbles. Some marbles are bags.

- Conclusion:** I. No cloth is a bag. II. All marbles are bags.
III. Some clothes are bags. IV. No marble is a cloth.
a) Only either I or IV follows b) Only either I or II follows.
c) None follows. d) Only either I or III follows.

29) Statements: Some tables are TVs. Some TVs are radios.

- Conclusion:** I. Some tables are radios. II. Some radios are tables.
III. All radios are TVs IV. All TVs are tables.
a) None follows. b) All follows.
c) Only I and III follow. d) Only II and IV follow.

30) Statements: Some houses are offices. Some offices are schools.

- Conclusion:** I. Some schools are houses. II. Some offices are houses.
III. No house is school. IV. Some schools are offices.
a) Only II or III follows b) Only I and IV follows.
c) Only either III or IV, and I follow d) Only II and IV and either I or III follows.

31) Statements: Some boxes are toys. All toys are blocks.

- Conclusion:** I. Some blocks are toys. II. No block is a box.
III. Some boxes are blocks. a) Only I and III follows b) Only II and III follows.
c) Only I follow d) None follows.

32) Statements: All buildings are rains.**All papers are buildings.****All dogs are papers.**

- Conclusion:** I. All dogs are rains. II. Some papers are rains.
III. Some rains are buildings. IV. Some rains are papers.
a) Only I and II follows b) Only II and III follows.
c) Only I, II and III follow d) All follow. e) None of these.

33) Statements: Some bags are purses.**All purses are containers.****All containers are suitcases.**

- Conclusion:** I. Some suitcases are bags. II. All purses are bags.
III. All purses are suitcases. IV. Some containers are purses.
a) Only I, II and III follow. b) Only II and III follow.



34) Statements: All Needles are Threads.

All Threads are Boxes.

All Trees are Boxes.

Conclusions: I. No Needle is Tree.
III. Some Boxes are Needles

- II. Some Trees are Threads.
- IV. Some Needles are Trees.

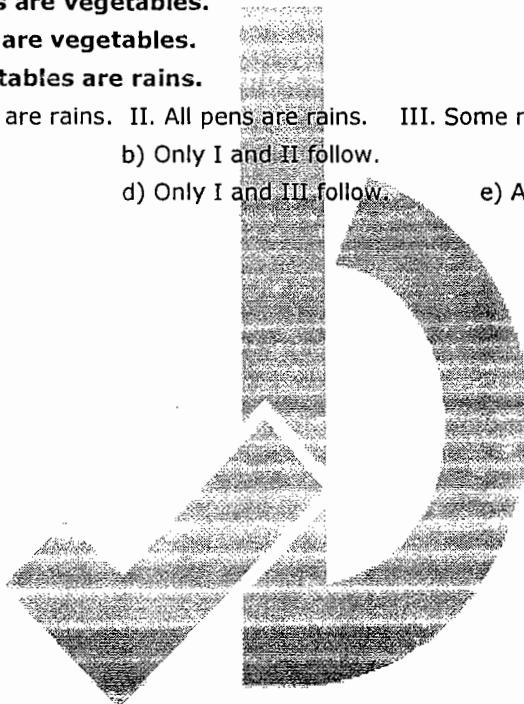
- a) Only either I or IV follows.
 - b) Only either I or IV & II follow.
 - c) Only III follows.
 - d) Only either I or IV & III follows.

35) Statements: All fruits are vegetables.

All pens are vegetables.

All vegetables are rains.

Conclusion: I. All fruits are rains. II. All pens are rains. III. Some rains are vegetables



PRACTICE EXERCISE

Directions (1-10): In each of the questions below are given two statements followed by two conclusions numbered I and II. You have to take the given statements to be true even if they seem to be at variance from commonly known facts. Read all the conclusions and then decide which of the given conclusions logically follows from the given statements disregarding commonly known facts.

Give answer (a) if only conclusion I follows.

Give answer (b) if only conclusion II follows.

Give answer (c) if either conclusion I or II follows.

Give answer (d) if neither conclusion I nor II follows.

Give answer (e) if both conclusions I and II follows.

1. Statements: All fish are birds. Some hens are fish.

- Conclusions:**
- I. Some hens are birds.
 - II. No birds are hens.

2. Statements: Some shoes are coats. Some coats are buttons.

- Conclusions:**
- I. No shoe is button.
 - II. Some shoes are buttons.

3. Statements: All bats are boys. All boys are gloves.

- Conclusions:**
- I. Some gloves are bats.
 - II. All bats are gloves.

4. Statements: All puppies are tigers. All tigers are kittens.

- Conclusions:**
- I. All kittens are puppies.
 - II. No puppy is kitten.

5. Statements: All doctors are nurses. All nurses are patients.

- Conclusions:**
- I. All doctors are patients.
 - II. Some patients are doctors.

6. Statements: Some kites are threads. No thread is needle.

- Conclusions:**
- I. Some kites are needles.
 - II. No needle is thread.

7. Statements: Some books are pens. All pens are papers.

- Conclusions:**
- I. Some papers are books.
 - II. All books are papers.

8. Statements: All chairs are buildings. All tables are buildings.

- Conclusions:**
- I. Some chairs are tables.
 - II. Some tables are chairs.

9. Statements: Some trucks are houses. Some houses are trains.

- Conclusions:**
- I. Some trains are trucks.
 - II. No train is truck.

10. Statements: All flowers are trees. All flowers are fruits.

- Conclusions:**
- I. Some trees are fruits.
 - II. All trees are fruits.



Directions (11-20): In each of the following questions, there are three statements followed by four conclusions numbered I, II, III and IV. Though the statements are at variance from commonly known facts you have to assume them to be true. Read the conclusions and based on the information given in statements, decide which of the options follows from the statements.

11) Statements: All maps are clocks. No chair is clock. Some chairs are clowns.

- Conclusions:**
- I. Some clowns are not maps.
 - II. Some chairs are maps.
 - III. No chair is map.
 - IV. No map is clown.

- a) None follows
- b) Only III follows
- c) Only I and III follow
- d) Only either I or IV, and II follow
- e) Only either II or III follows.

12) Statements: Some TVs are computers.

No computer is radio.

All radios are cameras.

- Conclusions:**
- I. Some cameras are not computers.
 - III. Some TVs are not radios.

- a) None follows
- b) Only I and III follows
- c) Only II follows
- d) Only I and II follows
- e) None of these

- II. All cameras are computers.

13) Statements: Some blankets are beds.

Some pillows are blankets.

All beds are pillows.

- Conclusions:**
- I. Some blankets are pillows.
 - III. Some beds are blankets.
- a) Only either I or II follows
 - b) Only I and either II or III follows.
 - c) All follows
 - d) Only III and either I or II follows.
 - e) None of these.

- II. Some pillows are beds.

14) Statements: All oceans are rivers.

Some springs are rivers.

All wells are springs.

- Conclusions:**
- I. Some springs are oceans. II. Some wells are rivers.

- III. Some rivers are oceans. IV. No well is river.

- a) None follows
- b) Only IV and either I or III follows.
- c) Only III and either II or IV follows.
- d) Only I and either II or IV follows.
- e) All follows.

15) Statements: Some bottles are glasses.

Some glasses are wines.

Some wines are songs.

- Conclusions:**
- I. Some songs are glasses. II. Some wines are bottles.

- III. Some songs are bottles. IV. No song is a glass.

- a) Only either I or IV follows.
- b) Only either II or IV follows.
- c) Only III and IV follow.
- d) Only III and either II or IV follows.
- e) None of these.

16) Statements: No paper is pen.

No pen is pencil.

All erasers are papers.

Conclusions: I. Some papers are erasers. II. No pencil is eraser.

III. No pen is eraser.

IV. All papers are erasers.

- a) Only II and III follow.
- b) Only I, II and III follow.
- c) Only I and II follow.
- d) All follow.
- e) None of these.

17) Statements: All Players are Spectators.

Some Spectators are Theatres.

Some Theatres are Dramas.

Conclusions: I. Some Dramas are Spectators. II. Some Players are Dramas.

III. Some Theatres are Spectators.

IV. All Spectators are Players.

- a) Only III follows
- b) Only II & IV follow.
- c) None of these follow.
- d) Only I & III follow.
- e) All follow.

18) Statements: Some flowers are rods.

Some rods are doors.

Some doors are houses.

Conclusion: I. Some houses are flowers II. Some doors are flowers
III. Some flowers are doors. IV. No houses is flower.

- a) Only either I or II follows
- b) Only either I or IV follows.
- c) Only II and III follow
- d) Only I and IV follows.
- e) None of these

19) Statements: Some Rings are Phones.

Some Phones are Computers.

Some Computers are Stations.

Conclusions: I. Some Stations are Rings. II. Some Phones are Stations.
III. Some Computers are Rings. IV. All Rings are Stations.

- a) None follows.
- b) Only I & II follow.
- c) Only I, II & III follow.
- d) Only II & III follow
- e) All follow.

20) Statements: Some Rats are Crows. All Crows are Yellows. All Yellows are Rabbits.

Conclusions: I. All Crows are Rabbits II. Some Yellows are Rats.
III. Some Rats are Rabbits

- a) All follow
- b) Only I follows.
- c) Only II follows.
- d) Either I or II follows.
- e) None follows

CHECK THE ANSWERS

1	A	6	B	11	C	16	E
2	C	7	A	12	B	17	A
3	E	8	D	13	C	18	B
4	D	9	C	14	C	19	A
5	E	10	A	15	A	20	A



LOGICAL CONNECTIVES

(Classroom Exercise)

- 1) When the baby smiles, his teeth are shown.
 a) His teeth are not shown means the baby did not smile.
 b) The baby smiled implies that his teeth are shown.
 c) The baby did not smile means his teeth are not shown.
 d) His teeth are shown means he smiled.
 1) Only A & B 2) Only A & C 3) Only B 4) Only B & D

- 2) Whenever it thunders, it does not rain
 a) It rained means it does not thunder
 b) It does not rain means it does not thunder
 c) It thunders means it does not rain
 d) It does not thunder means it does not rain
 1) Only A 2) Only B & C 3) Only C 4) Only A & C
- 3) Either it glitters or it is gold
 a) It is not gold means it glitters
 b) It does not glitter means it is gold
 c) It is not gold implies it does not glitters
 d) it does not glitter implies it is not gold
 1) Only A & B 2) Only C & D 3) only A & C 4) only B & C

- 4) If the bird flies, then the fly swims.
 a) The bird did not fly
 b) The fly did not swim
 c) The bird flew
 d) The fly swam
 1) CA and DB 2) BC and BA 3) BA and CD 4) AB and DC

- 5) If the bowler can bat, then the captain cannot bat.
 a) The bowler cannot bat
 b) The captain cannot bat
 c) The bowler can bat
 d) The captain can bat
 1) CB and DA 2) BA and CD 3) Only CB 4) Only BA
- 6) Either they use the computer or Abacus
 a) They use the computer
 b) They do not use Abacus
 c) They do not use the computer
 d) They use Abacus
 1) AB 2) BA 3) DC 4) AD

- 7) If the hut is tall, then the skyscraper is short.
 a) The hut is tall.
 b) The hut is not tall.
 c) The skyscraper is short.
 d) The skyscraper is not short.
 1) CA 2) BD 3) BC 4) DB

- 8) The Titan is cold, if the Moon is hot.
 a) The Titan is not cold.
 b) The Moon is hot.
 c) The Titan is cold.
 d) The Moon is not hot.
 1) CA 2) AD 3) CB 4) DA

- 9) Unless the sun sets, the moon does not rise.
 a) The moon rises.
 b) The sun sets.
 c) The moon does not rise.
 d) The sun did not set.
 1) AD 2) CD 3) CB 4) AB

- 10) Either the thief is not busy or the police is not active.
 a) The thief is not busy
 b) The police is active.
 c) The police is not active.
 d) The thief is busy
 1) CD 2) BA 3) BD 4) AC



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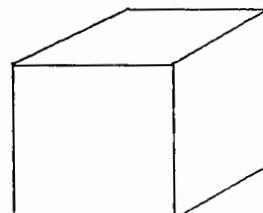
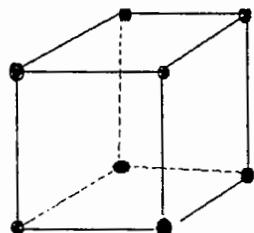
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None of these

CB and DA

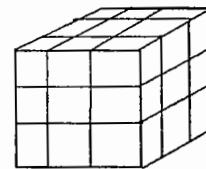
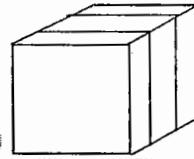
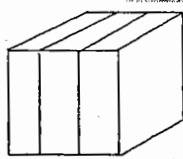
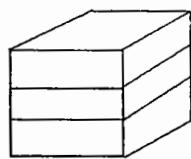
CUBES

A cube is a three dimensional solid having 6 faces, 12 edges and 8 corners. All the edges of a cube are equal and hence all the faces are square in shape.

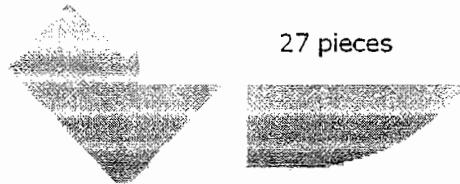
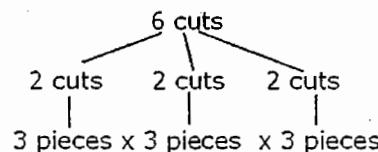


For any cut we will get one more piece... Like 1 cut, we make 2 pieces ... and 2 cuts, 3 pieces and 10 cuts, 11 pieces. For a cube to make into maximum possible pieces, we need to cut it into all possible axes and with equal cuts in all possible axes.

For Ex: A cube is made into 6 cuts, we need to cut 2 cuts on x-axis, 2 cuts on y-axis and 2 cuts on z-axis to make maximum number of pieces.



So finally to make maximum pieces with 6 cuts, we get 27 identical pieces by cutting it into all possible axis and having equality of number of cuts in them.



PRACTICE EXERCISE

- 1) What is the maximum number of identical pieces that can be obtained, when a cube is cut by 21 cuts?**
 1) 502 2) 512 3) 343 4) 522
- 2) If 15 cuts are to be made on a cube, then what is the maximum possible number of identical pieces that can be formed?**
 1) 125 2) 216 3) 212 4) None of these
- 3) What is the minimum possible number of cuts required to form exactly 1331 identical pieces from cube?**
 1) 100 2) 30 3) 35 4) None of these
- 4) What is the minimum possible number of cuts required to cut a cube into 420 identical pieces?**
 1) 20 2) 22 3) 24 4) None of these
- 5) What is the least number of cuts required to form exactly 100 identical pieces from a cube?**
 1) 13 2) 14 3) 11 4) 17
- 6) A cube is decorated in such a way that a diamond is placed at each corner, 8 diamonds are placed at each edge. How many diamonds are used to decorate the cube?**
 1) 90 2) 80 3) 70 4) None of these
- 7) There is a circular pizza with thickness that is cut into 'x' pieces by 4 straight line cuts. What is the maximum and minimum value of 'x' respectively? [TCS]**
 1) 12, 6 2) 11, 6 3) 12, 5 4) 11, 5

Directions [8-11]: These questions are based on the following information

A Cube is painted on all of its 6 faces. The cube is cut into 512 smaller and identical cubes

- 8) How many of the smaller cubes have exactly two painted faces?**
 1) 52 2) 62 3) 72 4) 82
- 9) How many of the smaller cubes have exactly one painted face?**
 1) 64 2) 216 3) 206 4) 68
- 10) How many of smaller cubes have exactly three painted faces?**
 1) 6 2) 8 3) 4 4) 12
- 11) How many of smaller cubes have no painted faces?**
 1) 216 2) 64 3) 68 4) 222

Directions [12-20]: These questions are based on the following information

One pair of adjacent faces is painted in White. One pair of opposite faces of a cube is painted in Blue and out of the two remaining faces, one is painted in Yellow and the other in blue. Now the cube is cut into 125 smaller and identical cubes

- 12) How many smaller cubes have all the three colours on them?**
 1) 2 2) 4 3) 6 4) 18
- 13) How many smaller cubes have only one colour on them?**
 1) 63 2) 54 3) 64 4) 74
- 14) How many smaller cubes have exactly one painted face?**
 1) 63 2) 54 3) 64 4) 74
- 15) How many smaller cubes have exactly two painted faces?**
 1) 24 2) 36 3) 48 4) 46
- 16) How many smaller cubes have exactly two colours on them?**
 1) 23 2) 33 3) 43 4) 53

17) How many smaller cubes have exactly two painted faces with exactly two colours?

- 1) 17 2) 27 3) 33 4) 43

18) How many smaller cubes have only white and blue on them

- 1) 19 2) 29 3) 24 4) 33

19) How many smaller cubes have no blue color on them

- 1) 42 2) 60 3) 52 4) 70

20) How many smaller cubes have yellow or white but not blue colour on them?

- 1) 33 2) 23 3) 27 4) None of these

Directions [21-26] A large cube is painted with Green color on two of the adjacent faces, one pair of opposite faces is painted with Blue and the remaining two faces are painted with Orange color. The cube is dissected into 64 identical pieces.

21) How many identical pieces have only Blue color?

- 1) 10 2) 4 3) 8 4) None of these

22) How many identical pieces have all the three colors?

- 1) 2 2) 4 3) 8 4) 0

23) How many identical pieces have only Green color?

- 1) 9 2) 12 3) 16 4) 10

24) How many identical pieces are unpainted?

- 1) 8 2) 27 3) 45 4) None of these

25) How many identical pieces have only Blue & Green?

- 1) 6 2) 8 3) 9 4) 10

Directions [26-30] A large cube is painted with Violet color on two of the adjacent faces, one pair of opposite faces is painted with Yellow and Indigo and in the remaining two faces one is painted with Blue and the other is unpainted. The cube is dissected into 125 identical pieces.

26) How many identical pieces have only violet color?

- 1) 18 2) 24 3) 27 4) 21

27) How many identical pieces have all the three colors?

- 1) 2 2) 4 3) 8 4) 0

28) How many identical pieces have only Yellow color?

- 1) 9 2) 12 3) 16 4) None of these

29) How many identical pieces have either yellow or Indigo on one face, violet on the other face and the remaining 4 faces unpainted?

- 1) 12 2) 14 3) 10 4) None of these

30) How many identical pieces are unpainted?

- 1) 11 2) 27 3) 9 4) 36

Direction [31- 35]: A cube has six different colours on its faces, namely Red, Blue, Green, Violet, Yellow and White. Each face of the cube is painted with exactly one of the above colours. The cube is dissected into 120 identical pieces by making least number of cuts, such that the minimum number of cuts is made parallel to Red coloured side and Blue coloured side, and the maximum number of cuts is made parallel to the Green coloured side and the Yellow coloured side.



31) How many cuts are made parallel to the sides which are coloured Violet and White?

- 1) 5 2) 4 3) 3 4) none of these

32) How many identical pieces will have only Blue and Violet or only White and Green on them?

- 1) 8 2) 6 3) 4 4) none of these

33) What is the total number of identical pieces having only a single side coloured?

- 1) 26 2) 57 3) 72 4) 52

34) How many identical number of pieces have Red, Green and Violet or Blue, Yellow and Violet color on them?

- 1) 1 2) 0 3) 2 4) 3

35) How many identical number of pieces have Red and Green only or Blue and violet only?

- 1) 7 2) 8 3) 6 4) None of these

Directions [36-40] A large cube is painted with red color on two of the adjacent faces, one pair of opposite faces is painted with green and silver and the remaining two faces are unpainted. The cube is dissected into 125 identical pieces.

[IBM]

36) How many identical pieces have only red color?

- 1) 18 2) 24 3) 27 4) None of these

37) How many identical pieces have all the three colors?

- 1) 2 2) 4 3) 8 4) 0

38) How many identical pieces have only silver color?

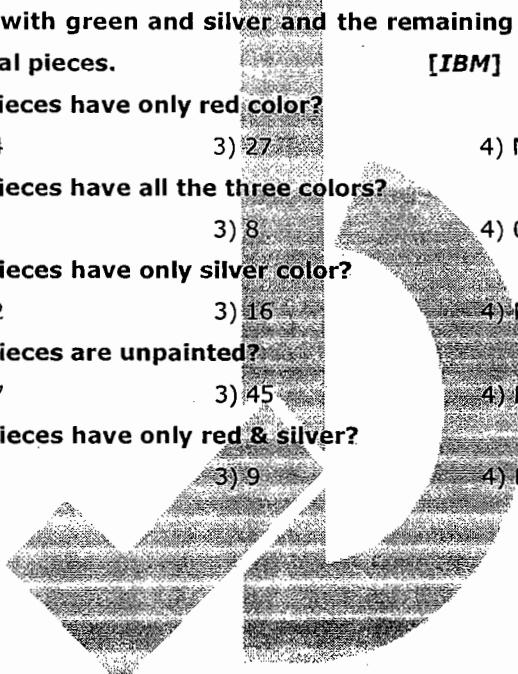
- 1) 9 2) 12 3) 16 4) None of these

39) How many identical pieces are unpainted?

- 1) 48 2) 27 3) 45 4) None of these

40) How many identical pieces have only red & silver?

- 1) 6 2) 8 3) 9 4) None of these



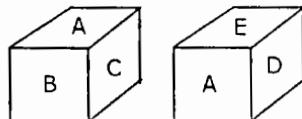
Check The Answers

1	2	11	1	21	3	31	2
2	2	12	1	22	2	32	2
3	2	13	1	23	4	33	4
4	1	14	2	24	1	34	3
5	3	15	2	25	4	35	1
6	2	16	2	26	2	36	3
7	3	17	2	27	1	37	4
8	3	18	1	28	2	38	3
9	2	19	2	29	2	39	1
10	2	20	1	30	4	40	3



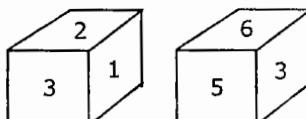
DICES

- 1) Two different views of a dice, whose faces are marked A through F are given below. Find the number which is on the face opposite to A.



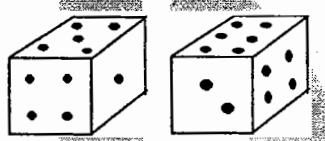
- a) F b) D c) C d) B

- 2) Six digits 1, 2, 3, 4, 5 and 6 are written on different faces of a cube as given below. Which digit is written on the face opposite to 3?



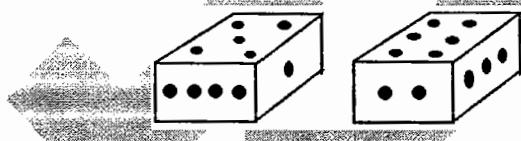
- a) 5 b) 2 c) 4 d) None

- 3) Two positions of a dice are shown below, when three dots are at the top, how many will be at the bottom?



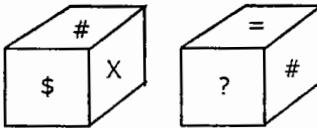
- a) 1 b) 2 c) 3 d) 4

- 4) Two positions of a parallelepiped are shown below, when three are at the top face, how many will be at the bottom?



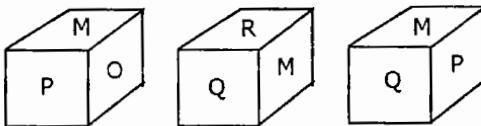
- a) 1 b) 2 c) 3 d) 4

- 5) Two different views of a dice, whose faces are marked #, @, \$, =, ? and x are given below. Find the symbol which is on the face opposite to #?



- a) \$ b) @ c) = d) ?

Direction [6 – 7]: Given below are three positions of the same dice having six letters M, N, O, P, Q, R.



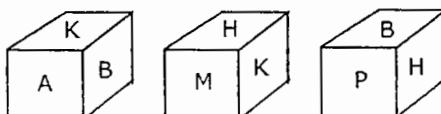
- 6) Which name occurs on the face opposite to that of R?

- a) O b) P c) N d) None

- 7) Which name occurs on the face opposite to that of N?

- a) O b) P c) Q d) M

Direction for the questions [8 - 9]: Three views of of a cube following a particular motion are given below.



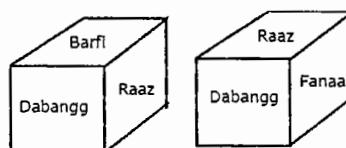
8) Which letter is opposite to A?

- a) H b) P c) B d) M

9) Which letter is opposite to P?

- a) H b) B c) K d) M

Direction [10]: Given below are three positions of the same dice having six movies Dabangg, Barfi, Golmaal, Raaz, Jannat and Fanaa.



10) Which name occurs on the face opposite to Fanaa?

- a) Barfi b) Golmaal c) Jannat d) Raaz

11) Four usual dices are rolled on the ground, the total of these faces are 10 as the top faces showed 4, 3, 1, 2 respectively. What is the sum of the numbers touching the ground?

- a) 20 b) 18 c) 19 d) Can't Say

12) Four usual dices are rolled on the ground, the total of these faces are 16 as the top faces showed 5, 6, 3, 2 respectively. What is the sum of the numbers touching the ground?

- a) 11 b) 13 c) 12 d) Can't Say

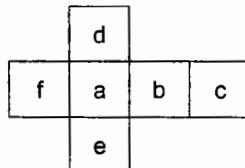
13) Six usual dices are rolled on the ground, 2 dices were showing 2 on the top faces, 3 dices were showing 3 on their top faces, and the remaining dice is showing 6 on its top face. What will be sum of the numbers which are touching the ground?

- a) 20 b) 24 c) 23 d) Can't Say

14) Hundred usual dices are rolled on the ground, the sum of the numbers showing on the top faces of all dice is 600, What will be sum of the numbers which are touching the ground?

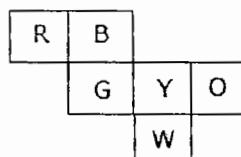
- a) 200 b) 100 c) 400 d) Can't Say

15) What is the alphabet on the face opposite to 'a' if the following figure is folded to form a cube?



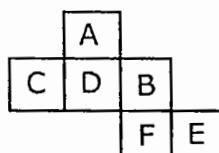
- a) b b) c c) d d) e

16) Six squares are coloured red(R), blue(B), yellow(Y), green(G), white(W) and orange(O) and are hinged together as shown in the figure given below. If they are folded to form a cube, what would be the face opposite to white face



- a) R b) G c) B d) O

17) Six squares are named A, B, C, D, E and F and are hinged together as shown in the figure given below. If they are folded to form a cube, what would be the face opposite to 'A' face?



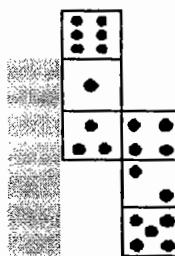
a) C

b) F

c) B

d) E

18) How many dots lie opposite to the face having three dots, when the given figure is folded to form a cube?



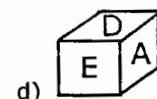
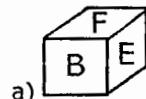
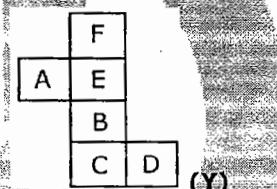
a) 2

b) 4

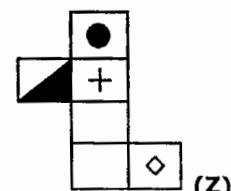
c) 5

d) 6

19) Choose the box that is similar to the box formed from the given sheet of paper (Y) ?



20) Choose the box that is similar to the box formed from the given sheet of paper (Z) ?



Check The Answers

1	A	6	B	11	B	16	C
2	C	7	D	12	C	17	B
3	D	8	A	13	C	18	D
4	A	9	C	14	B	19	B
5	B	10	A	15	B	20	B



ANALYTICAL PUZZLES 1 (*Classrooom Exercise*)

Direction for question 1 to 5:

Five friends Amit, Akash, Amar, Ajay and Arun bought T-Shirts from five different brands among Nike, Adidas Lotus, Crocodile and Dockers not necessarily in the same order. Each of these T - Shirts is of a different colour among Green, Red, Blue, Yellow and Black.

- i) Mr Amit bought Lotus brand Blue T-shirt
- ii) Neither Mr Amar nor Mr Arun bought Adidas brand T-Shirt
- iii) Mr Akash bought Dockers brand Green T-Shirt
- iv) Mr Amar did not buy Nike brand T- Shirt which is red in colour
- v) Adidas brand T- Shirt is Yellow in colour

1) Who bought black T-Shirt?

- | | | | |
|---------|---------|---------|---------|
| a) Amit | b) Amar | c) Ganu | d) None |
|---------|---------|---------|---------|

2) The branded T-Shirt Mr Amar bought is _____?

- | | | | |
|--------------|----------|---------|------------|
| a) Crocodile | b) Lotus | c) Nike | d) Dockers |
|--------------|----------|---------|------------|

3) Who bought Yellow Colour T-Shirt?

- | | | | |
|---------|---------|----------|---------|
| a) Arun | b) Ajay | c) Akash | d) Amit |
|---------|---------|----------|---------|

4) Who bought Nike brand T-Shirt?

- | | | | |
|---------|---------|---------|---------|
| a) Arun | b) Ajay | c) Amit | d) None |
|---------|---------|---------|---------|

Direction for question (5-9): Read the information given below carefully and answer the following questions.

There is a 5 storey building, each floor has one company. Each employee works on different floor. Each employee belongs to a different cities (i.e) Delhi, Mumbai, Bangalore, Hyderabad and Chennai. The five employees are Amit, Bhaskar, Charan, Daniel and Eshwar are employed in different companies Viz IBM, Wipro, HCL, Infosys, TCS but not necessarily in the same order

- i) Mr.Charan works in TCS and works on the first floor.
- ii) The officer who works on the top floor neither belongs to Hyderabad nor Chennai.
- iii) Mr.Bhaskar works in Wipro is from Hyderabad.
- iv) The officer who works for HCL and works in the third floor and belongs to Delhi.
- v) Mr.Daniel works on fourth floor and is from Bangalore city.
- vi) Mr.Eshwar works in Infosys and Mr.Daniel in IBM.

5) Who among the following is from Chennai?

- | | | | |
|---------|------------|-----------|-----------|
| a) Amit | b) Bhaskar | c) Charan | d) Daniel |
|---------|------------|-----------|-----------|

6) Who works on the second floor of the building?

- | | | | |
|---------|------------|-----------|-----------|
| a) Amit | b) Bhaskar | c) Charan | d) Daniel |
|---------|------------|-----------|-----------|

7) On which floor does Eshwar work?

- | | | | |
|----------|-----------|----------|--------|
| a) First | b) Second | c) Third | d) Top |
|----------|-----------|----------|--------|

8) Who among the following is from Delhi city?

- | | | | |
|---------|------------|-----------|-----------|
| a) Amit | b) Bhaskar | c) Charan | d) Daniel |
|---------|------------|-----------|-----------|

9) Which of the following is the correct combination?

- | | |
|-------------------------|-----------------------|
| a) Mr Charan: Hyderabad | b) Mr Daniel : Mumbai |
| c) Mr Amit : Chennai | d) Mr Eshwar : Mumbai |

Directions for questions 10 to 14:- These questions are based on the following information.

Five persons Anand, Bhavan, Chetan, Dhawan and Emanuel are attending an interview. They are wearing shirts and trousers of five different colours – White, Black, Blue, Green, and Yellow – not necessarily in that order.

- i) No person is wearing a shirt and a trouser of the same colour.
- ii) Dhawan is wearing a Yellow shirt but is not wearing a Green trouser.
- iii) Emanuel is wearing a Blue trouser but is not wearing a Black shirt.
- iv) Bhavan is wearing a White Shirt but is not wearing a Yellow trouser.
- v) Chetan is wearing a Black trouser.

10) What is the colour of the shirt that Emanuel is wearing?

- a) White b) Green c) Yellow d) Blue

11) Who among the following is wearing the Green trouser?

- a) Bhavan b) Anand c) Dhawan d) Elite

12) What is the colour of the shirt that Chetan is wearing?

- a) Black b) White c) Yellow d) Blue

13) What is the colour of the trouser that Dhawan is wearing?

- a) Black b) White c) Yellow d) Blue

14) What is the colour of the shirt and trouser worn by Anand, in that order?

- a) Yellow and Black b) Black and Yellow
c) Black and Green d) Green and Blue

Directions for questions 15 to 17:- Read the following information carefully and answer the questions given below it.

There are six friends A, B, C, D, E and F. Each one is proficient in one of the games, namely Badminton, Volleyball, Cricket, Hockey, Tennis and Polo. Each owns a different colored car, namely yellow, green, black, white, blue and red.

- i) D plays Polo and owns a yellow colored car.
- ii) C does not play either Tennis or Hockey and owns neither blue nor yellow colored car.
- iii) E owns a white car and plays Badminton.
- iv) B does not play Tennis; he owns a red coloured car.
- v) A plays Cricket and owns a black car.

[INFOSYS]

15) Who plays Volleyball?

- a) B b) C c) F d) Data inadequate

16) Which coloured car F owns?

- a) Green b) Blue c) Either Green or Blue d) Data inadequate

17) Which of the following combinations of colour of car and game played is not correct?

- a) Yellow - Polo b) Green - Tennis c) Black - Cricket d) Red- Hockey

Direction for the questions [18-20] :

Five friends specialized in Finance: Sushant, Bharati, Haritha, Aruna and Chaitali. After finishing their MBA, all of them joined five different foreign banks DCB, Exim Bank, American Express, HSBC and Citibank. To their dismay, they found that each was placed in different cities: Delhi, Bangalore, Noida, Ahmedabad and Chennai.

- a) Sushant was in Exim Bank and she was placed in Ahmedabad.
- b) Haritha was neither in DCB nor in HSBC but she was placed in Bangalore.
- c) Aruna joined DCB and she was neither placed in Chennai nor in Noida.
- d) Bharati was in Citibank but she was not in Chennai.



18) Which bank did Chaitali join?

- a) American Express b) HSBC c) DCB d) Cannot be determined

19) Who works for American Express?

- a) Haritha b) Aruna c) Chaitali d) Cannot be determined

20) Which of the following statements can be deduced from the above data?

- a) American Express has a branch in Chennai b) HSBC does not have a branch in Bangalore
 c) Citibank has a branch in Noida. d) None of the above

Directions [21 to 23]:- A, B, C, D, E, and F are a group of friends. There are two housewives, one professor, one engineer, one accountant and one lawyer in the group. There are only two married couples in the group. The lawyer is married to D, who is a housewife. No woman in the group is either an engineer or an accountant. C, the accountant, is married to F, who is a professor. A is married to a housewife. E is not a housewife.

21) Which of the following is one of the married couples?

- a) A & B b) B & E c) D & E d) A & D

22) What is E's profession?

- a) Engineer b) Accountant c) Professor d) Lawyer

23) How many members of the group are males?

- a) 2 b) 3 c) 4 d) Can't Say

Directions 24 to 26: There is a family of six persons P, Q, R, S, T and U. They are Lawyer, Doctor, Teacher, Salesman, Engineer and Accountant. There are two married couples in the family. S, the salesman is married to the Lady Teacher. The Doctor is married to the Lawyer. U, The Accountant is the son of Q and brother of T. R, the Lawyer is the daughter-in-law of P. T is the unmarried Engineer. P is the Grandmother of U.

[CAPGEMINI]

24) Which is the profession of P?

- a) Lawyer b) Teacher c) Doctor d) Accountant

25) Which of the following is a married couple?

- a) S and R b) Q and P c) Q and R d) None

26) What is the profession of Q?

- a) Lawyer b) Teacher c) Doctor d) Can't Say

Direction [27-28]: Study the information and answer the questions.

Sameer, John, Rajan, Nitin are a dancer, a painter, a singer and a writer not necessarily in the same order.

a) Sameer and Rajan, were in the audience while the singer made his debut on the concert stage.

b) John, Sameer and the writer have had portraits from the life by the painter.

c) The writer and Nitin are listening to the Singer.

27) What must be the profession of Sameer?

- a) a dancer b) a Painter c) a Singer d) a writer

28) Who among them is a painter?

- a) Sameer b) Nitin c) Rajan d) John

Direction for the questions [29-30]:

Four friends Ashwath, Charan, Karthik and Srinivas are nicknamed Essi, KK, Kit and Maha, not necessarily in that order.

- (a) Karthik is stronger than Essi but can't run as fast as Kit.
- (b) Essi is stronger than Ashwath but weaker than KK.
- (c) Srinivas is faster than Karthik and slower than Maha but weaker than Essi.

29) Who is nicknamed Maha?

- a) Karthik
- b) Ashwath
- c) Charan
- d) Srinivas

30) Who is nicknamed Essi?

- a) Karthik
- b) Ashwath
- c) Charan
- d) Srinivas

31) The surnames of four professionals are: Sharma,

Kapoor, Iyer and Gandhi. Their professions are accountant, lawyer, dentist and doctor (not necessarily in this order). The accountant and lawyer work in their offices, while the dentist and doctor work in their nursing homes. The accountant looks after Iyer's and Kapoor's account. Kapoor, does not know Sharma, although his nursing home is in the same street as Sharma's office. Kapoor is not a doctor. What are the occupations of the four people?

- a) Sharma - Doctor, Kapoor - Dentist, Iyer - Accountant and Gandhi - Lawyer
- b) Sharma - Lawyer, Kapoor - Dentist, Iyer - Accountant and Gandhi - Doctor
- c) Sharma - Doctor, Kapoor - Accountant, Iyer - Dentist and Gandhi - Lawyer
- d) Sharma - Lawyer, Kapoor - Dentist, Iyer - Doctor and Gandhi - Accountant
- e) Sharma - Dentist, Kapoor - Lawyer, Iyer - Doctor and Gandhi - Accountant

Directions for the questions [32-33]:

The head of the newly formed government desires to appoint six newly elected members A, B, C, D, E and F to portfolios of Home, Power, Defense, Telecom and Finance. F does not want any portfolio if D gets one of the five. C wants either Home or Finance or no portfolio. B says that if D gets either Power or Telecom then she must get the other one. E insists on a portfolio if A gets one.

32) Which is a valid assignment?

[CAPGEMINI, INTELLIGROUP]

- a) A -Home, B- Power, C- Defense, D- Telecom, E- Finance
- b) A- Home, B- Power, E- Defense, D- Telecom, F- Finance
- c) B- Home, F- Power, E- Defense, C- Telecom, A- Finance
- d) C- Home, D- Power, A- Defense, B- Telecom, E- Finance

33) If A gets Home and C gets Finance, then which is not a valid assignment for Defence and Telecom?

- | | |
|-----------------------------|-----------------------------|
| a) B - Defense, F – Telecom | b) F - Defense, B - Telecom |
| c) B - Defense, E – Telecom | d) B - Defense, D – Telecom |

Direction [34-35] In a software firm, five projects – P_1, P_2, P_3, P_4, P_5 – are to be assigned to six project heads – H_1, H_2, H_3, H_4, H_5 and H_6 . Each project has to be assigned to exactly one project head and each project head must be assigned to atmost one project. If any project is assigned to H_3 , then H_2 won't take any project. H_5 can be assigned either P_1 or P_2 . If H_3 is assigned either P_3 or P_5 , then H_1 must get the other one?

34) Which of the following is the valid assignment?

- | | |
|--|--|
| a) $H_1-P_3, H_3-P_5, H_4-P_2, H_5-P_4, H_6-P_1$ | b) $H_5-P_2, H_3-P_3, H_4-P_4, H_1-P_5, H_6-P_1$ |
| a) $H_4-P_2, H_1-P_3, H_6-P_4, H_3-P_5, H_2-P_1$ | d) $H_1-P_2, H_2-P_3, H_6-P_4, H_5-P_5, H_4-P_1$ |

35) Which of the following is not a valid assignment?

- | | |
|--|--|
| a) $H_1-P_5, H_3-P_3, H_4-P_2, H_5-P_1, H_6-P_4$ | b) $H_1-P_3, H_4-P_2, H_5-P_1, H_6-P_4, H_3-P_5$ |
| c) $H_1-P_3, H_2-P_1, H_3-P_5, H_4-P_4, H_5-P_2$ | d) $H_1-P_5, H_6-P_1, H_3-P_3, H_4-P_4, H_5-P_2$ |



ANALYTICAL PUZZLES 1 *(Practice Exercise)*

Direction for the question [1-2]:

Three persons A, B and C wore shirts of black, blue and orange colours (not necessarily in that order) and pants of green, yellow and orange colours (not necessarily in that order). No person wore shirt and pants of the same colour.

Further it is given that

- a) A did not wear shirt of black colour.
- b) B did not wear shirt of blue colour.
- c) C did not wear shirt of orange colour.
- d) A did not wear pants of green colour.
- e) B wore pants of orange colour.

[CSAT 2012]

1) What are the colours of the pants and shirt worn by C, respectively?

- | | |
|---------------------|---------------------|
| a) Orange and black | b) Green and blue |
| c) Yellow and blue | d) Yellow and black |

2) What are the colours of the pants and shirt worn by A, respectively?

- | | |
|----------------------|---------------------|
| a) Orange and black | b) Green and blue |
| c) Yellow and Orange | d) Yellow and black |

3) In five flats, one above the other, live five professionals . The professor has to go up to meet his IAS officer friend. The doctor is equally friendly to all, and has to go up as frequently as go down. The engineer has to go up to meet his MLA friend above whose flat lives the professor's friend.

From the ground floor to the top floor, in what order do the five professionals live?

- a) Engineer, Professor, Doctor, IAS officer, MLA
- b) Professor, Engineer, IAS officer, Doctor, MLA
- c) IAS officer, Engineer, Doctor, Professor, MLA
- d) Professor, Engineer, Doctor, MLA, IAS officer

[CSAT 2012]

Instructions for the questions [4-8]

Read the following information and answer the questions that follow:

Four friends Amit, Arun, Ajay and Ahmed works for 4 different companies - IBM, HCL, TCS and Infosys, as a Manager, Team leader, Quality Analyst and CEO, at 4 different locations - Hyderabad, Pune, Bangalore and Chennai (not necessarily in the same order).

- i) CEO is from IBM company.
- ii) Arun, the team leader is working in Pune.
- iii) Amit works in HCL, which is not located at Hyderabad.
- iv) Ajay neither works for TCS nor IBM but works in Chennai.
- v) Manager in from Bangalore.

4) Who among the following is a Quality Analyst?

- | | | | |
|---------|---------|---------|----------|
| a) Amit | b) Arun | c) Ajay | d) Ahmed |
|---------|---------|---------|----------|

5) Who among the following works for IBM Company?

- | | | | |
|----------|---------|---------|---------|
| a) Ahmed | b) Arun | c) Ajay | d) Amit |
|----------|---------|---------|---------|

6) Who works in TCS Company?

- | | | | |
|----------|---------|---------|---------|
| a) Ahmed | b) Arun | c) Ajay | d) Amit |
|----------|---------|---------|---------|

7) Which of the following is the correct combination of the designation and city, visited by Ahmed?

- | | |
|------------------------|--------------------|
| a) CEO - Chennai | b) CEO - Pune |
| c) Manager - Bangalore | d) CEO - Hyderabad |



8) Which of the following can be deduced from the above data?

- a) HCL has a branch in Pune.
- b) IBM does not have a branch in Chennai
- c) Infosys has a branch in Chennai.
- d) None of these

Directions for questions 9 to 13: Refer to the data below and answer the questions that follows.

There are 6 dancers Abha, Babita, Payal, Rohini, Meena and Sweta. They perform 6 different dances Kuchipudi, Kathak, Garba, Bharatnatyam, Kathakali and Western, not necessarily in the same order. They belong to 6 different states – Gujarat, U.P, M.P, Karnataka, Tamilnadu and Kerela and speak 6 different languages – Marathi, Oriya, Kannada, Bengali, Malayalam and Telugu. Following information is given:

- a) Kathakali dancer speaks Bengali.
- b) Meena knows Kathak but does not speak Telugu or Marathi.
- c) Rohini and Sweta don't know either of Kathakali or Bharatnatyam.
- d) Dancer from M.P speaks Kannada.
- e) Abha and Rohini don't know Garba or Khatak, and Babita speaks Kannada.
- f) Kuchipudi dancer speaks Kannada.
- g) Payal is from Karnataka.
- h) Abha speaks Bengali and Payal speaks Malayalam.
- i) Oriya speaking is from U.P
- j) Abha does not belong to Gujarat and Kerela.

9) Meena speaks:

- | | | | |
|----------|------------|------------|------------|
| a) Oriya | b) Bengali | c) Marathi | d) Kannada |
|----------|------------|------------|------------|

10) Kathakali is performed by:

- | | | | |
|---------|----------|-----------|----------|
| a) Abha | b) Payal | c) Rohini | d) Sweta |
|---------|----------|-----------|----------|

11) If Rohini speaks Marathi, then Sweta must speak:

- | | | | |
|--------------|------------|----------|-----------|
| a) Malayalam | b) Bengali | c) Oriya | d) Telugu |
|--------------|------------|----------|-----------|

12) Abha belongs to:

- | | | | |
|------------|---------------|-----------|--------|
| a) Gujarat | b) Tamil Nadu | c) Kerela | d) M.P |
|------------|---------------|-----------|--------|

13) Dancer from U.P is:

- | | | | |
|---------|-----------|----------|----------|
| a) Abha | b) Babita | c) Sweta | d) Meena |
|---------|-----------|----------|----------|

Instructions for the questions [14-15]

Read the following information and answer the questions that follow:

A team of four scientists comprising of physicists and mathematicians has to be formed for a training program. The team must have at least two physicists. The selection commission has shortlisted the following persons:

Physicists: Dr. Anthony, Dr. George and Dr. Bill,

Mathematicians: Dr. Clinton, Dr. Lincoln, Dr. Robert and Dr. Richard.

However, Dr. George refused to join if Dr. Lincoln joined the team. Dr. Richard would not join if Dr. Robert joined the team, and Dr. Bill would not join if Dr. Richard joined the team.

14) Which among the following groups should be selected?

- a) Dr. Anthony, Dr. Bill, Dr. Lincoln and Dr. George.
- b) Dr. Anthony, Dr. Bill, Dr. Richard and Dr. Robert.
- c) Dr. Bill, Dr. Lincoln, Dr. George and Dr. Clinton.
- d) Dr. Bill, Dr. George, Dr. Robert and Dr. Clinton.
- e) Dr. Anthony, Dr. Clinton, Dr. Robert and Dr. Lincoln.



15) Which among the following groups must not be selected?

- a) Dr. Anthony, Dr. Bill, Dr. Clinton and Dr. Lincoln.
- b) Dr. Anthony, Dr. Bill, Dr. Clinton and Dr. Robert.
- c) Dr. Anthony, Dr. Lincoln, Dr. George and Dr. Robert.
- d) Dr. George, Dr. Bill, Dr. Robert and Dr. Clinton.
- e) Dr. Anthony, Dr. Richard, Dr. George and Dr. Clinton

Instructions for the questions [16-18]

Read the following information and answer the questions that follow:

Four persons Akash, Dinesh, Sameer and Tarun are attending a party. They were wearing shirts and trousers of four different colours. The shirts were Blue, White, Red, Green in colour and the trousers were Blue, Green, Yellow and Black colour.

- i) No person is wearing a shirt and a trouser of the same colour.
- ii) Dinesh is not wearing Blue trouser, whereas Tarun did not wear Green shirt.
- iii) Sameer is wearing a Green trouser, but is not wearing a White shirt.
- iv) Akash is wearing a Blue shirt, but is not wearing a Yellow trouser.

16) What is the colour of the shirt that Sameer is wearing?

- a) Green
- b) Red
- c) White
- d) Blue

17) What is the colour of the trouser that Dinesh is wearing?

- a) Green
- b) Yellow
- c) Black
- d) Blue

18) What is the colour of the shirt and trouser worn by Tarun, in that order?

- a) Blue and White
- b) Green and Blue
- c) Red and Green
- d) White and Blue

Instructions for the questions [19-20]

Four Men Sharath, Suman, Shekar and Sameer are married four women Seeta, Geeta, Reeta and Latha (not necessarily in the same order).

- i) Sameer is married to Geeta's friend, who is the mother of Seeta.
- ii) Sharath and Shekar were attending Reeta's wedding as a guest.
- iii) Suman and Shekar are the brothers of Geeta.
- iv) Latha's Uncle Suman did not marry to Seeta.

19) Who is the spouse of Sameer?

- a) Seeta
- b) Geeta
- c) Latha
- d) Reeta

20) Who is the husband of Geeta?

- a) Sharath
- b) Suman
- c) Shekar
- d) Sameer

21) Who is the wife of Shekar?

- a) Seeta
- b) Geeta
- c) Latha
- d) Reeta

Direction for the questions [22 to 24]:

A, B, C, D and E are members of the same family. There are two fathers, two sons, two wives, three males, and two females. The teacher was the wife of a lawyer, who was the son of a doctor. E is not a male, neither also a wife of a professional. C is the youngest person in the family and D is the oldest. B is a male.

[CSAT 2011]

22) How is D related to E?

- a) Husband
- b) Son
- c) Father
- d) Wife

23) Who are the females in the group?

- a) C and E
- b) C and D
- c) E and A
- d) D and E

24) Whose wife is teacher?

- a) C
- b) D
- c) A
- d) B



25) Five persons Pradeep, Mohit, Bantu, Tarun and Nilesh live separately in any one of the following a palace, a hut, a fort, a house or a hotel. Each one likes two different colours from among the following blue, black, red, yellow and green. Bantu likes red and blue. Tarun likes black. The person living in the palace does not like blue or black. Pradeep likes blue and red. Mohit likes yellow. Nilesh lives in a hotel. Mohit lives in a

- a) Hut b) Palace c) Fort d) House

Directions for questions 26 to 29:

Refer to the data below and answer the questions that follow.

A family consists of seven members P, Q, R, S, T, U and V. There are three married couples. Q is an engineer and father of T. U is grandfather of T and is a contractor. S is a nurse by profession. V is T's uncle, who is a professor. R is the sister-in-law of Q and married to Professor. There is one student, one housewife and one doctor in the family. The student is spinster.

[CAPGEMINI, GENPACT]

26) Who is R's husband?

- a) V b) Q c) T d) R

27) Who is T's Aunt?

- a) S b) P c) U d) R

28) What is the profession of P?

- a) Housewife b) Doctor c) Professor d) Either (a) or (b)

29) Which of the following is definitely group of female members?

- a) PRST b) PRT c) PRS d) Cannot be determined

Direction for the question [30-31] :

Four students – Ankit, Amit, Akash and Ajay – went to four different cities – Mumbai, Vijaywada, Hyderabad and Nagpur – to interview in 4 different Companies – CTS, WIPRO, IBM, HCL. The following data is also known.

- i) Amit did not go to Hyderabad and did not write IBM and CTS.
- ii) IBM was conducted in Nagpur, Akash went to Mumbai.
- iii) Ankit did not go to Nagpur and did not write HCL.
- iv) Ankit did not write CTS.

30) Which of the following is the correct combination of the city, company visited and the by Amit?

- | | |
|------------------------|------------------------|
| a) Vijaywada and WIPRO | b) Vijaywada and HCL |
| c) Hyderabad and HCL | d) Hyderabad and WIPRO |

31) Who among the following went to Nagpur?

- | | | | |
|----------|---------|----------|---------|
| a) Ankit | b) Amit | c) Akash | d) Ajay |
|----------|---------|----------|---------|

Check The Answers

1	B	6	B	11	D	16	B	21	A	26	A
2	C	7	D	12	B	17	B	22	A	27	D
3	D	8	C	13	D	18	D	23	C	28	D
4	C	9	A	14	D	19	C	24	D	29	D
5	A	10	A	15	C	20	A	25	B	30/31	B/D



ANALYTICAL PUZZLES 2 (*Classrooom Exercise*)

- 1) Among P, Q, R, S, T and U, there are three newly married wed couples

P did not marry R or T.

Q did not marry T or U.

R married P or S. Who is the spouse of P?

- a) U b) S c) Q d) Can't Say

Directions for questions 2 to 5:-

Each of the seven persons A, B, C, D, E, F & G is of a different profession among Painter, Professor, Engineer, Doctor, Actor, Lawyer and Salesman. Some more information about them is as follows.

- i) Either A or G is the Professor.
- ii) Neither G nor B is the Engineer.
- iii) 'E' is either Painter or Doctor.
- iv) 'C' is the Actor.
- v) 'D' is either Salesman or Painter.
- vi) 'F' is either Professor or Salesman.

- 2) Who is the Engineer?

- a) A b) B c) C d) D

- 3) What is E's profession?

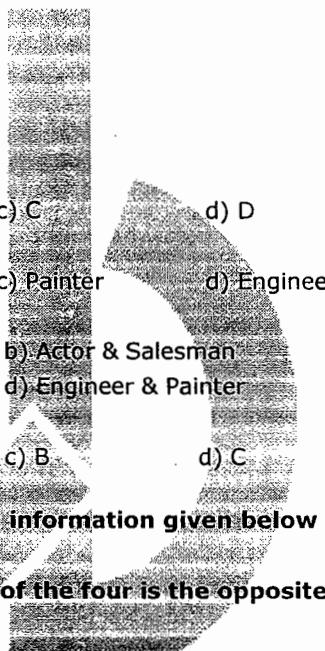
- a) Professor b) Doctor c) Painter d) Engineer

- 4) C and F are respectively _____?

- a) Actor & Painter b) Actor & Salesman
c) Professor & Engineer d) Engineer & Painter

- 5) Who is the Lawyer?

- a) D b) E c) B d) C



Directions for the questions: [6-9] Read the information given below carefully and answer the following questions.

A, B, C and D are related to each other. One of the four is the opposite sex from each of the other three.

- a) D is A's brother or only daughter.
- b) A or B is C's only son.
- c) B or C is D's sister.

- 6) How is B related to A?

- a) Son b) Cousin c) Nephew d) Brother

- 7) How is D related to B?

- a) Uncle b) Aunt c) Mother d) Brother

- 8) Who among the following are males?

- a) ACD b) BCD c) ABD d) ABC

Direction [9 – 11]

Five persons- A, B, C, D and E – have Rs.3500, Rs.3000, Rs.2000, Rs.3500 and Rs.2500 respectively with them. They go to a watch shop, where the shopkeeper has run out of stock and has only five watches – W₁, W₂, W₃, W₄ and W₅- costing Rs.2200, Rs.3500, Rs.1800, Rs.2500 and Rs.3000 respectively. After discussing among themselves, each person decides to buy exactly one of the five watches available, using only the money available with him/her.

- 9) D cannot purchase

- a) W₁ b) W₂ c) W₃ d) W₄

- 10) If A purchases W₅ and the cost of W₄ becomes Rs. 2600, while the other costs remain the same, then which of the following statements is true wearing?

- a) E must purchase W₄ b) B can purchase W₁
c) D must purchase W₂ d) All of them



11) If D purchases W₂, in how many different ways can they buy the watches?

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

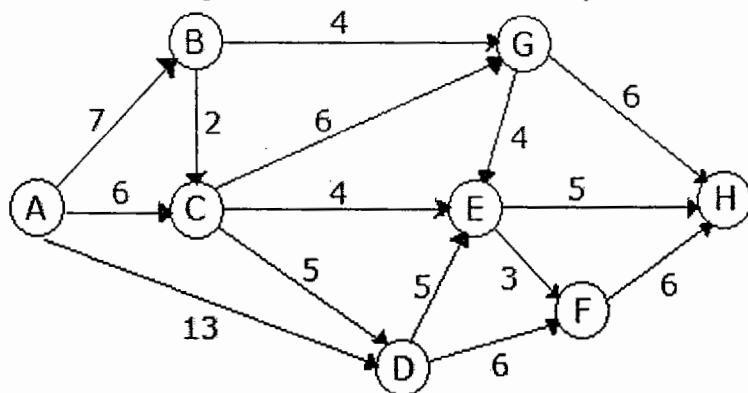
Direction for question [12]:

Seven cities connected A, B, C, D, E, F and G as follows. One-way routes are between A to B and C; B to C; B to E and D; D to E and F; F to G; E to G. Two-way routes are between C and D and E and F. Total how many routes are possible, if a person wants to go from A to G without going through E and not going to any city more than once?

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

Direction [13 – 16] : Study the data given below and answer the questions that follow:

A, B, C, D, E, F, G and H are 8 towns and the distances between them are shown in the figure below. No roads other than those shown in the figure are available between any two towns.



13) What is the shortest distance between A and H?

- a) 17 b) 13 c) 15 d) 14

14) If all the roads to E are blocked. What is the shortest route from A to H?

- a) ACGH b) ABGH c) ACDFH d) ADFH

15) If no journey can be undertaken on the direct road from A to C due to road repairs and as town E is under curfew, no journey is possible through this town. In how many ways can one travel from A to H?

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

16) What is the total possible ways one person can travel from A to H?

- a) 22 b) 24 c) 28 d) None

Directions for questions [17 – 18] :

Refer to the following data and answer the questions that follow.

On a trip to Kodaikanal, a group of eight, Amar, Akbar, Anthony, Anand, Jim, Joe, Johnny and Jatin went on a boat ride. Few of them form a group and go for the ride on two different boats.

- i) To maintain the balance, a boat can accommodate atmost four and had to accommodate atleast four students.
- ii) Amar and Anthony are being best friends would ride in the same boat only.
- iii) Amar and Jatin do not ride in the same boat.
- iv) Akbar and Joe do not sit in the boat in which Anthony is sitting.
- v) Jim will sit in the same boat with Amar and Anand only but not with Johnny.

17) If Jatin and Johnny are in the same boat, who are sitting in the other boat?

- | | |
|------------------------------|-------------------------------|
| a) Amar, Anthony, Jim, Anand | b) Joe, Akbar, Amar, Anand |
| c) Amar, Jim, Joe, Anand | d) Jim, Anand, Anthony, Akbar |

18) If Anand and Amar are in the same boat, which of the following statements is true?

- a) Five of them are in the same boat.
- b) Akbar is in the same boat.
- c) Jim is not in the same boat.
- d) Johnny is not in the same boat.

Directions for questions [19 – 21] :

Amit, Bittu, Chintu, Dumpy, Falgun, Hitesh, Ronit, Purav and Saurav are nine players from among whom three teams consisting respectively of 4 members, 3 members and 2 members must be formed subject to the following conditions.

- i) Chintu must have three more players with him while Dumpy must have only two more with him.
- ii) Chintu and Saurav cannot be in the same team.
- iii) Purav and Bittu cannot be in the same team.
- iv) Ronit and Hitesh must be in the same team.

19) If Dumpy, Falgun, Purav form the team of 3 members, then which of the following must be true?

- a) Hitesh must be in the same team of Saurav.
- b) Saurav must form a two-member team with Amit or Chintu.
- c) Saurav must form a two-member team with Bittu or Amit.
- d) Chintu should form a team of 4 members with Hitesh, Ronit and Amit.

20) If Dumpy takes Amit as a part of his three-member team, which of the following must go into Chintu's team?

- a) Bittu and Saurav
- b) Hitesh and Ronit
- c) Purav and Bittu
- d) Purav and Falgun

21) If Chintu and Falgun are together and Saurav is in the team of two members, then how many sets of different teams are possible?

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

Directions for questions [22 – 25] :

These questions are based on the following information.

A team of five players is to be selected from a group of 10 players – A, B, C, D, E, F, G, H, I and J.

- i) Exactly one of the G and H must be selected.
- ii) H and A must be selected together, if selected.
- iii) B and F must be selected together, if selected.
- iv) F and J cannot be selected together.
- v) C and D cannot be selected together.

[CAPGEMINI]

22) Which of the following can be a possible team?

- a) BCEFI
- b) BFCGJ
- c) HDBFI
- d) AHBFE

23) If J is selected and E is not selected, then who among the following cannot be selected?

- a) H
- b) D
- c) G
- d) C

24) If G is not selected and J is selected, then the total number of possible selections are

- a) 4
- b) 5
- c) 2
- d) 6

25) If G is selected, then which of the following can be the group of players who are not selected?

- a) H, A, F, D, I
- b) H, F, D, E, I
- c) H, A, C, D, J
- d) H, D, J, E, I

Directions for questions 26 to 28: Refer to the data below and answer the questions that follows.

Guest lectures on five subjects viz., Economics, History, Statistics, English and Mathematics have to be arranged in a week from Monday to Friday. Only one lecture can be arranged on each day. Economics cannot be scheduled on Tuesday. Guest faculty for History is available only on Tuesday. Mathematics lecture has to be scheduled immediately after the day of Economics lecture. English lecture has to be scheduled immediately before the day of Economics lecture.

26) Which lecture is scheduled on Monday?

- a) History
- b) Economics
- c) Mathematics
- d) Statistics

27) Which lecture is scheduled between Statistics and English?



- a) History b) Economics c) Mathematics d) No lecture

28) Which lecture is the last one in the week?

- a) History b) Economics c) Mathematics d) Statistics

Direction for questions [29-32]

Hyderabad Airport has only one flight departing at every 1 ½ hours each day. The last flight is for Singapore at 7:30 p.m. Flight for Japan is exactly at 12:00 hours and it is third flight. The maximum time gap between two consecutive flights is between that for Singapore and Pakistan. Flight for France is fifth flight and is followed by Canada. Time gap between France and Nepal is same as that between Australia and Korea.

29) First flight is for:

- a) Korea b) Pakistan c) Nepal d) Australia

30) If the second-last flight is for Nepal, then the flight for Australia is the _____ flight.

- a) Second b) Fourth c) Second or Fourth d) Can't Say

31) If the flight for Nepal is at 10:30 a.m., flight

for Korea could be at:

- a) 9 a.m. b) 1:30 p.m. c) 4:30 p.m. d) 3:00 p.m.

32) Flight for France is definitely after:

- a) Australia b) Korea c) Nepal d) Can't Say

Direction for questions [33-37]

ABC Learning Resources is conducting a refresher course for teachers on seven different topics of the competitive exams namely Problem Solving (PS), Data Interpretation (DI), Data Sufficiency (DS), Visual Aptitude (VA), Reading Comprehension (RC), Verbal Reasoning (VR) and Analytical Reasoning (AR) from 22nd June to 29th June.

- i) The course should end with DI.
- ii) 23rd June, being Sunday, should be a holiday.
- iii) VR should be on previous day of AR.
- iv) DS should be immediately after a holiday.
- v) There should be a gap of exactly one day between RC and AR.
- vi) There should be a gap of exactly two days between PS and RC, with PS occurring before RC.

33) The refresher course will start with:

- a) PS b) VR c) VA d) RC

34) Which subject will be on Tuesday?

- a) PS b) RC c) VR d) DS

35) Which subject precedes VA?

- a) PS b) DS c) AR d) VR

36) How many days gap is there between PS and VA?

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

37) Which subject follows DS?

- a) PS b) RC c) DI d) VA

Directions [38 to 39]: Read the following information and answer the given questions.

Professor Mukhopadhyay works only on Mondays, Tuesdays, Wednesdays, Fridays, and Saturdays. She performs four different activities – Lecturing, Conducting quizzes, evaluating quizzes and working on consultancy projects. Each working day she performs exactly

a) One activity in the morning and exactly one activity in the afternoon. During each

week her work schedule MUST satisfy the following restrictions:

b) She conducts quizzes on exactly three mornings.

c) If she conducts quizzes on Monday, she does not conduct a quiz on Tuesday.

d) She lectures in the afternoon on exactly two consecutive calendar days.



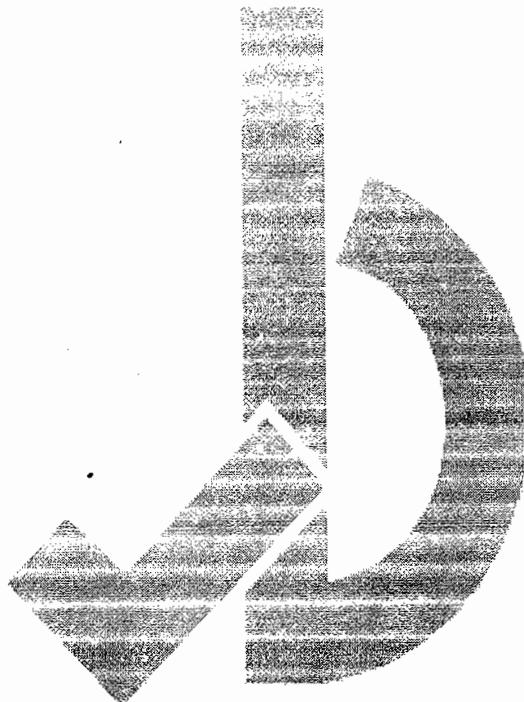
- e) She evaluates quizzes on exactly one morning and three afternoons.
 f) She works on consultancy project on exactly one morning.
 g) On Saturday, she neither lectures nor conducts quizzes.

38) On Wednesdays, the professor could be scheduled to?

- a) Work on a consultancy project in the morning and conduct a quiz in the afternoon
 b) Lecture in the morning and evaluate quizzes in the afternoon.
 c) Conduct a quiz in the morning and lecture in the afternoon
 d) Conduct a quiz in the morning and work on consultancy project in the afternoon.
 e) Evaluate quizzes in the morning and conducting quizzes in the afternoon.

39) Which one of the following must be a day on which professor lectures?

- a) Monday b) Tuesday c) Wednesday d) Friday



Check The Answers

1	C	6	C	11	A	16	A	21	A	26	D	31	B	36	D
2	A	7	A	12	A	17	A	22	D	27	A	32	D	37	B
3	B	8	C	13	C	18	D	23	C	28	C	33	A	38	C
4	B	9	C	14	B	19	C	24	B	29	B	34	B	39	B
5	C	10	C	15	B	20	B	25	C	30	C	35	C		



PRACTICE EXERCISE

Directions [1-3] A, B, C and D are related to each other.

There are same number of males and females.

- i) A is D's daughter or only son.
- ii) B or C is D's sister.
- iii) A is B's brother or nephew.
- iv) C is A's brother or sibling.

1) How is D related to C?

- a) Son
- b) Father
- c) Nephew
- d) Mother

2) How is C related to B?

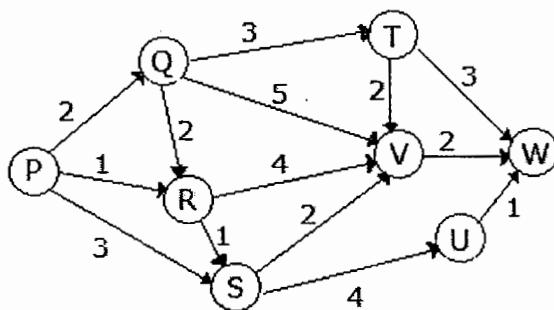
- a) Uncle
- b) Aunt
- c) Niece
- d) Nephew

3) Who among the following are males?

- a) AC
- b) BC
- c) AD
- d) BD

Direction [4 – 6] : Study the data given below and answer the questions that follow:

P, Q, R, S, T U, V and W were 8 cities and the distances between them are shown in the figure below. No roads other than those shown in the figure are available between any two cities.



4) What is the shortest distance between P and W?

- a) 5
- b) 6
- c) 7
- d) 8

5) If all the roads to V are blocked due to curfew. What is the shortest route from P to W?

- a) PQTW
- b) PRSUW
- c) PRQTW
- d) PSUW

6) What is the total possible ways one person can travel from P to W?

- a) 11
- b) 12
- c) 10
- d) None

7) At least two boys out of A, B, C and D and at least two girls out of P, Q, R and S have to be chosen to form a group of 5 members.

i) Neither A nor C can go with Q.

ii) Neither P nor S can go with B.

iii) Q and R cannot be together.

- a) ARCQP
- b) CSQPD
- c) BSQRP
- d) PSRAD

Directions for questions [8 – 9]: These questions are based on the following information.

A, B, C, D, E, F and G are seven players. They form two teams of two players each and one team of three players. A and B cannot be in the same team. B and C cannot be in the same team whereas E and F must be in the same team. G and D cannot be in the same team.

8) If C, D and A form a team of three players. Which of the following can be the members of one of the other teams?

- a) A and E
- b) G and B
- c) E and F
- d) Both (b) and (c)



- 9) If B, E and F form a team of three members, which of the following cannot be the two teams of two member each?
- a) AD and CG b) AC and GD c) AG and CD d) Both (a) and (b)

Directions for questions [10 – 12] :

Refer the data below to answer the following questions.

[E - COGNOSYS]

A group of three friends are being selected to participate in a quiz show. The three friends must be selected from a group of seven namely Alex, Bijoy, Carey, Donna, Elizabeth, Firoze and Gina. As the quiz show has several rounds, for each round a different team is made based on their special areas of quizzing. The teams are made according to the following conditions:

- i) As they both specialize in multiple domains, either Carey or Alex or both must be selected.
- ii) For any round, Alex or Bijoy have to be selected together or not selected at all.
- iii) Carey and Donna belong to the same specialization and hence should not be selected together.

- 10) In round 2, Donna is selected. Who forms the other members of the team?

- a) Bijoy and Carey b) Alex and Gina
c) Alex and Bijoy d) Carey and Elizabeth

- 11) In round 1, If Elizabeth is selected, which of the following pairs of friends could also be selected?

- a) Alex and Firoze b) Bijoy and Carey
c) Carey and Firoze d) Carey and Donna

- 12) For round 3, which of the following combinations of friends conforms to the conditions?

- a) Alex, Carey, Donna b) Alex, Elizabeth, Firoze
c) Bijoy, Carey, Gina d) Carey, Elizabeth, Gina

Directions for questions [13 – 16] :

Refer the data below to answer the following questions.

Four people of different nationalities live on the same side of a street in four houses each of a different colour. Each person has a different favourite drink. The following additional information is also known :

[E - COGNOSYS]

- i) The Englishman lives in the red house.
- ii) The Italian drinks tea.
- iii) The Norwegian lives in the first house on the left.
- iv) In the second house from the right they drink milk.
- v) The Norwegian lives adjacent to the blue house.
- vi) The Spaniard drinks fruit juice.
- vii) Tea is drunk in the blue house.
- viii) The white house is to the right of the red house.

- 13) The colour of the Norwegian's house is

- a) yellow b) white c) Blue d) Red

- 14) Milk is drunk by the

- a) Norwegian b) Englishman c) Italian d) None of these

- 15) The Norwegian drinks

- a) milk b) cocoa c) fruit juice d) tea

- 16) Which of the following is not true?

- a) Milk is drunk in the red house. b) The Italian lives in the blue house.

c) The Spaniard lives in a corner house.

d) The Italian lives next to the Spaniard.

Directions for the questions [17 to 18]: Refer to the data below and answer the questions that follow.

A team is to be selected from five men A, B, C, D and E and six women L, M, N, O, P and Q where A, B and N are lecturers; C, D, L, M and O are engineers and the rest are doctors. The team should be selected subject to the following conditions:

- i) B cannot go with N or D.
- ii) C and P have to be together.
- iii) A, L, and Q have to be together.
- iv) D and L cannot go together.
- v) E and M have to be together.
- vi) C cannot go with M.

17) If the team consists of one lecturer, two engineers, three doctors and C does not go with P, the members of the team are:

- a) B E L M P Q b) A C E L P Q c) A E L M P Q d) A C E M P Q

18) If the team consists of one lecturer, three engineers and one male doctor, the members of the team are:

- a) A D L M Q b) D E M N O c) D E L M N d) A L M O Q

Directions 19 to 20: Refer to the data below and answer the questions that follow.

Four Friends Ajit, Kishan, Umesh and Tarun – have Rs. 6000, Rs. 6500, Rs. 7000 and Rs. 4500 respectively with them. They have visited a mobile store, where the shopkeeper has run out of stock and have only four mobiles – M₁, M₂, M₃ and M₄ – costing Rs. 5500, Rs. 6000, Rs. 6200, Rs. 4000 respectively. After discussing among themselves, each person decides to purchase exactly one of the mobile available using only the money available with him/her.

22) Umesh cannot purchase:

- a) M₁ b) M₂ c) M₃ d) M₄

23) If Umesh purchase M₂, In how many ways they can purchase the mobiles

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

Check The Answers

1	B	6	A	11	C	16	D
2	C	7	D	12	D	17	C
3	C	8	D	13	A	18	B
4	B	9	B	14	B	19	D
5	B	10	C	15	B	20	A

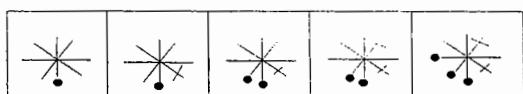


NON VERBAL

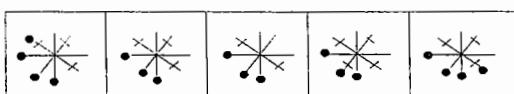
Directions for questions 1-39: In the following questions, four figures, that follow a certain sequence or pattern are given. Find the next figure in the sequence from the answer choices provided to the right.

1)

PROBLEM FIGURES

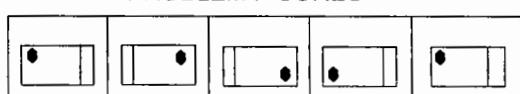


ANSWER FIGURES

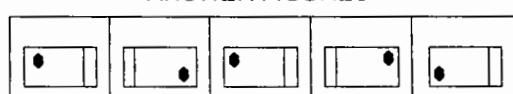


2)

PROBLEM FIGURES



ANSWER FIGURES

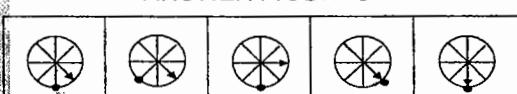


3)

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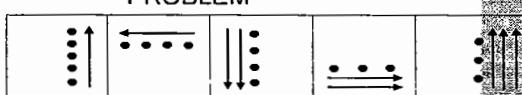


ANSWER FIGURES

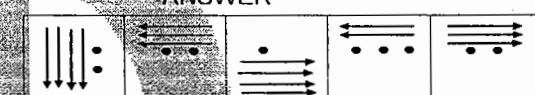


4)

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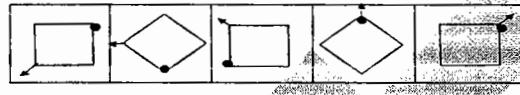


ANSWER

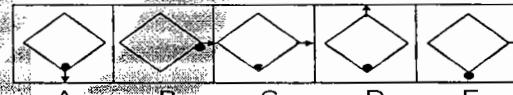


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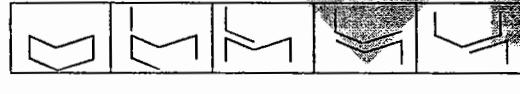


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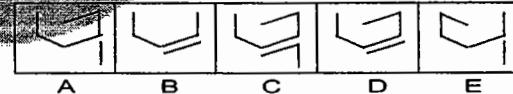


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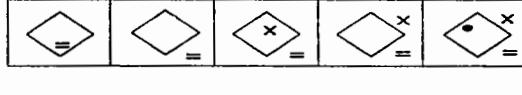


ANSWER FIGURES

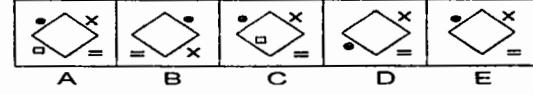


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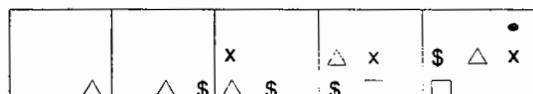


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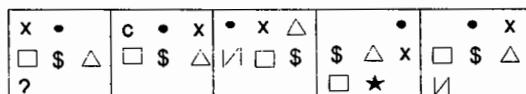


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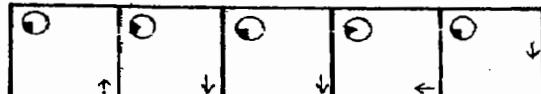
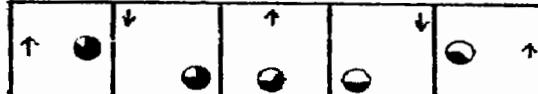
PROBLEM FIGURES



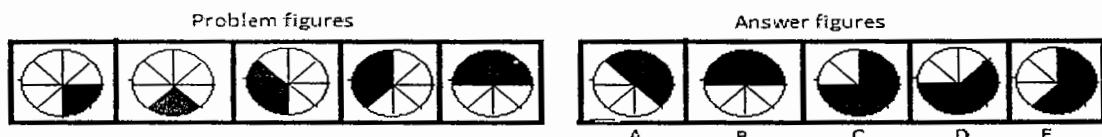
ANSWER FIGURES



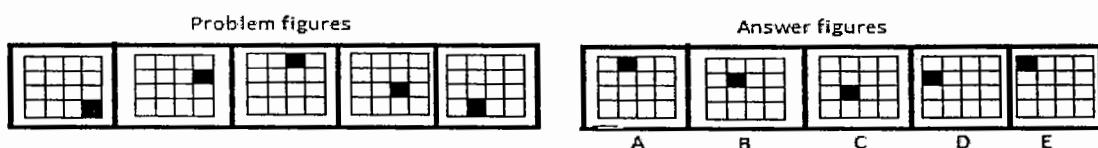
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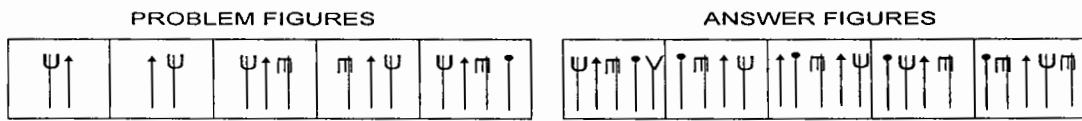
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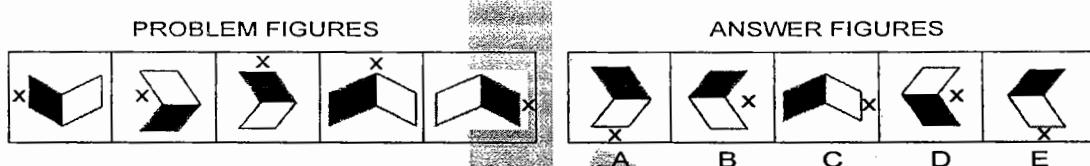
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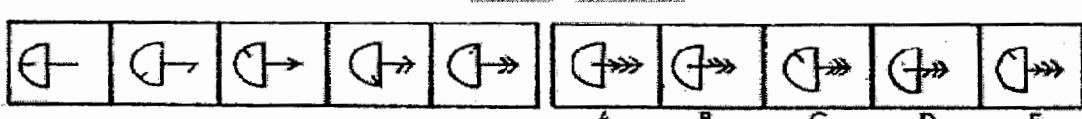
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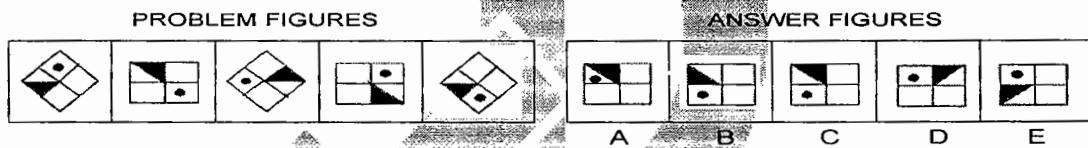
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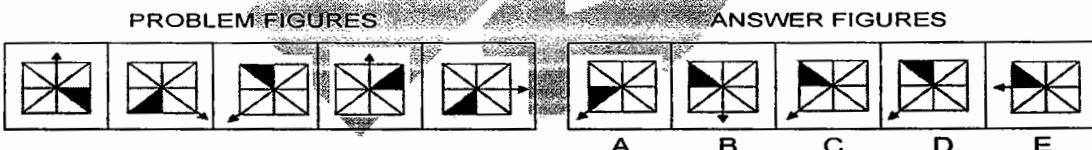
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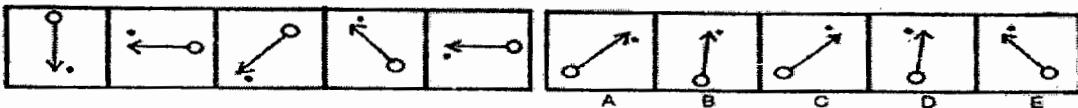
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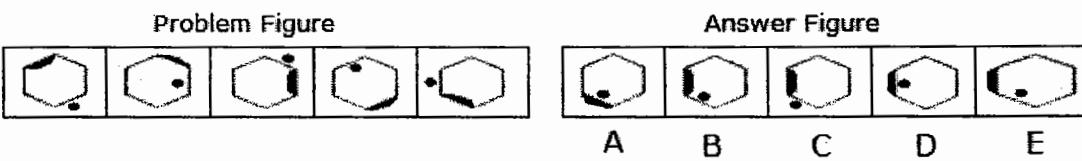
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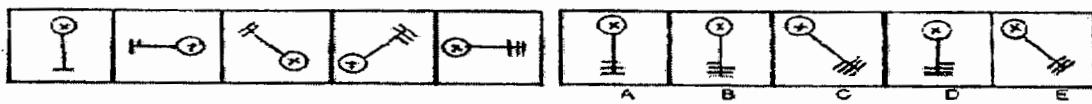
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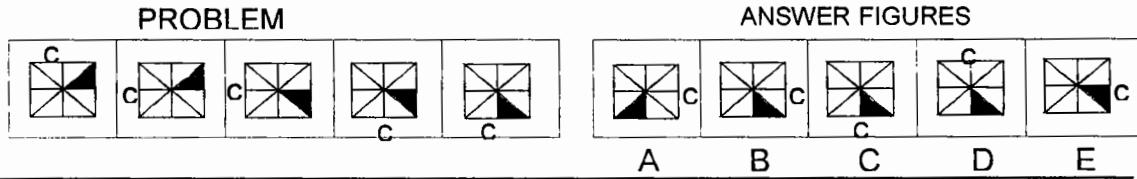
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19)

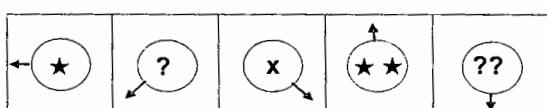


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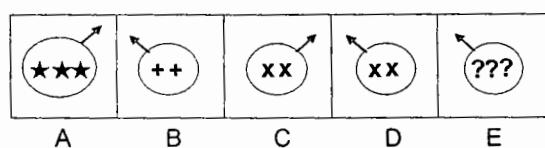


21)

PROBLEM FIGURES



ANSWER FIGURES

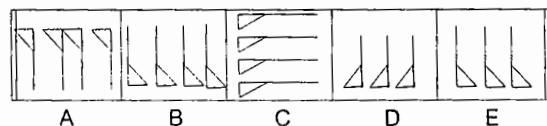


22)

PROBLEM FIGURES



ANSWER FIGURES

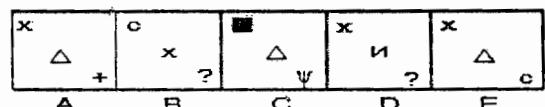


23)

PROBLEM FIGURES



ANSWER FIGURES



24)

PROBLEM FIGURES



ANSWER FIGURES

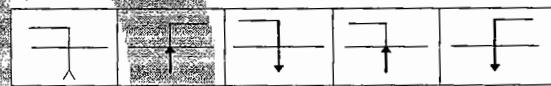


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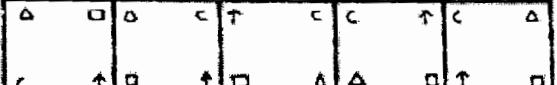
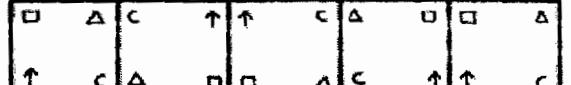


ANSWER FIGURES



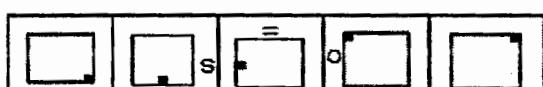
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PROBLEM FIGURES

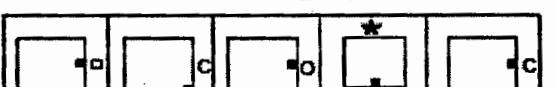


27)

PROBLEM FIGURES

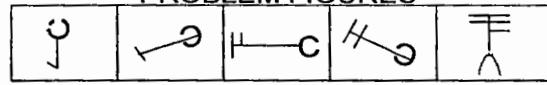


ANSWER FIGURES

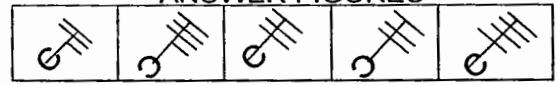


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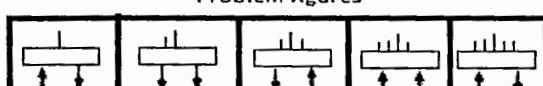


ANSWER FIGURES

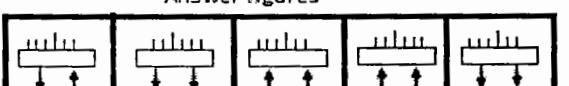


29)

Problem figures

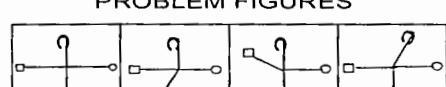


Answer figures

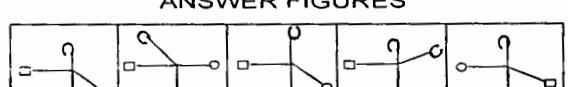


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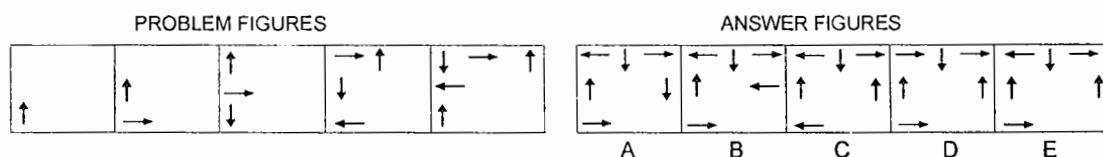
PROBLEM FIGURES



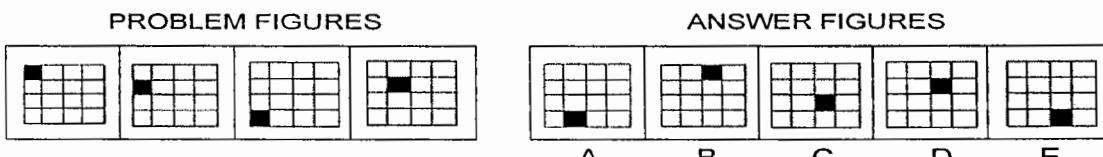
ANSWER FIGURES



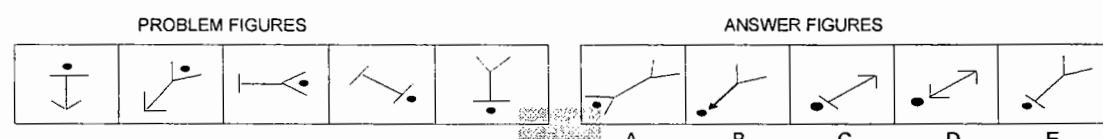
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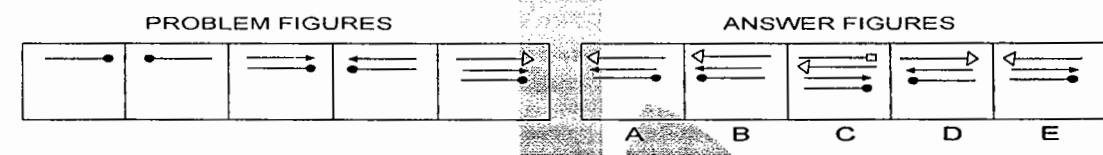
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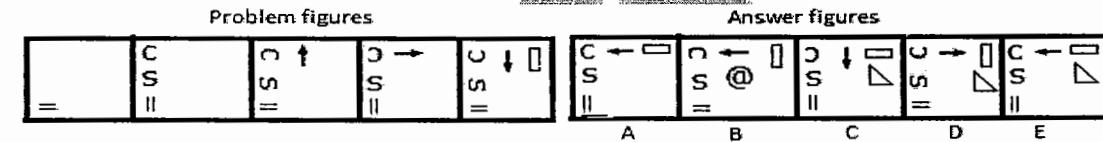
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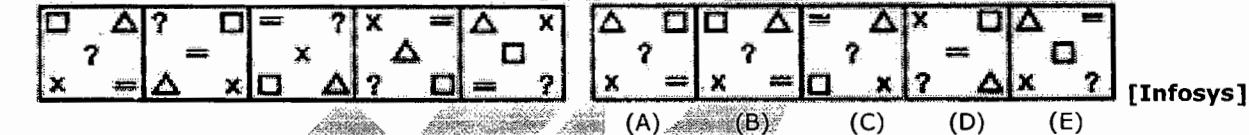
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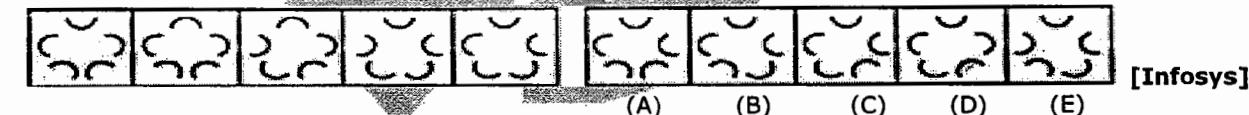
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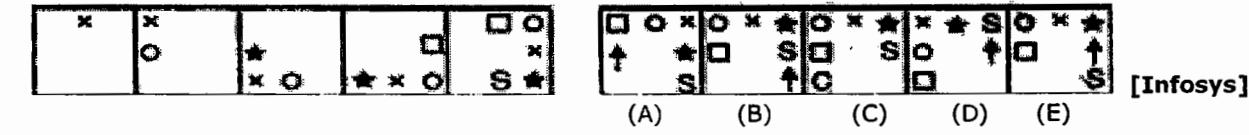
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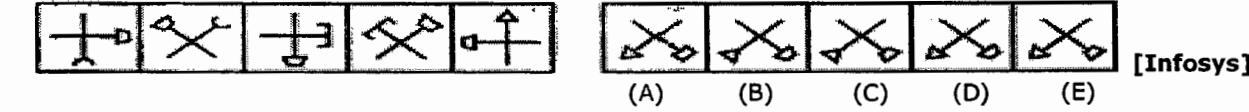
37)



38)



39)



Check The Answers

1	B	6	A	11	B	16	D	21	D	26	D	31	E	36	B
2	D	7	E	12	B	17	B	22	E	27	A	32	C	37	D
3	A	8	E	13	B	18	E	23	E	28	C	33	A	38	A
4	B	9	C	14	D	19	B	24	E	29	E	34	B	39	E
5	C	10	A	15	A	20	B	25	D	30	A	35	A	40	



CLOCKS

1. Minute Spaces:

The face or dial of watch is a circle whose circumference is divided into 60 equal parts, called minute spaces.

Hour Hand and Minute Hand:

A clock has two hands, the smaller one is called the **hour hand** or **short hand** while the larger one is called **minute hand** or **long hand**.

2.

- i. In 60 minutes, the minute hand gains 55 minutes on the hour hand on the hour hand.
- ii. In every hour, both the hands coincide once.
- iii. The hands are in the same straight line when they are coincident or opposite to each other.
- iv. When the two hands are at right angles, they are 15 minute spaces apart.
- v. When the hands are in opposite directions, they are 30 minute spaces apart.
- vi. Angle traced by hour hand in 12 hrs = 360°
- vii. Angle traced by minute hand in 60 min. = 360° .
- viii. If a watch or a clock indicates 8.15, when the correct time is 8, it is said to be 15 minutes **too fast**.
On the other hand, if it indicates 7.45, when the correct time is 8, it is said to be 15 minutes **too slow**.

Some Important points :

- (1) Clock hands coincide 11 times in every 12 hours, as they coincide only one time between 11 and 1, at 12 o'clock.
- (2) So, Both hands coincide 22 times in 24 hours or in a day.
- (3) In 12 hours both hands are in straight line (either coincides or in opposite direction) 22 times.
- (4) So, In 24 hours both hands are in straight line (either coincides or in opposite direction) 44 times.
- (5) In 12 hours both hands are at right angled 22 times and 44 times in a day
- (6) In 12 hours both hands are in opposite direction 11 times, between 5 to 7 , they are opposite at 6 o'clock only. So in a day 22 times in opposite directions.



Practice Exercise

1) What is the angle between the hands of the clock at 2 : 45?

- a) $180\frac{1}{2}^\circ$ b) $187\frac{1}{2}^\circ$ c) $172\frac{1}{2}^\circ$ d) Both 2 and 3

2) What is the angle between the hands of the clock at 3 : 30?

- a) 65° b) 85° c) 75° d) $87\frac{1}{2}^\circ$

3) What is the angle between the hands of the clock at 8 : 40?

- a) 10° b) 20° c) 25° d) $87\frac{1}{2}^\circ$

4) What is the angle between the hands of the clock at 9 : 10?

- a) 165° b) 145° c) 135° d) 215°

5) What is the angle between the hands of the clock at 4 : 20 ?

- a) 10° b) 85° c) 75° d) 60°

6) At what time between 6 O' clock and 7 O' clock the hands of the clock will coincide

- a) $6:30\frac{8}{11}$ min b) $6:32\frac{8}{11}$ min c) $6:20\frac{8}{11}$ min d) $6:25\frac{8}{11}$ min

7) At what time between 4 O' clock and 5 O' clock the hands of the clock will be at right angles?

- a) $4:30\frac{8}{11}$ min b) $4:38\frac{2}{11}$ min c) $4:32\frac{8}{11}$ min d) $4:34\frac{8}{11}$ min

8) At what time between 1 O' clock and 2 O' clock the hands of the clock will be in opposite direction?

- a) $1:38\frac{2}{11}$ min b) $1:20\frac{8}{11}$ min c) $1:10\frac{8}{11}$ min d) $1:32\frac{4}{11}$ min

9) How many times in a day the hands of a clock will have 180° ?

- a) 20 b) 22 c) 19 d) 18

10) How many times do the hands of a clock coincide in a day?

- a) 23 b) 48 c) 22 d) 24

11) How many times are the hands of a clock at right angles in a day?

- a) 22 b) 48 c) 44 d) 46

12) At what time between 9 and 10 o'clock will the hands of a watch be together?

- a) 45 min. past 9 b) 50 min. past 9 c) 49 min. past 9 d) 48 min. past 9

13) Find the mirror image when the exact time shown in a clock was 8 : 40?

- a) 3:20 b) 3:40 c) 8:20 d) 9:20

14) Find the mirror image when the exact time shown in a clock was 3 : 23?

- a) 3:37 b) 8:37 c) 8:23 d) 9:20

15) Find the mirror image when the exact time shown in a clock was 11 : 43?

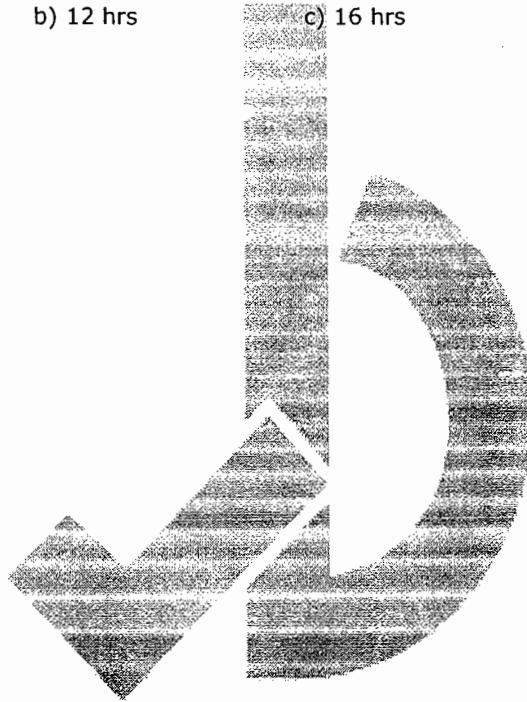
- a) 11:17 b) 12:43 c) 12:17 d) 9:20

16) A clock is set right at 5 a.m. The clock loses 16 minutes in 24 hours. What will be the true time when the clock indicates 10 p.m. on 4th day? [INFOSYS]

- a) 12 am b) 6 am c) 11 pm d) 10 pm



- 17) A clock is set right at 8 a.m. The clock gains 10 minutes in 24 hours will be the true time when the clock indicates 1 p.m. on the following day
 a) 46 mins past 12 b) 48 mins past 12 c) 47 mins past 12 d) 49 mins past 12
- 18) A watch, which gains 5 seconds in 3 minutes, was set right at 7 a.m. in the afternoon of the same day, when the watch indicated quarter past 4'o clock, the true time is:
 a) 59 min.past 3 b) 4 pm c) 4 : 10 pm d) 4 : 04 pm
- 19) There were two clock one is getting slow by three minutes every hour and another one is gaining two minutes every hour and exactly after how many hours there two clock has a 2 hour difference?
 a) 24 hrs b) 48 hrs c) 36 hrs d) 20 hrs
- 20) There were two clock one is getting slow by two minutes every hour and another one is gaining 1 minute every hour and exactly after how many hours there two clock has a 1 hour difference?
 a) 14 hrs b) 12 hrs c) 16 hrs d) 20 hrs



Check The Answers

1	B	6	B	11	C	16	C
2	C	7	B	12	C	17	D
3	B	8	A	13	A	18	B
4	D	9	B	14	B	19	A
5	A	10	C	15	C	20	D

CALENDARS

1. Odd Days:

We are supposed to find the day of the week on a given date.

For this, we use the concept of 'odd days'.

In a given period, the number of days more than the complete weeks are called **odd days**.

2. Leap Year:

(i). Every year divisible by 4 is a leap year, if it is not a century.

(ii). Every 4th century is a leap year and no other century is a leap year.

Note: A leap year has 366 days.

Examples:

- i. Each of the years 1948, 2004, 1676 etc. is a leap year.
- ii. Each of the years 400, 800, 1200, 1600, 2000 etc. is a leap year.
- iii. None of the years 2001, 2002, 2003, 2005, 1800, 2100 is a leap year.

3. Ordinary Year:

The year which is not a leap year is called an **ordinary years**. An ordinary year has 365 days.

4. Counting of Odd Days:

$$1. \text{ 1 ordinary year} = 365 \text{ days} = (52 \text{ weeks} + 1 \text{ day})$$

∴ 1 ordinary year has 1 odd day.

$$2. \text{ 1 leap year} = 366 \text{ days} = (52 \text{ weeks} + 2 \text{ days})$$

∴ 1 leap year has 2 odd days.

$$3. \text{ 100 years} = 76 \text{ ordinary years} + 24 \text{ leap years}$$

$$= (76 \times 1 + 24 \times 2) \text{ odd days} = 124 \text{ odd days.}$$

$$= (17 \text{ weeks} + \text{days}) \equiv 5 \text{ odd days.}$$

∴ Number of odd days in 100 years = 5.

Number of odd days in 200 years = $(5 \times 2) \equiv 3$ odd days.

Number of odd days in 300 years = $(5 \times 3) \equiv 1$ odd day.

Number of odd days in 400 years = $(5 \times 4 + 1) \equiv 0$ odd day.

Similarly, each one of 800 years, 1200 years, 1600 years, 2000 years etc. has 0 odd days.

1. Day of the Week Related to Odd Days:

No. of days:	0	1	2	3	4	5	6
Day:	Sun	Mon	Tues	Wed	Thurs	Fri	Sat



Practice Exercise

- 1) Today is Monday. After 61 days, it will be?**
 a) Wednesday b) Saturday c) Thursday d) Tuesday
- 2) How many odd days are there in 289 days?**
 a) 4 b) 3 c) 2 d) 1
- 3) If 6th March, 2005 is Monday, what was the day of the week on 6th March, 2004?**
 a) Tuesday b) Monday c) Sunday d) Wednesday
- 4) If 19th March 1991 was Friday, then what day of the week 19th March 1997 was?**
 a) Saturday b) Monday c) Sunday d) Tuesday
- 5) It was Sunday on January 1, 2006. What was the day of the week January 1, 2010?**
 a) Saturday b) Friday c) Sunday d) Wednesday
- 6) If 16th April 2003 was Friday, then what was the day of the week on 19th August 2008?**
 a) Wednesday b) Saturday c) Thursday d) Tuesday
- 7) How many odd days are there in the first 22 years?**
 a) 5 b) 6 c) 4 d) 3
- 8) What was the day of the week on 16th July, 1776?**
 a) Wednesday b) Saturday c) Sunday d) Tuesday
- 9) What will be the day of the week 15th August, 2010?**
 a) Saturday b) Monday c) Sunday d) Tuesday
- 10) What will be the day of the week 19th March, 1936?**
 a) Monday b) Wednesday c) Thursday d) Tuesday
- 11) On what dates of April, 2001 did Wednesday fall?**
 a) 1st, 8th, 15th, 22nd, 29th
 b) 2nd, 9th, 16th, 23rd, 30th
 c) 3rd, 10th, 17th, 24th
 d) 4th, 11th, 18th, 25th
- 12) On what dates of July, 2004 did Monday fall?**
 a) 1st, 8th, 15th, 22nd, 29th
 b) 6th, 13th, 20th, 27th
 c) 4th, 11th, 18th, 25th
 d) 5th, 12th, 19th, 26th
- 13) The calendar for the year 2009 will be the same for the year:**
 a) 2014 b) 2015 c) 2017 d) 2018
- 14) The calendar for the year 2007 will be the same for the year:**
 a) 2014 b) 2015 c) 2017 d) 2018
- 15) What will be the day of the week 15th August, 1947?**
 a) Monday b) Wednesday c) Thursday d) Friday

Check The Answers

1	B	4	A	7	B	10	C	13	B
2	C	5	B	8	D	11	D	14	D
3	C	6	C	9	C	12	D	15	D

Arithmetic



PERCENTAGES

Introduction

The use of percentages is common place in many aspects of commercial life. Interest rates, discounts, pay rises and so on are all expressed using percentages. This leaflet revises the meaning of the term 'percentage' and shows how to calculate percentages, and how to convert expressions involving percentages into alternative forms.

Percentages

Any fraction which has a denominator of 100 can be written in a special way known as a percentage. The symbol for percentage is %.

For example, the fraction $\frac{20}{100}$ is written as 20%, and this is read as 'twenty per cent'.

To convert a decimal to a percentage:

The decimal should first be expressed as a fraction. Consider the following examples:

The decimal 0.06 can be written $\frac{6}{100}$ which now has a denominator of 100. Thus $0.06 = 6\%$.

The decimal 0.1 can be written as $\frac{1}{10}$, or equivalently $10/100$. Thus $0.1 = 10\%$.

Fractional Equivalents of Important Percentages

1	100 %	$\frac{1}{5}$	20 %	$\frac{1}{9}$	$11\frac{1}{9}\%$
$\frac{1}{2}$	50 %	$\frac{1}{6}$	$16\frac{2}{3}\%$	$\frac{1}{10}$	10 %
$\frac{1}{3}$	$33\frac{1}{3}\%$	$\frac{1}{7}$	$14\frac{2}{7}\%$	$\frac{1}{11}$	$9\frac{1}{11}\%$
$\frac{1}{4}$	25 %	$\frac{1}{8}$	$12\frac{1}{2}\%$	$\frac{1}{12}$	$8\frac{1}{3}\%$

Net Change in Percentage:

In the first step, a number is changed (increased or decreased) by $x\%$, and in the second step, this changed number is again changed (increased or decreased) by $y\%$, then net percentage change on the original number can be conveniently found out by using the following formula,

$$\text{net \% change} = x + y + \frac{xy}{100}$$

(+ or -) If x or y indicates in percentage, then put a (-)ve sign x or y , otherwise positive sign remains

% EXCESS OR % SHORTNESS

When a number A exceeds the another B by $x\%$, then % shortness of B $\frac{x}{100+x} \times 100\%$

It implies that B is less than A by $\frac{x}{100+x} \times 100\%$

Similarly, if a number A is short of (or less than) B by $x\%$, then % excess of B $= \frac{x}{100-x} \times 100$

i.e. B is more than A by $\frac{x}{100-x} \times 100\%$



Classroom Exercise

- 1) Which of the following is the largest?**
- I) 6% of 500 II) 17% of 180 III) 16% of 200 IV) 500% of 6
- a) I b) II c) III d) IV
- 2) If X is $55\frac{5}{9}\%$ of 90 and 38 is Y% of 190, then what is the value of (X + 2Y)?**
- a) 12 b) 70 c) 80 d) 90
- 3) 22% of a number is 40 less than 47% of the number, then the number is**
- a) 120 b) 160 c) 110 d) None
- 4) 16% of a number is 39 less than 29% of the number, then what is half of the number**
- a) 150 b) 160 c) 140 d) 120
- 5) In a shop, If 40 percent of the store's customers decide to purchase articles, and of those customers 15 percent purchase hats, what percent of the store's customers purchase hats?**
- a) 4 % b) 6 % c) 15 % d) 24 %
- 6) From a vessel 20% of the liquid is evaporated on the first day, 35% of the remaining liquid is evaporated on the second day. How much percentage of liquid is left over in the bowl on the second day?**
- a) 42 % b) 52 % c) 55 % d) 45 %
- 7) The cost of a machine depreciates its value by 25%, 20% and 15% in the three consecutive years compared to its previous year, what was its cost 3 years ago, if its present cost is Rs. 6120?**
- a) Rs. 15000 b) Rs. 12000 c) Rs. 18000 d) None of these
- 8) In a country X, 1 percent of the population is taller than 6 feet whereas 3 percent of the population of country Y is taller than 6 feet. There are thrice as many people in country X as in country Y. Taking both countries together, what percent of the population is taller than 6 feet? [GATE 2014]**
- a) 2 % b) 15 % c) 3 % d) None of these
- 9) In a stock pile of products of three machines, 40% and 30% were manufactured in machine I and machine II respectively. Three percent of the products of machine I are defective. One percent of the products of machine II are defective while 95% of the products of machine III are non-defective. What is the percentage of defective in the stockpile?**
- a) 3 % b) 9 % c) 15 % d) 30 %
- 10) In a village, there are three localities A, B and C, the population are in the ratio of 3 : 2 : 5 respectively. In a locality A, 70% of the people are literate, in locality B, 40 % of the people are literate. If 90 % people in locality C are literate, find the percentage of literacy in the village.**
- a) 75 % b) 74 % c) 85 % d) 71 %
- 11) The number of workers in a company is increased by 12% and 15% in two successive years. If the present strength is 6440. What was the strength two years ago?**
- a) 5200 b) 5400 c) 5500 d) 5000
- 12) Ram spends 20% of his monthly income on his household expenditure, 15% of the rest on books, 30% of the rest on clothes and saves the rest. On counting, he comes to know that he has finally saved Rs.9520. Find his monthly income.**
- a) Rs. 10000 b) Rs. 15000 c) Rs. 20000 d) None of these
- 13) In an examination a student gets 35% of maximum marks and fails by 20 marks. Another student who gets 39% of maximum marks and fails by 4 marks. Find the maximum marks of exams in the examination?**



- a) 800 b) 300 c) 400 d) Cannot be determined

- 14) In an examination a student gets 39% of maximum marks and fails by 8 marks. Another student who gets 44% of maximum marks gets 12 marks more than the pass mark. What is the pass percentage in the examination?
- a) 40% b) 42% c) 41% d) None
- 15) In an election contested by A and B, A secures 54% of the votes and wins by a majority of 1248 votes. How many votes were totally cast?
- a) 15000 b) 16600 c) 15600 d) 16200
- 16) In an election contested by A and B, 20% of the votes polled were invalid. A candidate got 56% of the valid votes and won by a majority of 1440 votes. What is the total number of votes cast?
- a) 15000 b) 12000 c) 14000 d) 22000
- 17) In an election contested by A and B, 10% of the votes polled were invalid. A candidate got 65% of the valid votes and won by a majority of 3780 votes. What is the total number of votes cast?
- a) 15000 b) 14600 c) 14800 d) 14880
- 18) In an election contested by A and B, 40% of the voters promised to vote for A and the rest for B. However on the day of election, 15 % of the voters went back on their promise to vote for A and instead voted for B. 25 % of the voters went back on their promise to vote for B and instead voted for A. If Finally A lost to B by 140 votes, How many voters totally cast their vote? [GATE 2011]
- a) 7000 b) 7500 c) 14000 d) 14500
- 19) A landowner increased the length and the breadth of a rectangular plot by 10% and 20% respectively. Find the percentage change in the area of the rectangular plot?
- a) 33% b) 30% c) 25% d) 32%
- 20) When the price of a product was decreased by 10%, the number sold increased by 30%. What was the effect on the total revenue?
- a) 14% dec b) 17% inc c) 14% inc d) 17% dec
- 21) The number of workers decreased by $\frac{1}{5}$ of the current number of workers and the salary of each worker is increased by $\frac{1}{4}$ of their current salary, if the present construction cost is Rs.15,600, what will be the new construction cost?
- a) Rs.14,600 b) Rs.14,160 c) Rs.14,500 d) Rs. 14,040
- 22) The length, breadth and height of a room is in the shape of a cuboid are increased by 10%, 20% and 30% respectively. Find the percentage change in the volume of the cuboid?
- a) 71% increase b) 72 % increase c) 70.5 % increase d) 71.6 % increase
- 23) If Ramesh salary is 25% more than Chetan's salary, then how much percent is salary of Chetan's salary is less than Ramesh salary?
- a) 12% b) 25% c) 18% d) 20%
- 24) The salary of Amit 15% less than that of Varun. Find by what percentage is the salary of Varun more than that of Amit?
- a) 12.2% b) 15.5% c) 18% d) 17.2%
- 25) The price of milk has increased by 30%, by what percentage the consumption should be decreased so that the total expenditure remains unchanged?
- a) 23.07% b) 20% c) 16 1/3% d) None
- 26) A company wants to increase the salaries of employees by 35%, without increasing the total expenses. Find by what percent the manpower be reduced to achieve the same?
- a) 24 % b) 28 % c) 25.9 % d) None

- 23) 120 litres of a mixture of A and B contains 10% of A. When 30 litres of A is added. What percentage of B in the final mixture?**
- a) 30 % b) 36 % c) 28 % d) 72%
- 24) In a mixture of 80 litres of milk and water, 25% of the mixture is milk. How much water should be added to the mixture so that milk becomes 20% of the mixture?**
- a) 25 L b) 15 L c) 20 L d) None
- 30) Sushanth spends 20% of his income on food, 10% on travelling, 15% on shopping, 25% on education of his children and the remaining on savings. If the savings is Rs.2100. How much does he spend on food?**
- a) Rs.1050 b) Rs.1100 c) Rs.960 d) Rs.900
- 31) In a community, 40% of the people are adults, 55% of the adults are women. There are 360 children. How many male adults are there?**
- a) 108 b) 160 c) 196 d) 236
- 32) In a group of persons from different families, 70% of the persons are male and 30 % of the persons are married. If two-sevenths of the males are married, what fraction of the females is single?**
- a) 25% b) 30% c) 20% d) None
- 33) The ratio of the number of boys and girls in a school is 3 : 4. Out of these 30% of the boys and 30% of girls are scholarship holders. Find the percentage of the students who are not scholarship holders?**
- a) 90% b) 75% c) 70% d) None
- 34) Bharathi's expenditure forms 70% of her total income. If her income increases by 20% and her expenditure increases by 30%, by what percentage does her saving inc/dec?**
- a) 1% dec b) 1% inc c) 2% inc d) 2% dec
- 35) A man distributes some gold coins in the following way: He gave 50% of the coins he had to his first friend, 50% of the rest to his second friend and again 50% of the rest to his third friend. If their combined share is worth 2625 gms of gold, find the quantity of gold man had?**
- a) 30 kg b) 300 kg c) 3 kg d) None of these

Practice Exercise

- 1) Which of the following is the largest?**
 I) 13% of 300 II) 12% of 400 III) 16% of 200 IV) 15% of 120
 a) I b) II c) III d) IV
- 2) What is 20% of 30% of 40% of 130 ?**
 a) 2.92 b) 2.1 c) 1.92 d) 3.12
- 4) If X is $28\frac{4}{7}\%$ of 700 and Y is $12\frac{1}{2}\%$ of 160, then find (X + Y)% of 200?**
 a) 440 b) 400 c) 220 d) None of these
- 5) 26% of a number is 160 more than 18% of the number, then the number is**
 a) 1200 b) 1600 c) 1400 d) 2000
- 6) A landowner increased the length and the breadth of a rectangular plot by 15% and 20% respectively. Find the percentage change in the area of the rectangular plot?**
 a) 38% b) 30% c) 25% d) 32%
- 7) The current construction cost of a structure is Rs.92,000. If the labour wages per day increase by $\frac{1}{5}$ of the current wages and the working hours decrease by $\frac{1}{6}$ of the current period, then the new cost of construction is**
 a) Rs.92,550 b) Rs.90,000 c) Rs.96,000 d) Rs.92,000
- 8) In an examination two students gets 36% and 39% of maximum marks and fails by 30 marks and 24 marks respectively. Find the pass percentage?**
 a) 51% b) 42% c) 41% d) None of these
- 9) In an election contested by A and B, A secures 58% of the votes and wins by a majority of 1808 votes. How many votes were totally cast?**
 a) 11300 b) 13600 c) 15600 d) 11200
- 10) In an election contested by A and B, 10% of the votes polled were invalid. A candidate got 53% of the valid votes and won by a majority of 108 votes. What is the total number of votes polled?**
 a) 3000 b) 2500 c) 4000 d) 2000
- 11) Out of the total production of iron from hematite, an ore of iron, 20% of the ore gets wasted, and out of the remaining iron, only 25% is pure iron. If the pure iron obtained in a year from a mine of hematite was 80,000 kg, then the quantity of hematite mined from that mine in the year is**
 a) 5,00,000 kg b) 4,00,000 kg c) 4,50,000 kg d) None of these
- 12) Ajay spends 30% of his monthly income on his household expenditure, 20% of the rest on books, 10% of the rest on shopping and saves the rest. On counting, he comes to know that he has finally saved Rs.15120. Find his monthly income.**
 a) 10000 b) 15000 c) 20000 d) 30000
- 13) 80% of the voters in a village promised to vote for Mr. Lootera and the rest promised to vote for Mr. Bemaan. Of these voters, 10% of the voters who had promised to vote for Mr. Lootera, did not vote on election day, while 20% of the voters who had promised to vote for Mr. Bemaan did not vote on the election day. What is the total number of votes polled if Mr. Lootera got 216 votes?**
 a) 200 b) 300 c) 264 d) 100
- 14) The length of the rectangle is increased by 20% and breadth is decreased by 20%. What is the effect on its area?**
 a) 4% dec b) 4% inc c) 20% inc d) 12% dec

- 15) When the price of a movie ticket was decreased by 15%, then the number of tickets sold increased by 20%. What was the effect on the total amount collected from the event organizer?
 a) 4% dec b) 2% inc c) 4% inc d) 2% dec
- 16) A student project report consists of 25 pages, each of 60 lines with 75 characters on each line. In case the number of lines is reduced to 25 but the number of characters is increased to 90 per lines. What is the percentage change in the number of pages.
 a) 30% b) 75% c) 100% d) 50%
- 17) A machine depreciates in value each year at the rate of 10% of its previous value. However, every second year there is some maintenance work so that in that particular year, depreciation is only 5% of its previous value. If at the end of the fourth year, the value of the machine stands at Rs.1,46,205, then find the value of the machine at the start of the first year.
 a) Rs.1,90,000 b) Rs. 2,00,000 c) Rs.1,95,000 d) Rs. 2,10,000
- 18) From a vessel 33.33% of the water is evaporated on the first day, 25% of the remaining water is evaporated on the second day. How much percentage is left over in the bowl on the second day?
 a) 40% b) 50% c) 60% d) 45%
- 19) David is 60% more than Chetan, Chetan is $\frac{2}{3}$ of Amit and Amit's salary is 50% more than Bharat. Now each of Amit, Bharat, Chetan and David is increased by 10%, then the salary of David forms what percent to the salary of Bharat?
 a) 150% b) 160% c) 175% d) None of these
- 20) After receiving two successive raises, Harsh's salary became equal to $\frac{15}{8}$ times of initial salary. By how much percent was the salary raised the first time, if the second raise was twice as high (in percent) as the first?
 a) 30% b) 20% c) 25% d) 10%

Check The Answers

1	B	6	A	11	B	16	C
2	D	7	B	12	D	17	B
3	A	8	A	13	B	18	B
4	D	9	A	14	A	19	B
5	A	10	D	15	B	20	C

PROFIT & LOSS

Cost Price: The price, at which an article is purchased, is called its **cost price**, abbreviated as **C.P.**

Selling Price: The price, at which an article is sold, is called its **selling prices**, abbreviated as **S.P.**

Profit or Gain: If S.P. is greater than C.P., the seller is said to have a **profit or gain**.

Loss: If S.P. is less than C.P., the seller is said to have incurred a **loss**.

IMPORTANT FORMULAE

1. Gain = (S.P.) - (C.P.)
2. Loss = (C.P.) - (S.P.)
3. Loss or gain is always reckoned on C.P.
4. Gain Percentage: (Gain %)

$$\text{Gain \%} = \left(\frac{\text{Gain} \times 100}{\text{C.P.}} \right)$$

5. Loss Percentage: (Loss %)

$$\text{Loss \%} = \left(\frac{\text{Loss} \times 100}{\text{C.P.}} \right)$$

6. Selling Price: (S.P.)

$$\text{SP} = \left[\frac{(100 + \text{Gain \%})}{100} \times \text{C.P.} \right]$$

7. Selling Price: (S.P.)

$$\text{SP} = \left[\frac{(100 - \text{Loss \%})}{100} \times \text{C.P.} \right]$$

8. Cost Price: (C.P.)

$$\text{C.P.} = \left[\frac{100}{(100 + \text{Gain \%})} \times \text{S.P.} \right]$$

9. Cost Price: (C.P.)

$$\text{C.P.} = \left[\frac{100}{(100 - \text{Loss \%})} \times \text{S.P.} \right]$$

10. If an article is sold at a gain of say 35%, then S.P. = 135% of C.P.

11. If an article is sold at a loss of say, 35% then S.P. = 65% of C.P.

12. When a person sells two similar items, one at a gain of say x%, and the other at a loss of x%, then the seller always incurs a loss given by:

$$\text{Loss \%} = \left(\frac{\text{Common Loss and Gain \%}}{10} \right)^2 = \left(\frac{x}{10} \right)^2.$$

13. If a trader professes to sell his goods at cost price, but uses false weights, then

$$\text{Gain \%} = \left[\frac{\text{Error}}{(\text{True Value}) - (\text{Error})} \times 100 \right] \%$$

Practice Exercise

- 1) A fruit seller buys Oranges @ 4 for Rs. 9/- and sold them @ 6 for Rs. 15/-. His profit percent is?**
- a) $14\frac{2}{7}\%$ b) $16\frac{2}{3}\%$ c) $11\frac{1}{9}\%$ d) $9\frac{1}{11}\%$
- 2) Some oranges were bought at 5 for Rs.12 and sold them at the rate of 7 for Rs.12. what is the loss percentage?**
- a) $14\frac{2}{7}\%$ b) $28\frac{2}{3}\%$ c) $33\frac{1}{3}\%$ d) None
- 3) A man bought some articles at the rate of 7 for Rs.11 and sold 5 articles for Rs. 9. If he made Rs.40 profit in the business. How many articles he sold?**
- a) 200 b) 175 c) 150 d) 165
- 4) If the cost price of 15 apples is equal to the selling price of 12 apples. What is the gain percentage in the transaction?**
- a) 20 % b) 40% c) 25 % d) None
- 5) If the selling price of 70 bags is equal to the cost price of 50 bags, then the loss percentage is**
- a) $14\frac{2}{7}\%$ b) $16\frac{2}{3}\%$ c) $28\frac{4}{7}\%$ d) 40%
- 6) A man bought 27 chairs and sold them at a gain equal to the selling price of 5 tables. Find his gain percent?**
- a) $28\frac{4}{7}\%$ b) $21\frac{4}{7}\%$ c) $28\frac{5}{7}\%$ d) $42\frac{4}{7}\%$
- 7) By selling a shirt for Rs.1056, a loss of 12 % is obtained, at what price the shirt must be sold to gain 12%?**
- a) Rs.1340 b) Rs.1356 c) Rs.1200 d) Rs.1344
- 8) A bicycle is sold at 10% profit. Had it been sold for Rs. 171 less, He would have got a loss of 9%. What is the cost price of the bicycle?**
- a) Rs.900 b) Rs. 800 c) Rs.850 d) Rs.950
- 9) A merchant bought an article and sold it at a loss of 10%. If he had bought at 12% less and sold it for Rs.300 more, he would have gained 25%. Find the cost price of the article?**
- a) Rs.1500 b) Rs.2250 c) Rs.2750 d) Rs.3000
- 10) A Shopkeeper bought a cycle and sold it at a loss of 5%. If he had bought at 10% less and sold it for Rs.650 more, he would have gained 20%. Find the cost price of the article?**
- a) Rs.2500 b) Rs.5500 c) Rs.6000 d) Rs.5000
- 11) A boy sold his bag at Rs. 75 and got a percentage of profit numerically equal to its cost price. The cost price of the bag is.**
- a) Rs.60 b) Rs.50 c) Rs.30 d) Rs.40
- 12) The sales price of a bag including sales tax is Rs. 780. The rate of sales tax is 20%, if the shopkeeper has made a profit of 30% then the cost price of bag is ?**
- a) Rs.600 b) Rs.500 c) Rs.640 d) Rs.520
- 13) The radio was sold at a certain price gives a gain of 20%. What will be the gain percent, if sold for twice that price ?**
- a) 240 % b) 160% c) 140 % d) 180%



- 14) Anand sells Kiran a cellphone at a profit of 40%. After a year Kiran sells it to Harish at a loss of 30%. What profit did Anand earn if Harish paid Rs.882 for the cellphone?**
- a) Rs.360 b) Rs.240 c) Rs.900 d) Rs.800
- 15) A bought a pen for Rs. 200 and sold it to B at 10% gain, B sold it to C at 20% loss and C sold it to D at 25% gain. What was the price paid by D?**
- a) Rs.180 b) Rs.200 c) Rs.220 d) Rs.225
- 16) A salesman sells a laptop for Rs.32,000 each. On one it gained 30 % and on the other 30%. What is the overall gain or loss percent?**
- a) 1 % loss b) 8 % gain c) 9 % loss d) 9 % gain
- 17) A man sold two articles for Rs. 1980 each. On selling first, he gains 10% and on the other, he losses 10%. What is loss he made in the transaction?**
- a) Rs.45 b) Rs.38 c) Rs.39 d) Rs.40
- 18) A shopkeeper sells two mobiles each at Rs.3600 and he gains 20% on first and loss of 40%. What is loss in percentage in the whole transaction?**
- a) 30 % b) 20 % c) 25 % d) 10 %
- 19) A man bought two articles for Rs. 1240 each. On selling first, he gains 22% and on the other, he losses 22%. What is the overall profit or loss in the transaction?**
- a) 1 % loss b) 1 % gain c) 2 % loss d) No profit / loss
- 20) A single discount of 25 %, 20% and 15% is ?**
- a) 51% b) 49 % c) 45 % d) 50 %
- 21) A shopkeeper marks price of his articles 12% above the cost price and then allows 12% discount on the marked price. What is his loss percent?**
- a) 1.44% b) 1.4 % c) 2.4 % d) 0 %
- 22) A trade person allows a discount 12% on an article and still gains 10% profit on the article. By what percent is MP is above the cost price?**
- a) 22 % b) 25 % c) 30 % d) 33.33 %
- 23) The MP of a camera is $\frac{11}{7}$ of CP and SP is $\frac{15}{22}$ of MP. Find the percentage profit or loss?**
- a) $14\frac{2}{7}\%$ b) $28\frac{2}{3}\%$ c) $33\frac{1}{3}\%$ d) $7\frac{1}{7}\%$
- 24) A tradesman fixed his marked price of goods at 20% above the cost price. He sells half of the stock at this marked price, one-fourth of his stock at a discount of 20% on the original marked price and the rest at a discount of 30% on the original marked price. Find the gain percent altogether?**
- a) 6% b) 9 % c) 5 % d) 6 %
- 25) A whole-seller allows a discount of 20% on the list price to a retailer. The retailer sells at 5% discount on the list price. If the customer paid Rs.3800 for an article, what profit is made by the retailer?**
- a) Rs.600 b) Rs.620 c) Rs.640 d) Rs.650
- 26) A merchant professes to sell goods at the cost price but uses weight of 900 grams in place of 1000 grams. What is his profit percent?**
- a) 11 % b) $11\frac{1}{9}\%$ c) 10 % d) $5\frac{5}{9}\%$

27) A merchant professes to sell goods at the loss of 5% but uses weight of 900 grams in place of 1000 grams. What is his profit percent?

- a) 5 % b) 6 % c) 10 % d) $5\frac{5}{9}$ %

28) A merchant professes to sell goods at 20% profit but uses weight of 800 g in place of a 1000 grams. what is his actual profit percent?

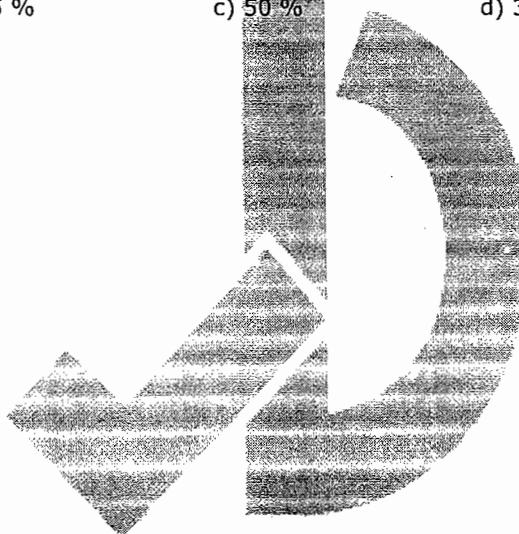
- a) 20 % b) 25 % c) 50 % d) $3\frac{1}{3}$ %

29) A businessman decides to sell his articles at cost price but he uses false weights with which he cheats by 10% while buying and by 10% while selling on every 1000 grams. Find his profit percentage?

- a) 20 % b) 25 % c) $22\frac{2}{9}$ % d) $3\frac{1}{3}$ %

30) A businessman decides to sell goods at a profit of 8 %, but he cheats both his customer and the supplier by 10% for every 1 kg. Find his profit percentage?

- a) 20 % b) 25 % c) 50 % d) 32%



CHECK THE ANSWERS

1	C	6	A	11	B	16	C	21	A	26	B
2	B	7	D	12	B	17	D	22	B	27	D
3	B	8	A	13	C	18	B	23	D	28	C
4	C	9	A	14	A	19	D	24	C	29	C
5	C	10	B	15	C	20	B	25	A	30	D



RATIO & PROPORTION

Synopsis

- Ratio is the comparison of two or more elements of same type in simple terms.

Ex: If the amounts with A and B are 10 lakhs and 5 lakhs respectively, we say that A has twice or double that of B.

- The number of times one quantity contains other quantity is called ratio of two quantities.

The ratio of a to b is written as a:b (or) a/b and read as 'a is to b'

In a: b the first element is called antecedent and second element is called consequent.

Ratio can be modified by multiplying or dividing its terms with the same number

$$1 : 2 \Rightarrow 2(1 : 2) = 2 : 4$$

$$1 : 2 \Rightarrow 3(1 : 2) = 3 : 6$$

$$\text{i.e., } 1/2 = 2/4 = 3/6 = 3 : 6$$

- If a : b is the ratio then

$$\text{i) Duplicate ratio} = a^2 : b^2$$

$$\text{ii) Subduplicate ratio} = a : b$$

$$\text{iii) Triplicate ratio} = a^3 : b^3$$

$$\text{iv) Subtriplicate ratio} = \sqrt[3]{a} : \sqrt[3]{b}$$

- If a : b, c : d and e : f are three ratios then compound ratio = ratio of first elements to second elements in all the ratios

$$\text{i.e., } a \times c \times e : b \times d \times f$$

- If two ratios a : b and c : d are equal then we say that the proportionals a, b, c and d are in proportion

$$a : b = c : d \text{ [written as } a : b :: c : d]$$

$$a/b = c/d$$

$$ad = bc$$

Product of extremes is equal to product of means

Here 'a' and 'd' are called 'extremes' and 'b' and 'c' are called 'means'.

- If a, b, c are in continued proportion then

$$a : b = b : c$$

$$b^2 = ac$$

$$b = \sqrt{ac}$$

Here 'b' is called Mean proportional of 'a' and 'c'



Classroom Exercise

- 1) If $a : b = 5 : 4$ and $b : c = 5 : 6$, then what is $a : c$?
 a) 18 : 13 b) 15 : 11 c) 25 : 24 d) 5 : 6
- 2) If $A : B = 3 : 4$, $B : C = 2 : 5$, $C : D = 5 : 7$ then what is $A : B : C : D$?
 a) 3 : 5 : 10 : 14 b) 3 : 4 : 10 : 14 c) 4 : 5 : 3 : 14 d) 4 : 5 : 10 : 14
- 3) If $a : b = 2 : 5$, $b : c = 5 : 3$, $c : d = 4 : 5$ and d is 50% more than e , find the ratio between a and e ?
 a) 3 : 5 b) 5 : 4 c) 4 : 5 d) None of these
- 4) 4 chairs cost as much as 5 tables, 2 tables cost as much as 3 benches, 4 benches cost as much as 7 sofas. If the cost of 64 chairs is Rs. 21000. Find the cost of each sofa?
 a) 90 b) 900 c) 800 d) 100
- 5) Rs.4800 is to be distributed amongst A, B and C in the proportion 2 : 3 : 11. How much would C get?
 a) Rs.2500 b) Rs.1500 c) Rs.2000 d) Rs.3300
- 6) Rs 124 is divided into three parts in the ratio $\frac{1}{2} : \frac{1}{3} : \frac{1}{5}$, what amounts to the first part?
 a) 62 b) 60 c) 24 d) 40
- 7) Rs.312 is divided among A, B and C such that 2 times of A's, 3 times of B's and 4 times of C's shares are equal. What is the share of C?
 a) Rs.48 b) Rs.72 c) Rs.144 d) Rs.96
- 8) Rs.366 are divided amongst A, B and C so that A gets half as much as B and C together, B gets $\frac{2}{3}$ as much as A and C together, then the share of A is :
 a) Rs.122 b) Rs.129.60 c) Rs.146.60 d) Rs.183
- 9) An amount of money is to be divided among P, Q and R in the ratio of 3 : 5 : 7 respectively. If the amount received by R is Rs 3,000 more than the amount received by Q, what will be the total amount received by P and Q together?
 a) Rs.8000 b) Rs.12000 c) Rs.16000 d) Rs.20000
- 10) The ratio between two positive numbers is 5 : 9. If the larger number exceeds the smaller by 20, find the smaller number.
 a) 18 b) 15 c) 25 d) 20
- 11) The ratio of boys and girls in a class is 5 : 4. If 3 boys and 6 girls joined the class, then the ratio becomes 7 : 6. Find the actual number of students in the class?
 a) 48, 60 b) 60, 48 c) 60, 24 d) 40, 32
- 12) In class A, the ratio of boys to girls is 2 : 3. In class B the ratio of boys to girls is 4 : 5. If the ratio of boys to girls in both classes put together is 3 : 4, what is the ratio of number of girls in class A to number of girls in class B
 a) 4 : 3 b) 3 : 5 c) 3 : 2 d) 3 : 4
- 13) The ratio of a two-digit natural number to a number formed by reversing its digits is 4 : 7. Which of the following is the sum of all the numbers of all such pairs.
 a) 99 b) 198 c) 330 d) 132
- 14) A dealer buys dry fruits at Rs. 100, Rs. 80 and Rs. 60 per kilogram. He mixes them in the ratio 3 : 4 : 5 by weight. And sells at a profit of 50%. At what price per kilogram does he sell the dry fruit?
 a) Rs.115 b) Rs.100 c) Rs.95 d) Rs.111
- 15) The students in three batches are in the ratio of 2 : 3 : 5. If 20 students are increased in each batch, the ratio changes to 4 : 5 : 7. Then the total number of students in the batch before increasing?
 a) 120 b) 100 c) 150 d) 200
- 16) A mixture contains milk and water in the ratio of 5 : 1. On adding 5 litres of water, the ratio of milk and water becomes 5 : 2. The quantity of milk in the mixture is.
 a) 18 lit b) 15 lit c) 25 lit d) 20 lit



- 17) In a mixture 60 litres, the ratio of milk and water 2 : 1. How much water must be added so the ratio becomes 1 : 2?**
- a) 20 lit b) 30 lit c) 40 lit d) 60 lit
- 18) 65 litres of mixture contains wine and water in the ratio of 7 : 6. How much wine must be added to it so that the ratio of wine and water becomes 5 : 3 ?**
- a) 12 lit b) 25 lit c) 20 lit d) 15 lit
- 19) The income and expenditure of a person are in the ratio 7 : 4. Find the savings of the person if his monthly expenditure is Rs.8000.**
- a) Rs.5500 b) Rs.6000 c) Rs.4000 d) Rs.5000
- 20) The income of A and B are in the ratio of 3 : 2 and their expenditure are in the ratio 5 : 3. If each saves Rs.1500 then the expenditure of B is :**
- a) Rs.5500 b) Rs.6000 c) Rs.4500 d) Rs.5000
- 21) The income of A and B are in the ratio 4 : 5 and their expenditures are in the ratio 5 : 7. What is income of A, if each one of them saves Rs 1200?**
- a) Rs.3000 b) Rs.1800 c) Rs.3200 d) Rs.1600
- 22) A bag contains amount of Rs 120 in the form of 25 paise, 50 paise and 1 rupee coins in the ratio of 8 : 2 : 3 respectively. Find the total number of 25 rupee coins in the bag.**
- a) 50 b) 80 c) 160 d) 40
- 23) A bag contains amount of Rs 65 in the form of ten paise, 25 paise and 50 paise coins in the ratio of 3 : 2 : 1. Find the total number of 50 paise coins in the bag.**
- a) 150 b) 200 c) 300 d) 900
- 24) Find the fourth proportional to 12, 36, 16.**
- a) 18 b) 48 c) 56 d) 20
- 25) Find the fourth proportional to 2.3, 9.2, 5.8.**
- a) 23.2 b) 23 c) 23.1 d) 22.2
- 26) Find the mean proportion of 8 and 18.**
- a) 11 b) 10 c) 12 d) 14
- 27) What least number must be subtracted from each of 13, 16, 17, 21 to make them in proportion?**
- a) 2 b) 1 c) 0 d) 3
- 28) The salaries of Ramesh, Babu and Dheraj were in the ratio 3 : 5 : 7 respectively. If their salaries were increased by 50%, 80% and 50% respectively, then what will be the new ratio of their respective salaries.**
- a) 4 : 5 : 8 b) 4 : 5 : 7 c) 3 : 6 : 7 d) None of these
- 29) Two containers of equal capacity are full of a mixture of oil and water. In the first ,the ratio of oil to water is 4 : 5 and in the second 7 : 11. Now both the mixtures are mixed in a bigger container. What is the resulting mixture of the oil and water?**
- a) 15 : 22 b) 14 : 17 c) 11 : 16 d) 5 : 7
- 30) What will be the ratio of wine and water in the mixture formed by mixing wine and water that are present in three vessels in the ratio 5 : 4, 4 : 3 and 7 : 2 respectively ?**
- a) 40 : 23 b) 16 : 9 c) 39 : 23 d) 23 : 40

Practice Exercise

- 1) Rs 705 is divided into three parts in the ratio $\frac{1}{3} : \frac{1}{4} : \frac{1}{5}$, what amounts to the second part?**
- a) Rs.250 b) Rs.225 c) Rs.300 d) Rs.150
- 2) If P : Q = 5 : 4, Q : R = 3 : 5, R : S = 4 : 3 then What is P : Q : R : S?**
- a) 60 : 12 : 20 : 30 b) 30 : 15 : 20 : 15 c) 60 : 12 : 40 : 15 d) 30 : 12 : 20 : 15
- 3) 2 pens cost as much as 5 pencils, 1 pencil cost as much as 3 erasers, 4 erasers cost as much as 3 books. If the cost of 8 pens is Rs. 135. Find the combined cost of a book?**
- a) Rs.7 b) Rs.6 c) Rs.3 d) Rs.2.5
- 4) The salaries of A, B and C were in the ratio 5 : 6 : 8 respectively. If their salaries were increased by 20%, 50% and 50% respectively, then what will be the new ratio of their respective salaries.**
- a) 2 : 3 : 4 b) 4 : 5 : 7 c) 3 : 4 : 5 d) 1 : 3 : 5
- 5) Rs.1800 be divided among A, B and C such that A gets $\frac{5}{7}$ of what B gets and B gets $\frac{1}{5}$ of what C gets, find the share of C?**
- a) Rs.70 b) Rs.50 c) Rs.750 d) Rs.40
- 6) Manish, Rahul and Bharti have some stones with each of them. 5 times the number of stones with Rahul equals 7 times the number of stones with Manish while 5 times the number of stones with Manish equals 7 times the number of stones with Bharti. What is the minimum number of stones that can be there with all three of them put together?**
- a) 113 b) 109 c) 93 d) 97
- 7) An sum of money is to be divided among A, B and C in the ratio of 4 : 11 : 5 respectively. If the amount received by A is Rs 105 less than the amount received by B, what will be the total amount received by B and C together?**
- a) Rs.250 b) Rs.225 c) Rs.300 d) Rs.225
- 8) A mixture contains milk and water in the ratio of 4 : 3. On adding 6 litres of water, the ratio of milk and water becomes 1 : 1. The quantity of milk in the mixture is.**
- a) 8 lit b) 6 lit c) 10 lit d) 4 lit
- 9) 44 litres of mixture contains wine and water in the ratio of 5 : 6. How much wine must be added to it so that the ratio of wine and water becomes 2 : 1 ?**
- a) 24 lit b) 18 lit c) 20 lit d) 28 lit
- 10) A dealer buys dry fruits at Rs. 70, Rs. 60 and Rs. 50 per kilogram. He mixes them in the ratio 5 : 6 : 9 by weight. And sells at a profit of 25%. At what price per kilogram does he sell the dry fruit?**
- a) Rs.70 b) Rs.71.5 c) Rs.72.5 d) Rs.75
- 11) Rs.1180 is divided among A, B and C such that 5 times of A's, 6 times of B's and 8 times of C's shares are equal. What is the share of A?**
- a) Rs.280 b) Rs.400 c) Rs.300 d) Rs.480
- 12) A and B are two alloys of gold and copper prepared by metals in the ratio of 7 : 2 and 7 : 11 respectively. If equal quantities of A and B are melted to form a third alloy C, then what is the ratio of gold and copper in alloy C?**
- a) 5 : 7 b) 7 : 5 c) 4 : 5 d) None



- 13) Rs. 1820 among three persons A, B and C such that A gets $\frac{5}{9}$ as much as B and C together gets and B gets $\frac{6}{7}$ as much as A and C together. What is the share of C?
 a) 330 b) 650 c) 330 d) None
- 14) The ratio of Science and Arts students in a college is 4 : 3. If 14 Science students shift to Arts then the ratio becomes 1 : 1. Find the total strength of Science and Arts students
 a) 156 b) 225 c) 28 d) 196
- 15) The salaries of A, B and C are of ratio 2 : 3 : 5. If the increments of 5%, 10% and 20% are done to their respective salaries, then find the new ratio of their salaries
 a) 7 : 11 : 20 b) 21 : 33 : 60 c) 22 : 33 : 60 d) 23 : 33 : 60
- 16) The income of A and B are in the ratio 5 : 3 and their expenditures are in the ratio 4 : 5. What is income of A, if A saves Rs 2200, whereas B saves Rs. 800?
 a) Rs.1500 b) Rs.2000 c) Rs.3000 d) Rs.1000
- 17) A bag contains 20 paise, 50 paise and 1 rupee coins in the ratio 5 : 4 : 3, amounting to Rs.66 respectively. Find the total number of coins.
 a) 90 b) 100 c) 132 d) None
- 18) Find the mean proportion of 0.5 and 24.5.
 a) 3.2 b) 3.5 c) 2.5 d) 3
- 19) Two containers of equal capacity are full of a mixture of oil and water. In the first, the ratio of oil to water is 3 : 7 and in the second 9 : 11. Now both the mixtures are mixed in a bigger container. What is the resulting mixture of the oil and water?
 a) 5 : 7 b) 5 : 9 c) 22 : 17 d) 3 : 5
- 20) What will be the ratio of milk and water in the mixture formed by mixing milk and water that are present in three vessels in the ratio 4 : 3, 5 : 2 and 3 : 2 respectively ?
 a) 22 : 35 b) 22 : 13 c) 22 : 15 d) 13 : 22

Check The Answers

1	B	6	B	11	D	16	C
2	D	7	D	12	B	17	C
3	C	8	B	13	A	18	B
4	A	9	D	14	D	19	D
5	D	10	C	15	A	20	B

PROBLEMS ON AGES

Introduction:

- In solving the problems related to ages, we come across three situations.
 1. Age Some Years ago / back
 2. Present age
 3. Age some years hence / after
 - Always we consider the present age to be the base for finding out the past age or future age.
For example if the present age of a person is 'x'.
Age of the person 5 years after will be $x + 5$
Age of the person 7 years before would be $x - 7$

Classroom Exercise

- 1) A man is 24 years older than his son. In 2 years, his age will be twice the age of his son. The present age of his son is:
a) 14 b) 18 c) 20 d) 22

2) Ms. Anita is 30 years older than her daughter. In 10 years, her age will be thrice the age of her daughter. The present age of Ms. Anita:
a) 35 b) 32 c) 36 d) None

3) Radha is 30 years younger than her aunt today. Five years ago, Radha was one-fourth as old as her aunt. How old will Radha's aunt be 8 years hence?
a) 45 b) 53 c) 23 d) 32

4) The age of the father 3 years ago was seven times the age of his son. At present the father's age is 5 times that of his son. What are the present ages of the father?
a) 40 yrs b) 45 yrs c) 42 yrs d) 48 yrs

5) Father's age is three years more than three times the son's age. After three years, father's age will be ten years more than twice the son's age. What is the father's present age?
a) 32 yrs b) 33 yrs c) 40 yrs d) 35 yrs

6) The present age of a father is 20 years less than three times his son's age. If the present age of the son, in years is an integer, which of the following choices represents the present age of the father?
a) 55 yrs b) 48 yrs c) 53 yrs d) 38 yrs

7) Anand is two years older than Bhaskar, who is twice as old as Suman. If the total of their ages is 27, the how old is Bhaskar?
a) 8 b) 9 c) 10 d) 11

8) In 30 years, age of a person becomes three times of his present age. What is his present age?
a) 6 yrs b) 15 yrs c) 10 yrs d) None

9) In 18 years, age of a person becomes seven times of his present age. What is his present age?
a) 4 b) 5 c) 3 d) None

10) In 40 years, age of a person becomes five times of his present age. What will be his age after 10 year?
a) 15 yrs b) 18 yrs c) 20 yrs d) None

11) After 12 years, the age of Suresh will be 4 times as old as he is now. How many years hence will he be 8 times as old as he now?
a) 21 yrs b) 18 yrs c) 32 yrs d) None

- 12) Ram will be 5 times as old as he is now after 8 years. How many years hence will he be 10 times as old as he is now?**
- a) 20 yrs b) 18 yrs c) 16 yrs d) 32 yrs
- 13) In 10 years, the age of Vamsi will be 3 times that of his age 6 years ago. What is his present age?**
- a) 14 yrs b) 16 yrs c) 18 yrs d) 28 yrs
- 14) The sum of a father and a son is 57 years. If father is twice the age of the son. What is the age of the son after 10 years?**
- a) 19 yrs b) 39 yrs c) 29 yrs d) 15 yrs
- 15) The sum of the present age of Seeta and Radha is 48 years. If their ratio of their ages is 3 : 5, then what is the age of Seeta after 5 years?**
- a) 18 yrs b) 23 yrs c) 30 yrs d) 35 yrs
- 16) The average age of a man and his son is 16 years. The ratio of their ages is 15 : 1 respectively. What is the son's age?**
- a) 4 yrs b) 6 yrs c) 2 yrs d) 3 yrs
- 17) The age of the two friends were in the ratio of 6 : 5. If sum of their ages is 55. Then after how many years their ratio will become 8 : 7?**
- a) 11 b) 7 c) 10 d) 12
- 18) The sum of the ages of Ramesh and Suresh is 42 years. The ratio of their ages is 4 : 3 respectively. Then after how many years their ratio will become 5 : 4?**
- a) 4 yrs b) 6 yrs c) 2 yrs d) 3 yrs
- 19) The age of the Suresh and Kamal were in the ratio of 2 : 3. If sum of their ages is 30. Then after how many years their ratio will become 9 : 11? [TCS]**
- a) 11 b) 33 c) 22 d) 15
- 20) The ratio of ages of John and Chris are in the ratio of 3 : 4. After 12 years their ages will be in the ratio 6 : 7. By how many years Chris is older than John?**
- a) 2 b) 3 c) 4 d) 5
- 21) The ages of three persons are in the ratio of 2 : 3 : 7. The sum of their ages of persons is 132 years. What is the age of the eldest person?**
- a) 33 yrs b) 44 yrs c) 77 yrs d) 12 yrs
- 22) 3 years ago, the father's age was twice the age of his four daughters. In 3 years' time the father's age will be equal to sum of ages of the daughters. Find the present age of the father?**
- a) 36 yrs b) 30 yrs c) 39 yrs d) 28 yrs
- 23) In a family the mother's age is 4 times the sum of the ages of her three daughters. After 8 years her age will become twice the sum of ages of the three daughters. What is the mother's present age?**
- a) 20 yrs b) 60 yrs c) 40 yrs d) 80 yrs
- 24) When I add 4 times my age 4 years from now to 5 times my age 5 years from now, I get 10 times my present age. How old will I be 3 years from now?**
- a) 42 yrs b) 40 yrs c) 44 yrs d) 46 yrs
- 25) Sam said Ramesh " I am five times as old as you were when I was as old as you are". If the sum of their ages is 80 years then find their present ages.**
- a) 45, 35 b) 52, 28 c) 50, 30 d) 55, 25
- 26) Suresh said David " I am eight times as old as you were when I was as old as you are". If the sum of their ages is 50 years then find their present ages.**
- a) 30, 20 b) 26, 24 c) 34, 16 d) 32, 18



- 27) Father said to his son " I am nine times as old as you were when I was as old as you are". If the sum of their ages is 70 years then find their present ages.** [Infosys]
 a) 40, 30 b) 36, 34 c) 45, 25 d) 48, 22
- 28) Ramesh said to her friend " I am three times as old as you were when I was as old as you are". If the sum of their ages is 60 years then find the difference of their present ages.**
 a) 20 years b) 14 years c) 12 years d) None
- 29) Difference of ages of 2 persons is 9 and difference of squares of their ages is 459. What is the age of the older person?**
 a) 12 b) 25 c) 30 d) 18
- 30) The age of the father is reversed the age of the son, One year ago father was twice as old as son. What are the present age of the father?** [Infosys]
 a) 42 b) 62 c) 52 d) 73
- 31) The age of the grandfather is reversed the age of the grandson, One year ago father was thrice as old as son. What are the present age of the father?**
 a) 81 b) 62 c) 71 d) 82
- 32) The age of the Tarun is reversed the age of the Varun, One year ago Tarun was 5 times as old as Varun. What are the present age of the Varun?**
 a) 17 b) 18 c) 19 d) 16
- 33) The age of the a girl is reversed the age of her Aunt, One year ago her Aunt was 4 times as old as her. What is the sum of their present ages?**
 a) 77 b) 88 c) 76 d) 75
- 34) Pooja and Esha met each other after long time. In the course of their conversation, Pooja asked Esha her age. Esha replied, "If you reverse my age, you will get my husband's age. He is of course older than me. Also, the difference between our age is $\frac{1}{11}$ th of the sum of our age." Can you help out Pooja in finding Esha's age?**
 a) 37 yrs b) 38 yrs c) 45 yrs d) 54 yrs
- 35) A family I know has several children. Each boy in this family has as many sisters as brothers but each girl has twice as many brothers as sisters. How many brothers and sisters are there?** [Infosys]
 a) 5 boys, 4 girls b) 5 boys, 3 girls c) 3 boys, 4 girls d) 4 boys, 3 girls
- 36) A family I know has several children. Each boy in this family has as many sisters as brothers but each girl has thrice as many brothers as sisters. How many children are there are in the family?**
 a) 5 boys, 4 girls b) 7 boys, 6 girls c) 3 boys, 2 girls d) 2 boys, 3 girls
- 37) A family I know has several children. Each boy in this family has as twice as many brothers as sisters but each girl has five times as many brothers as sisters. How many children are there are in the family?**
 a) 5 b) 9 c) 7 d) 8
- 38) Ours is a big family. Raghu says "I have thrice as many brothers as sisters and my sister Bharathi has four times as many brothers as sisters."How many children do my parents have?**
 a) 15 b) 16 c) 21 d) 20
- 39) Rahim was 'A' years old 'P' years ago. How old was he 'T' years ago?**
 a) $A + P + T$ b) $A - P + T$ c) $A + P - T$ d) $T - A + P$
- 40) A boy was 'a' years old 'b' years after. His age 'c' years from now is**
 a) $a - b + c$ b) $a + b - c$ c) $a + 2b - c$ d) $b - a + c$

PARTNERSHIP

- If two or more persons put their money together in order to carry on a certain business, then the deal is known as "PARTNERSHIP"
- If the capitals are invested for different time periods, then the partnership is called "Compound partnership". In this case profits must be divided in the ratio of the products of investment and time period.
- Profits ratio is obtained by taking the ratio of product of individual investments along with Time periods.

$$P = I \times t$$

- Persons who have entered into partnership with one another are individually called 'Partners'. They are two types.

a) Sleeping Partner: A person who invests the capital into the business but does not actively participate in the conduct of business is called Sleeping Partner.

b) Working Partner: A person who takes part in running the business besides investing the Capital is called working partner. He gets salary for his work or some percent of profit in Addition.

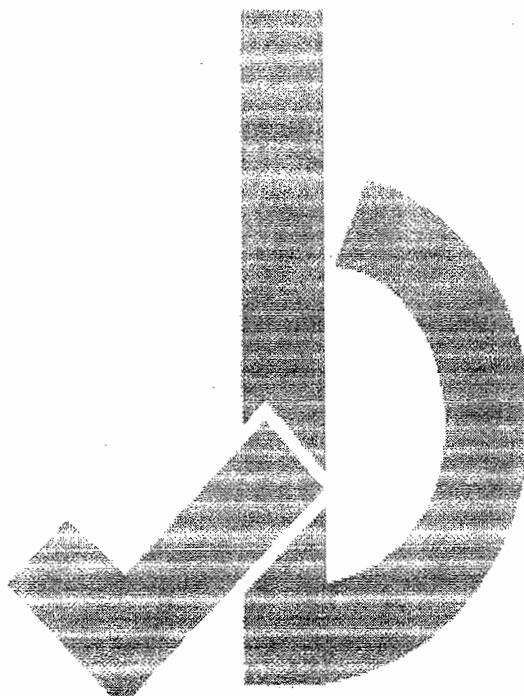


CLASSROOM EXERCISE

- 1) A, B and C started a business in partnership by investing Rs.6,000, Rs.4,000, Rs.10,000 respectively. If at the end of one year, They receive an annual profit of Rs.2,500, what is the total profit made by C?**
- a) Rs. 750 b) Rs.450 c) Rs.1250 d) Rs.500
- 2) Raman Iyer opened a shop investing Rs. 30000. Akash joined him 2 months later, investing Rs. 45000. They earned a profit of Rs. 54000 after completion of one year. What will be Akash share of profit?**
- a) Rs.30,000 b) Rs.27,000 c) Rs.24,000 d) Rs.36,000
- 3) A started business with an investment Rs.60,000. Four months later, B joined him with his investment Rs. 60,000. If at the end of the year, Rs. 35,000 profit is made. What is the share of A in the same**
- a) Rs.14,000 b) Rs.21,000 c) Rs.15,000 d) Rs.20,000
- 4) Mohinder and Surinder entered into a partnership investing Rs. 12000 and Rs. 9000 respectively. After 3 months, Tarun joined them with an investment of Rs. 15000, What is the share of Tarun in a half yearly profit of Rs. 9500?**
- a) Rs.3500 b) Rs.2500 c) Rs.3000 d) Rs.4000
- 5) A and B started a business jointly. A's investment was thrice the investment of B and the period of his investment was one – fourth the period of investment of B. If B received Rs. 16000 as profit, then their total profit is:**
- a) Rs.16,000 b) Rs.12,000 c) Rs.24,000 d) Rs.28,000
- 6) X, Y and Z started a business. X invested one fifth of the capital, Y invested one-third of the capital and the rest is invested by Z. The share of Y in the total profit of Rs.75,000 is (in Rs.)**
- a) Rs.12,500 b) Rs.25,000 c) Rs.50,000 d) Rs.62,500
- 7) In a partnership, A invested $\frac{1}{6}$ of the capital for $\frac{1}{6}$ of the time, B invested $\frac{1}{3}$ of the capital for $\frac{1}{3}$ of the time and C invested the rest of the capital for the whole time. If the total profit of the business is Rs.46,000 then the share of B is (in Rs.)**
- a) Rs.6,000 b) Rs.7,000 c) Rs.8,000 d) Rs.9,000
- 8) In a business the investment of A is one third of the total investment of B and C. B invested one-fifth of total investment of A and C. What is the share of B in the profit of Rs.72,000?**
- a) Rs.12,000 b) Rs.6,000 c) Rs.8,000 d) Rs.14,000
- 9) P, Q and R entered into a partnership by investing Rs.20,000, Rs.15,000 and Rs.15,000 respectively. P withdrew 25% of his capital after 4 months and after 2 more months Q added Rs.5000 to his investment. R withdrew his capital at the end of 10 months. What is the share of R in an annual profit of Rs.1,12,000?**
- a) Rs.33,000 b) Rs.28,000 c) Rs.30,000 d) Rs.42,000
- 10) A, B and C invested Rs.12,000, Rs.24,000 and Rs.36,000 in a business. A withdrew his capital after 1 year and after 6 more months B withdrew his capital. If the total profit is Rs.3,90,000 for 3 years. What is the share of B?**
- a) Rs.65,000 b) Rs.72,000 c) Rs.80,000 d) Rs.90,000
- 11) X and Y together started a business. X invests Rs.2000 at the beginning of every quarter and Y withdraws Rs.1000 at the end of every quarter. If their initial investments were Rs.1000 and Rs.4000 respectively and they make Rs.39,000 profit for the year, find the respective shares of X and Y.**
- a) Rs.23000, Rs.16000 b) Rs.25000, Rs.14000
 c) Rs.20000, Rs.19000 d) Rs.24000, Rs.15000

- 12) A and B started a business jointly. A's investment was thrice that of B and period of his investment was twice that of B. If B receives Rs.4000 as profit then their total profit (in rupees) is**
- a) Rs.20,000 b) Rs.24,000 c) Rs.28,000 d) Rs.32,000
- 13) In a partnership among A, B and C, A's capital is Rs. 5,000. If his share in profit of Rs. 800 is Rs.200, and C's share is Rs. 130, what is B's capital?**
- a) Rs.13,000 b) Rs.13,100 c) Rs.12,100 d) Rs.11,750
- 14) A started a business with a capital of Rs.10,000. Four months later, B joined him and 2 more months later, C joined them in the partnership. If at the end of the year, all of them got an equal share of profit, what was C's investment?**
- a) Rs.15,000 b) Rs.20,000 c) Rs.18,000 d) Rs.22,000
- 15) Mohan and Lal started a business with investments of Rs.20,000 and Rs.28,000 respectively. At the end of one year, they gave 25% of the total profit of Rs.16,000 to charity. Find the share of Lal in the annual profit?**
- a) Rs.5,000 b) Rs.7,000 c) Rs.10,000 d) Rs.14,000
- 16) A and B started a business by investing Rs.60,000 and Rs.1,80,000. A is the working partner and has to get 20% of the total profit for his work and the rest is to be divided in the ratio of their capitals. If the total profit is Rs.40,000, what is the share of B?**
- a) Rs.21,000 b) Rs.24,000 c) Rs.80,000 d) Rs.92,000
- 17) X, Y and Z invest Rs.1,50,000, Rs.2,50,000 and Rs.3,50,000 respectively into a partnership firm. X is to earn Rs.1000 per month as salary and Y is entitled to 10% commission of profits after deducting the salary given to X. If the total profit earned is Rs.87,000, What is the share of Y?**
- a) Rs.22,500 b) Rs.27,000 c) Rs.36,000 d) Rs.30,000
- 18) In a business, the investments of A and B are in the ratio 3 : 2. If 10% of total profit goes to a foundation and A received Rs.810 then what is the total profit?**
- a) Rs.1,400 b) Rs.1,460 c) Rs.1,500 d) Rs.1,550
- 19) Rahul and Gandhi started a business with investments of Rs.15000 and Rs.45000 respectively. At the end of one year they gave Rs.4800 to charity which is 20% of the total profit. Find the difference in the profit shares of both out of the remaining profit (in Rs)**
- a) Rs.3,500 b) Rs.4,050 c) Rs.4,800 d) Rs.9,600
- 20) B receives 1/8 of the profits of a business as wages and the rest is divided between B and A in the proportion of their capitals of Rs. 6,000 and Rs. 8,000 respectively. If in a year, B receives Rs. 1,000 totally, what does A receive?**
- a) Rs.800 b) Rs.1,000 c) Rs.1,200 d) Rs.1,500
- 21) X, Y and Z enter into a partnership with capitals in the ratio of 6 : 5 : 4. If at the end of the year they share the profits in the ratio of 4 : 5 : 8, what is the ratio of time periods for which their investments were in the business?**
- a) 2 : 6 : 3 b) 2 : 5 : 6 c) 2 : 3 : 6 d) 3 : 2 : 6
- 22) Yogesh, Mahesh and Bhavesh started a business in partnership by investing the amounts in the ratio of 3 : 7 : 11. After 4 months, Bhavesh withdrew. In what proportion will the profit made at the end of one year be distributed in the sequence "Yogesh : Mahesh : Bhavesh"?**
- a) 9 : 7 : 11 b) 9 : 21 : 7 c) 9 : 21 : 11 d) 3 : 7 : 7

- 23) Ajay and Anil started a business in partnership. Anil invested Rs. 300 more than Ajay for half the number of months that Ajay did. If, out of the total profit of Rs. 375 of one year, Ajay got Rs.25 more than Anil, what was the investment made by Anil?
- a) Rs.800 b) Rs.700 c) Rs.350 d) Rs.400
- 24) A and B invest Rs.3,000 and Rs. 4,000 respectively in a business. If A doubles his capital after six months, in what proportion should B and A divide that year's profit?
- a) 9 : 8 b) 8 : 9 c) 9 : 7 d) 11 : 12
- 25) B invests Rs. 500 more than A in a business but A's investment is in the business for 4 months whereas B's investment is for 3 months only. If A's share of total profit of Rs. 520 is Rs. 40 more than B's. How much did A contribute in the business?
- a) Rs.2,500 b) Rs.3,000 c) Rs.3,500 d) Rs.2,800



Check The Answers

1	C	6	B	11	D	16	B	21	C
2	A	7	C	12	D	17	A	22	C
3	B	8	A	13	D	18	C	23	B
4	B	9	C	14	B	19	D	24	B
5	D	10	D	15	B	20	B	25	C

NUMBER SYSTEM

Tests of divisibility :

Divisibility by 2: If its unit's digit is any of 0, 2, 4, 6, 8.

Ex: 100 is divisible by 2 while 101 is not

Divisibility by 3: If the sum of its digits is divisible by 3.

Ex: 309 is divisible by 3, since sum of its digits = $(3+0+9) = 12$, which is divisible by 3

Divisibility by 4: If the number formed by the last two digits is divisible by 4.

Ex: 2648 is divisible by 4, since the number formed by the last two digits is 48 which is divisible by 4

Divisibility by 5: If its units digit is either 0 or 5.

Ex: 20825 and 50545 are divisible by 5.

Divisibility by 6: If it is divisible by both 2 & 3.

Ex: 53256 is divisible by 6 because it is divisible by 2 as well as 3.

Divisibility by 7: If after subtraction of a number consisting of the last three digits from a number consisting of the rest of its digits the result is a number that can be divided by 7 evenly

Ex.: 414141 is divisible 7 as $414-141= 273$ is divisible by 7

Many different ways to test divisibility by seven have been devised. Some are long and complex, a few involve rewriting the digits, and one even consists of a grid-like box. We have chosen one of the more simplistic versions even though in almost every case it is quicker to merely perform long division.

Divisibility by 8: If the last three digits of the number are divisible by 8.

Ex: 3652736 is divisible by 8 because last three digits (736) is divisible by 8.

Divisibility by 9: If the sum of its digit is divisible by 9.

Ex: 672381 is divisible by 9, since sum of digits = $(6+7+2+3+8+1) = 27$ is divisible by 9.

Divisibility by 10: If the digit at unit's place is 0 it is divisible by 10.

Ex: 69410, 10840 is divisible by 10

Divisibility by 11: If the difference of the sum of its digits at odd places and sum of its digits at even places, is either 0 or a number divisible by 11.

Ex: 4832718 is divisible by 11, since:

(Sum of digits at odd places) – (sum of digits at even places)

$(8+7+3+4)-(1+2+8) = 11$

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

Ex: 34632

(i) The number formed by last two digits is 32, which is divisible by 4

(ii) Sum of digits = $(3+4+6+2) = 15$, which is divisible by 3.

Divisibility by 14: If a number is divisible by 2 as well as 7.

Divisibility by 15: If a number is divisible by both 3 & 5.

Divisibility by 16: If the number formed by the last 4 digits is divisible by 16.

Ex: 7957536 is divisible by 16, Number formed by the last four digits is 7536, which is divisible by 16.

Divisibility by 24: If a number is divisible by both 3 & 8.

Divisibility by 40: If it is divisible by both 5 & 8.

Divisibility by 80: If a number is divisible by both 5 & 16

Cyclicity Table:

Number	0	1	2	3	4	5	6	7	8	9
Cyclicity	1	1	4	4	2	1	1	4	4	2

Concept of Cyclicity:

Example : The digit in the unit place of the number represented by $(7)^{95}$

Solution

Cycle of 7 is

$$7^1 = 7$$

$$7^2 = 49$$

$$7^3 = 343$$

$$7^4 = 2401$$

If we divide 95 by 4, the remainder will be 3.

So the last digit of $(7)^{95}$ is equals to the last digit of $(7)^3$ i.e. 3.

Classroom Exercise

- 1) Find the number of divisors of 1728?
 a) 18 b) 28 c) 56 d) None
- 2) In how many ways 720 can be expressed product of two factors?
 a) 30 b) 16 c) 15 d) None
- 3) In how many ways 3600 can be expressed product of two distinct factors?
 a) 24 b) 36 c) 23 d) 22
- 4) Find the number of prime factors in the given expression $12^2 \times 5^4 \times 34^8 \times 19^{10}$?
 a) 4 b) 5 c) 6 d) None
- 5) Find the number of prime factors in the given expression $6^{22} \times 15^{44} \times 14^8 \times 22^{10}$?
 a) 4 b) 5 c) 6 d) None
- 6) Find the highest power of 7 in $57!$?
 a) 8 b) 7 c) 14 d) None
- 7) Find the highest power of 5 in $78!$?
 a) 18 b) 17 c) 16 d) 19
- 8) Find the number of zeros in the following product $13 \times 15 \times 22 \times 125 \times 44 \times 35 \times 12$?
 a) 4 b) 5 c) 1 d) 2
- 9) Find the number of zeros in the following product $12^2 \times 5^4 \times 10^8 \times 16^{10} \times 15^{12} \times 25^{20}$?
 a) 64 b) 65 c) 60 d) 63
- 10) Find the number of zeros in the following product $1^1 \times 2^2 \times 3^3 \dots \times 25^{25}$?
 a) 100 b) 15 c) 20 d) None
- 11) Find the number of zeros in $148!$?
 a) 33 b) 35 c) 34 d) 36
- 12) Find the number of zeros in the following product $(15!)^{15!} \times (25!)^{19!}$?
 a) $(3 \times 15!) + (30!)$ b) $15! + 25!$



- c) $(3 \times 15!) + (5 \times 19!)$ d) None of these

13) If $BA412AB$ (in decimal notation, where A, B are digits > 0) is divided by 6, then the smallest value of A + B is [TCS]

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

14) If $34X5Y$ (in decimal notation, where X, Y are digits > 0) is divided by 36, then the smallest value of X + Y is

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

Direction for the [15 – 17]: Find the remainders in each of the following series

15) $17 \times 25 \times 38$ divided by 12

- a) 7 b) 3 c) 4 d) 10

16) $1998 \times 1999 \times 2000$ is divided by 7

- a) 0 b) 1 c) 5 d) 4

17) $2011 \times 2012 \times 2013$ is divided by 8

- a) 0 b) 1 c) 5 d) 4

18) What is the remainder, when $(44)^{77}$ is divided by 7.

- a) 5 b) 3 c) 4 d) 1

19) What is the remainder, when $(1999)^{1000}$ is divided by 7.

- a) 5 b) 3 c) 4 d) 1

20) What is the remainder, when $(2011)^{2011}$ is divided by 8.

- a) 5 b) 3 c) 4 d) 1

21) What is the units place of the product given $123 \times 169 \times 17 \times 555 \times 57 \times 123$

- a) 1 b) 5 c) 6 d) 0

22) What is in units place of the sum given $(82)^{43} + (83)^{44} + (84)^{97} + (86)^{98} + (87)^{105} + (88)^{94}$

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

23) What is the units place of the sum given $(13)^{24} + (68)^{57} + (24)^{13} + (57)^{68} + 1234 + 578$

[TCS]

- a) 1 b) 3 c) 8 d) 6

24) What is the units place of the sum given $(126)^{124} + (169)^{157} + (170)^{13} + (777)^{69} + 5678 + 123$

- a) 1 b) 3 c) 8 d) None

25) Find the last two digits of 41^{2789} ?

- a) 21 b) 61 c) 01 d) 41

26) Find the last two digits of 71^{56747} ?

- a) 61 b) 01 c) 91 d) 41

27) Find the last two digits of the given product $(1941)^{3881} \times (1961)^{4181}$?

- a) 21 b) 61 c) 01 d) 41

28) Find the last two digits of $51^{456} \times 61^{567}$?

- a) 21 b) 91 c) 61 d) None

29) What is the unit digit of the given series $1! + 2! + 3! + 4! + 5! + \dots + 100!$

- a) 0 b) 1 c) 2 d) 3
 a) 2 b) 0 c) 24 d) 9

30) What is the remainder when the given series $1! + 2! + 3! + 4! + \dots + 50!$ is divided by 5? [TCS]

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



Practice Exercise

- 1) Find the number of divisors of 21600?**
 a) 72 b) 80 c) 56 d) None
- 2) Find the number even factors of 240?**
 a) 24 b) 18 c) 16 d) None
- 3) In how many ways can a number 6084 be written as a product of 2 different factors [Amcat]**
 a) 28 b) 27 c) 14 d) 13
- 4) Find the number of prime factors in the given expression $33^{42} \times 38^8 \times 51^{10}$?**
 a) 5 b) 6 c) 3 d) None of these
- 5) Find the number of prime factors in the given expression $221 \times 77^4 \times 57^8 \times 55^{10}$?**
 a) 4 b) 5 c) 6 d) None of these
- 6) Find the highest power of 5 in $127!$?**
 a) 30 b) 31 c) 32 d) None of these
- 7) What is the greatest positive power of 5 that divides $30!$ exactly [Amcat]**
 a) 7 b) 6 c) 3 d) 4
- 8) If $155!$ is divisible by 5^n , then find the maximum value of n.**
 a) 34 b) 33 c) 35 d) 38
- 9) Find the number of zeros in the following product $12^{12} \times 13^{13} \times 15^{15} \times 16^{16} \times 20^{20}$**
 a) 15 b) 35 c) 20 d) 19
- 10) Find the number of zero's in the following product $1^1 \times 2^2 \times 3^3 \times \dots \times 50^{50}$**
 a) 300 b) 350 c) 100 d) None of these
- 11) Find the number of zeros present at the end of $68!$?**
 a) 13 b) 14 c) 15 d) 16
- 12) Find the number of zeros present at the end of $75!$?**
 a) 20 b) 18 c) 20 d) 19
- 13) Find the number of zeros in the following product $(12!)^{13!} \times (17!)^{30!}$**
 a) $(2 \times 13!) + (3 \times 30!)$ b) $13! + 17!$ c) $(2 \times 13!) + (30!)$ d) None of these
- 14) What is the remainder, when $(200)^{200}$ is divided by 7.**
 a) 2 b) 5 c) 4 d) 3
- 15) What is the remainder, when $(571)^{77}$ is divided by 9.**
 a) 5 b) 3 c) 4 d) 7
- 16) What is the remainder, when $(58)^{85}$ is divided by 5.**
 a) 3 b) 2 c) 5 d) 1
- 17) What will be the remainder when 13^{36} is divided by 2196 [Amcat]**
 a) 0 b) 2 c) 1 d) 2196
- 18) The remainder when 7^{84} is divided by 342 is**
 a) 0 b) 1 c) 49 d) 341
- 19) What will be the remainder when 13^{36} is divided by 2196 [Amcat]**



- a) 0 b) 2 c) 1 d) 2196
- 20) What will be the remainder when $15^{81} + 16^{81}$ is divided by 31 is [Amcat]
 a) 0 b) 2 c) 1 d) 2196
- 21) What is the remainder when 17^{23} is divided by 16 [Amcat]
 a) 15 b) 6 c) 3 d) 1
- 22) $(7)^{21} + (7)^{22} + (7)^{23} + (7)^{24} = N$, then what is the remainder when N is divided by 25? [TCS]
 a) 2 b) 0 c) 24 d) 9
- 23) $(3)^{111} + (3)^{112} + (3)^{113} + (3)^{114} = N$, then what is the remainder when N is divided by 40? [TCS]
 a) 0 b) 3 c) 9 d) 80
- 24) What is the remainder when 4^{96} is divided by 5 ?
 a) 0 b) 2 c) 1 d) 4
- 25) What is the remainder when the given series $1! + 2! + 3! + 4! \dots 100!$ is divided by 7 ?
 a) 0 b) 5 c) 1 d) 3
- 24) What is the remainder when $50!$ is divided by 16 ?
 a) 0 b) 4 c) 9 d) None of these
- 25) $(2)^0 + (2)^1 + (2)^2 + (2)^3 \dots + (2)^{20}$ is divided by 7, then what is the remainder?
 a) 0 b) 3 c) 5 d) 0
- 25) $(3)^0 + (3)^1 + (3)^2 + (3)^3 \dots + (3)^{40}$ is divided by 5, then what is the remainder?
 a) 1 b) 3 c) 5 d) 1
- 26) What is the unit digit of the given series $1! + 2! + 3! + 4! + 5! + \dots 100!$
 a) 0 b) 1 c) 2 d) 3
- 27) The last digit of the number obtained by multiplying the numbers $41 \times 42 \times 43 \times 44 \times 45 \times 46 \times 47 \times 48$ will be
 a) 0 b) 8 c) 9 d) 2
- 28) The last digit of the number obtained by multiplying the numbers $352 \times 358 \times 773 \times 444 \times 451$ will be
 a) 0 b) 8 c) 9 d) 2
- 29) What is the last digit of $(2012)^{2012}$?
 a) 2 b) 4 c) 6 d) 8
- 30) What is the units place of the sum given $(12)^{41} + (66)^{66} + (25)^{15} + (51)^{61} + 4321$?
 a) 1 b) 5 c) 8 d) 6
- 31) What is the units place of the sum given $(16)^{12} + (13)^{15} + (17)^{13} + (71)^{69} + 567 + 13$?
 a) 1 b) 3 c) 8 d) 5
- 32) What is the last two digits of $(7)^{2012}$?
 a) 21 b) 61 c) 01 d) 41
- 33) Find the last two digits of 71^{56747} ?
 a) 61 b) 01 c) 41 d) 91

- 34) Find the last two digits of $51^{456} \times 61^{567}$?
 a) 21 b) 91 c) 61 d) None of these
- 35) If 1A64815 is divisible by 3, which of the following will be the value of A?
 a) 0 b) 2 c) 7 d) 5
- 36) If the number 347A25B is divisible by 15, (in decimal notation, where A, B are digits > 0), then what is the minimum value of A + B?
 a) 6 b) 2 c) 7 d) 5
- 37) If B4B2B (in decimal notation, where A, B are digits > 0) is divided by 15, then the smallest value of B is
 a) 7 b) 6 c) 5 d) 4
- 38) If AB313AB (in decimal notation, where A, B are digits > 0) is divided by 12, then the smallest value of A + B is
 a) 7 b) 6 c) 3 d) 4
- 39) If a number 774958A95B is to be divisible by 4 and 9, the value of A and B respectively will be:
 a) 7 and 6 b) 7 and 2 c) 8 and 2 d) 6 and 2
- 40) The digit in the units place of the number represented by $(7^{95} - 3^{58})$ [Amcat]
 a) 7 b) 0 c) 6 d) 4
- 41) The digit in the units place of the number represented by $(8^{43} - 6^{55})$ [Amcat]
 a) 2 b) 4 c) 0 d) 6
- 42) Every Sunday Mike jogs 3 miles and for the rest of the week, each day he jogs 1 mile more than the previous day. What is the number of miles mike jogs in 2 weeks [TCS]
 a) 42 miles b) 84 miles c) 86 miles d) 336 miles
- 43) The total number of prime factors of the product $(8)^{20} + (15)^{24} + (17)^{15}$ [Amcat]
 a) 59 b) 118 c) 121 d) 123
- 44) The total number of prime factors of the product $(6)^{10} + (35)^{20} + (11)^{30}$ [Amcat]
 a) 100 b) 15 c) 90 d) 80
- 45) Let P be the product of any three consecutive positive odd integers each of which is less than 146. Then the largest integer dividing all such P is [TCS]
 a) 6 b) 3 c) 5 d) 15

Check The Answers

1	A	6	B	11	C	16	A	21	D	26	D	31	A	36	A	41	D
2	C	7	A	12	B	17	A	22	B	27	A	32	C	37	C	42	B
3	C	8	D	13	A	18	B	23	A	28	D	33	D	38	A	43	D
4	A	9	B	14	A	19	C	24	C	29	C	34	A	39	B	44	C
5	C	10	B	15	D	20	A	25	B	30	B	35	B	40	D	45	D



AVERAGES AND MIXTURES

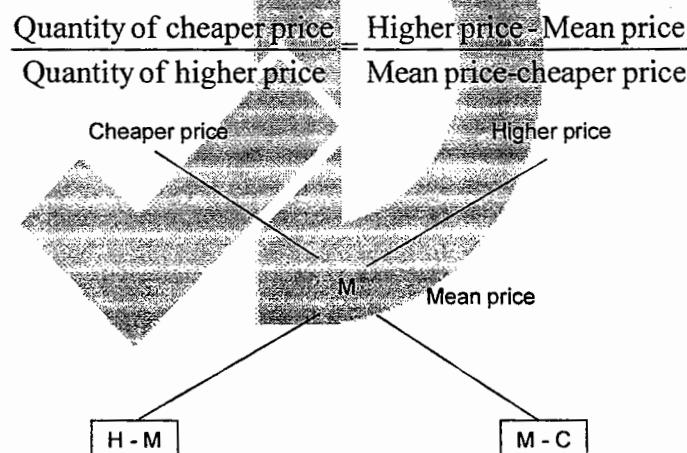
- Average is the sum of quantities divided by the number of those quantities. It is dividing the total equally for all.

$$\text{Average} = \frac{\text{Sum of items}}{\text{Number of items}}$$

- Average lies between the least term and the highest term
- If each term is increased by 'K', then the average gets increased by 'K' (Same condition holds true for decreased, multiplied and divided)
- For a number series with equal difference, the Average is the mean of first and last (or) the middle term if exists.

$$\text{Average} = \frac{F+L}{2}$$

- **Counting principle:** The number of times a quantity with a certain price is counted, those many times we need to multiply the price to get the total value.
- **Mixtures:** When two quantities with different prices are mixed, we get a quantity with a price which lies between the prices of two quantities mixed.
- By using Allegation rule, we can find out the ratio in which a cheaper price quantity is mixed with a higher price quantity to get a desired price quantity.



PRACTICE EXERCISE

- 1) What is the average of all the odd numbers between 40 and 90?**
 1) 98 2) 65.5 3) 65 4) 130
- 2) The average of 99 items is 27. If 3 is added to each number of the series, the new average is:**
 1) 24 2) 27 3) 30 4) 33
- 3) The average of 18 numbers is 24. If each item of the series is multiplied by 3, the new average is:**
 1) 8 2) 24 3) 27 4) 72
- 4) The average of first 47 natural numbers is:**
 1) 23 2) 24 3) 25 4) 47
- 5) If the average of five consecutive numbers is 23, find the smallest number**
 1) 20 2) 21 3) 22 4) 25
- 6) If sum of three consecutive odd is 63, find the first term**
 1) 19 2) 21 3) 22 4) 23
- 7) Average of first seven multiples of 7 is :**
 1) 18 2) 24 3) 27 4) 28
- 8) Find the average of first eight multiples of 6 :**
 1) 18 2) 2 3) 27 4) 30
- 9) The average age of 40 students in a class is 15 years. If the age of teacher is also included, the average becomes 16 years, find the age of the teacher?**
 1) 15 years 2) 16 years 3) 55 years 4) 56 years
- 10) The average score of a player in 10 matches is 12. If in the 11th match his score is 34, what is the new average?**
 1) 11 2) 12 3) 13 4) 14
- 11) The average age of Mr and Mrs Rao and their 4 children is 20 years. If his age is excluded, the average age of remaining members in the family would be 17 years. How old is Mr. Rao?**
 1) 26 years 2) 29 years 3) 30 years 4) 35 years
- 12) The average age of 17 players is 14 years. If the age of their coach is included, the average age of the group becomes 15 years. How old is the coach?**
 1) 31 years 2) 32 years 3) 38 years 4) 41 years
- 13) Average age of 15 men is increased by 1 year when one man in the group is replaced with other man whose age is 49 years. Find the age of the man replaced**
 1) 34 years 2) 48 years 3) 50 years 4) 64 years
- 14) A cricketer has an average of 28 runs in 24 innings. How many runs must he score in the 25th inning to make his average 29?**
 1) 51 2) 54 3) 55 4) 53
- 15) The average age of 20 students of a class is 13 years. If the age of teacher is also included, the average age is increased by 2 years. Find the age of the teacher.**
 1) 65 years 2) 75 years 3) 85 years 4) None of these
- 16) Average age of 6 persons is decreased by 1 year when one new person is included in the group. Find the age of new man, if average age of 6 persons was 39 years.**
 1) 32 years 2) 33 years 3) 38 years 4) 40 years
- 17) The average age of 15 kids in a school is 8 years. If the age of the teacher is also included, the average age is increased by 2 years. Find the age of the teacher.**
 1) 26 years 2) 40 years 3) 30 years 4) 28 years



- 18) Average age of 6 persons is increased by 1 year when one new person is included in the group. Find the age of new man, if average age of 6 persons was 39 years.**
- 1) 44 years 2) 45 years 3) 48 years 4) 46 years
- 19) A batsman has a certain average of runs for 16 innings. In the 17th inning he scores 85 runs, thereby increases his average by 3 runs. What was his average before 17th inning?**
- 1) 88 runs 2) 82 runs 3) 34 runs 4) 37 runs
- 20) Average age of 12 men is increased by 2 years when one man whose age is 43 years is replaced by a new man. Find the age of the new man.**
- 1) 19 years 2) 41 years 3) 45 years 4) 67 years
- 21) Average age of 18 men is decreased by 1 year when one man whose age is 49 years is replaced by a new man. Find the age of the new man.**
- 1) 31 years 2) 48 years 3) 50 years 4) 67 years
- 22) Average weight of 30 students in a class is increased by 200 grams when one student whose weight is 20kg is replaced by a new student, find the weight of the new student admitted.**
- 1) 10 kg 2) 25 kg 3) 26 kg 4) 30 kg
- 23) The average age of 12 men in a group is increased by 2 years when two men whose ages are 20 years and 22 years, are replaced by new members. What is the average age of the new men included?**
- 1) 32 years 2) 33 years 3) 35 years 4) 66 years
- 24) The average of 18 numbers is 14. While calculating the average, one number is taken as 73 instead of 37. What is the correct average?**
- 1) 12 2) 18 3) 19 4) 36
- 25) Average marks of 100 students is 58. Later on it is found that marks of one student are misread as 47 instead of 87. Find the correct average.**
- 1) 57.4 2) 57.6 3) 58.4 4) 58.6
- 26) In an exam, the average mark was found to be 45. The average was 5 marks less due to computational error in recording two students' marks of 720 and 300 as 670 and 200 respectively. What is the strength of the class?**
- 1) 25 2) 30 3) 35 4) 40
- 27) 4 years ago, the average age of 5 members of a family was 22 years. A baby having been born, the average age of the family is the same today. Find the age of the baby.**
- 1) 2 years 2) 3 years 3) 5 years 4) 17 years
- 28) 5 years ago, the average age of a family of 3 members was 17 years. A new boy was born during this period. Even then the average age of the family remains unchanged. What is the present age of the boy?**
- 1) 1 year 2) 2 years 3) 3 years 4) 4 years
- 29) In a Zoo there are rabbits and pigeons. If the heads are counted there are 200 and if legs are counted there are 580. How many pigeons are there?**
- 1) 110 2) 90 3) 100 4) 80
- 30) The sales for the month of January was 500 units. Sales increased by 100 units every month over the previous month for the next eleven months. Find the average monthly sales for the year.**
- 1) 1000 units 2) 1050 units 3) 1100 units 4) 1150 units

- 31) Nine students out of ten ate 5 chocolates per head. The tenth student ate 18 more than the average of all the ten. How many chocolates did the tenth student eat?**
- 1) 20 2) 65.5 3) 30 4) 25
- 32) Six years ago the average age of A, B, C and D was 44 years. C expired 2 years ago. The present average age of A, B, D is 48 years. What was the age of C when he expired?**
- 1) 50 years 2) 52 years 3) 54 years 4) 56 years
- 33) A Can contains 50 litres of pure milk. From this 5 litres of milk is removed and 5 litres of water is added. Again 5 litres of the solution is removed and 5 litres of water is added. What is the quantity of milk in the mixture now**
- 1) 39.5 litres 2) 40.5 litres 3) 41.5 litres 4) 42.5 litres
- 34) If average of 5 observations is 46 and that of 5 other observations is 50, find the average of all the 10 observations.**
- 1) 96 2) 50 3) 48 4) 46
- 35) The average mark obtained by 30 girls is 55 and the average mark of 20 boys is 40. What is the average mark of all the students in the class?**
- 1) 38 2) 42 3) 63 4) 49
- 36) The average expenditure of 40 persons is Rs. 60/- per day and that of 60 other persons is Rs. 40/- per day. Find the average expenditure of all the 100 persons.**
- 1) Rs. 42 2) Rs. 48 3) Rs. 50 4) Rs. 100
- 37) A Sum of Rs.250 was divided among 100 boys and girls such that each girl received Rs.2.10 and each boy Rs.3.10. Find the number of boys and girls.**
- 1) 40 boys, 60 girls 2) 60 boys, 40 girls 3) 50 boys, 50 girls 4) 30 boys, 70 girls.
- 38) A man purchased a colour television and a washing machine for Rs.30,000. He sold the washing machine at 60% profit and colour television at 30% profit. He makes a profit of 50% on the whole transaction. Find for how much did he purchase the colour television.**
- 1) Rs. 10,000 2) RS. 15,000 3) Rs. 18,000 4) Rs. 20,000
- 39) A Sum of Rs.15,000 was lent out partly at 6% p.a and partly at 9% p.a If the total interest earned at the end of the year is Rs.1050, what is the amount invested at 6% p.a?**
- 1) Rs. 9,000 2) Rs. 10,000 3) Rs. 11,500 4) Rs. 12,000
- 40) The average mark of 30 students in a class is 48, 15 new students join the class. With this the average mark of the class is brought down to 40. What is the average mark of the 15 new students?**
- 1) 24 2) 28 3) 32 4) 42
- 41) Rooney scores on an average of 4 goals per match in the first 12 games of a tournament which has 20 games. How many goals should he score per match in the remaining games such that he maintains an average of 6 goals per match at the end of the tournament?**
- 1) 8 2) 9 3) 10 4) 11
- 42) Ten litres of a solution of salt in water contains 25% salt. How much water must be evaporated from the solution so as to increase the salt content to 40%?**
- 1) 7.5 litres 2) 3.75 litres 3) 2.5 litres 4) 1.75 litres
- 43) The contents of two containers of equal volume containing water and milk in the ratio 5 : 4 and 1 : 2 respectively are added together to form a third solution. What is the ratio of the quantities of water and milk in the resultant solution**
- 1) 4 : 3 2) 4 : 5 3) 4 : 1 4) 1 : 2

44) One litre water is added to a three litres solution of sugar in water containing 40% sugar.

What is the revised content of sugar in the new solution so formed

- 1) 30% 2) 33% 3) 36% 4) 38%

45) A liquid contains 80% pure spirit. Another liquid contains 55% pure spirit. In What ratio should these liquids be mixed together so as to obtain a mixture containing 70% pure spirit?

- 1) 2 : 3 2) 4 : 5 3) 3 : 1 4) 3 : 2

46) In what ratio should coal at the rate of Rs.20 per kg, be mixed with coal at the rate Rs.17 per kg so that if the mixture is sold at the rate of 19.80 per kg, 10% profit is made?

- 1) 1 : 2 2) 3 : 5 3) 2 : 1 4) 3 : 2

47) If 40 litres of a mixture is made up of milk and water in the ratio of 3 : 1, how much water should be added to it so as to obtain a ratio of milk to water as 1 : 3 in the new mixture?

- 1) 50 litres 2) 60 litres 3) 80 litres 4) 70 litres

48) In what ratio must a grocer mix two types of commodities that cost Rs.15 and Rs.20 per kg respectively so as to get the mixture costing Rs.18 per kg?

- 1) 2 : 3 2) 2 : 5 3) 3 : 1 4) 3 : 2

49) If one litre water is added to 800 ml solution that contains 15% salt, what percent of the resulting solution will the salt be ?

- 1) $6\frac{2}{3}$ 2) $10\frac{1}{2}$ 3) $5\frac{1}{3}$ 4) $2\frac{2}{5}$

50) The ratio of quantities of honey and sugar syrup in three pots of equal volumes is 9 : 11, 1 : 9, and 3 : 5 respectively. If the contents of all the three pots are mixed together, what would be the ratio of the quantities of honey and sugar syrup in the mixture so formed?

- 1) 83 : 37 2) 32 : 85 3) 33 : 67 4) 37 : 83

Check The Answers

1	2	11	4	21	1	31	4	41	2
2	3	12	2	22	3	32	3	42	2
3	4	13	4	23	2	33	2	43	2
4	2	14	4	24	1	34	3	44	1
5	2	15	5	25	3	35	4	45	4
6	1	16	1	26	2	36	2	46	1
7	4	17	2	27	1	37	1	47	3
8	3	18	4	28	2	38	1	48	1
9	4	19	3	29	1	39	2	49	1
10	4	20	4	30	2	40	1	50	4



TIME AND WORK

- Two quantities are said to be directly related. If one quantity increases the other quantity also increases.

Ex: Men and Work

- Two quantities are said to be inversely related if one quantity increases the other quantity decreases

Ex: Men and time

$$M \propto \frac{1}{T}$$

- **Note:** If there is more than one person carrying out the work then it is assumed that each person does same amount of work on each day i.e. capacity of every individual is equal

•

M \Rightarrow Number of men

D \Rightarrow Number of days

H \Rightarrow Number of Hours

W \Rightarrow Work done

$$\frac{M_1 D_1 H_1}{W_1} = \frac{M_2 D_2 H_2}{W_2}$$

- Work to be done is usually considered as one unit

- If a man can do a work in 6 days then in one day he will be able to do $\frac{1}{6}$ part of total 6 parts of work and conversely if he can do $\frac{1}{8}$ th part of the work in 1 day then he will be able to do the total work in 8 days.

6 days \Rightarrow 1 work

1 day \Rightarrow $\frac{1}{6}$ work

- If a tap can fill a tank in 30 minutes then in one minute it can fill $\frac{1}{30}$ th part of the tank and conversely if a tap can fill $\frac{1}{8}$ th part of the tank in 1 minute then it can fill the tank in 8 minutes

- If 2 men together can do the work in 15 days it means that one man can do it in days [since men and time are inversely related]. This in turn means each person can do $\frac{1}{30}$ th of the work per day

$$+ 12 \left(\begin{array}{c} 2M \\ 1M \end{array} \right) \rightarrow 15 \text{ days} \times 12$$

- If a boy can work three times as fast as a girl then the boy takes one third of the time the girl takes to complete the work.

- If the girl takes 15 days to complete the work then the boy takes 5 days to complete the work. [Since efficiency and time are inversely related]

- In pipes and cisterns a filling pipe does positive work and an emptying pipe or a leak does negative work.
- Wages are to be distributed according to the work done by each person involved in the work (or). It can be divided in the ratio of their capacities (one day's work). If they work for the same time.



Classroom Exercise

- 1) 12 persons can make 28 toys in 8 days, in how many days can 16 persons make 42 toys?
 a) 10 days b) 8 days c) 9 days d) 10 days

- 2) 39 persons can repair a road in 12 days, working 5 hours a day. In how many days will 30 persons, working 6 hours a day, complete the work? [AMCAT]
 a) 10 days b) 13 days c) 26 days d) 6 days

- 3) If 12 men can do a 1/3 of work in 15 days working for 6 hours a day, In how many days will 18 men can do the remaining work, working 3 hours a day?
 a) 40 days b) 30 days c) 25 days d) 50 days

- 4) Some persons can do a piece of work in 12 days. Two times the number of such persons will do half of that work in? [AMCAT]
 a) 4 days b) 3 days c) 5 days d) 6 days

- 5) 45 men can complete a work in 16 days. Six days after they started working, 30 more men joined them. How many days will they now take to complete the remaining work?
 a) 8 days b) 10 days c) 6 days d) 5 days

- 6) In one Army Camp had food sufficient for 560 soldiers for 20 days. After 12 days 112 soldiers left the camp. For how many days, the remaining soldiers can stay in the camp without getting additional food?
 a) 9 days b) 12 days c) 5 days d) 10 days

- 7) 1200 persons have ration for 60 days, after some days, 200 persons left the camp and the food lasted for 54 days. After how many days they left the camp?
 a) 12 days b) 15 days c) 14 days d) 8 days

- 8) 2 men or 4 boys can do a piece of work in 51 days. In how long will 6 men and 5 boys take to complete the work?
 a) 12 days b) 14 days c) 15 days d) 18 days

- 9) If 3 men or 6 women can do a work in 36 days, in how many days will 7 men and 4 women can do that same work?
 a) 12 days b) 15 days c) 6 days d) 8 days

- 10) 1 boy or 2 girls or 4 children can complete a work in 60 days. How many days will it take for 2 boys, 1 girl and 6 children to complete the same work?
 a) 10 days b) 9 days c) 15 days d) 16 days

- 11) A and B can complete a work in 15 days and 10 days respectively. They started doing the work together but after 2 days B had to leave and A alone completed the remaining work. The whole work was completed in?
 a) 10 days b) 12 days c) 15 days d) 8 days

- 12) A and B can do a piece of work in 9 days and 18 days respectively. B started the work and was assisted by A, 3 days before the completion of the day. How long will work was completed?
 a) 12 days b) 6 days c) 8 days d) 9 days

- 13) A, B and C can do a piece of work in 16 days, 32 days and 8 days respectively. They started the work together, after 2 days B left the job, further after 2 days C left the job. In how many days the work was completed?
 a) 16 days b) 10 days c) 7 days d) None of these

- 14) A can do a piece of work in 36 days, B in 18 days and C in 72 days. All the three began the work together but A left after 6 days and B left 10 days before the completion of the work. How many days in all did C put in the entire work was finished?**
- a) 20 days b) 17 days c) 8 days d) None of these
- 15) A can complete a job in 5 days working 6 hrs a day, whereas B can complete the same job in 12 days working 5 hrs a day. How many days they can complete the job working 4 hrs a day?**
- a) 6 days b) 4 days c) 8 days d) 5 days
- 16) A and B working separately can complete a work in 6 days and 8 days respectively. B starts the work and they work alternate days. Find in how many days they will complete the work?**
- a) 5 days b) 8 days c) 7 days d) 6 days
- 17) A, B and C can do a piece of work in 18, 9 and 36 days respectively. In how many days it will take to complete the work if A is assisted by B on first day and by C on every second day alternatively?**
- a) 8 days b) 4 days c) 16 days d) None of these
- 18) A, B and C can do a piece of work in 20, 30 and 60 days respectively. In how many days can A do the work if he is assisted by B and C on every third day alternatively?**
- a) 12 days b) 15 days c) 16 days d) None of these
- 19) A can do a certain work in 24 days. B is 60% more efficient than A. How many days does B alone take to do the same job?**
- a) 18 days b) 15 days c) 20 days d) 12 days
- 20) A is 40% less efficient than B. If B can do it in 12 days. In how many days can they complete the same job working together?**
- a) 20 days b) $7\frac{1}{2}$ days c) 8 days d) 10 days
- 21) A is twice as efficient as B, who is thrice as efficient as C. If C alone can do a piece of work in 24 days, then In how many days can A complete the same work if he is assisted by B and C on every third day alternatively?**
- a) $6\frac{1}{3}$ days b) $3\frac{1}{3}$ days c) 108 days d) 120 days
- 22) A can do a piece of work in 12 days, B can do the same work in 16 days. They agreed to work for Rs.2100. Find the share of B?**
- a) Rs.900 b) Rs.1400 c) Rs.1600 d) Rs.1200
- 23) A can do $\frac{1}{2}$ of the work in 3 days, whereas B can $\frac{1}{3}$ of the same work in 3 days and C can $\frac{2}{3}$ of the work in 8 days. A, B and C undertook the work for Rs.5200. What is the share of C?**
- a) Rs.1200 b) Rs.1600 c) Rs.1000 d) Rs.2000
- 24) A alone can do a work for 12 days. Along with B, he finishes the work and earns Rs.1600 and If B earns Rs.2400 for himself. In how many days B alone can finish the work?**
- a) 6 days b) 9 days c) 8 days d) 10 days
- 25) Three workers A, B, C were given a contract of Rs. 1800 for doing a certain piece of work. All the three together can finish this work in 5 days. A and C together can do it in 6 days, while B and C together can do it in 10 days. What is the share given to C?**
- a) Rs.800 b) Rs.600 c) Rs.900 d) Rs.300
- 26) A and B can do a job in 15 days and 60 days respectively. They agreed to work for Rs.8400 for the complete job. But they work only for 6 days. How much money should they get together?**
- a) Rs.4200 b) Rs.3400 c) Rs.2600 d) Rs.4000

- 27) A tap alone can fill a tank in 8 hours while another tap alone can empty the same in 12 hours. If both the taps are opened simultaneously, in what time would the tank get full?
 a) 4 hours b) 16 hours c) 24 hours d) None of these
- 28) Two pipes can fill a tank in 10 hours and 12 hours respectively while the third pipe empties the full tank in 20 hours. If all the pipes operate simultaneously, in how much time will the tank be half filled?
 a) 7 hours b) $7\frac{1}{2}$ hours c) $3\frac{3}{4}$ hours d) None of these
- 29) The cistern is normally filled in 6 hours but takes 4 hours longer to fill because of a leak in its bottom. If the cistern is full, the leak will empty it in how much time?
 a) 15 hours b) 16 hours c) 20 hours d) None of these
- 30) Tap A takes 30 minutes to empty a half-full tank by draining it. It is decided to simultaneously pump water into the half-full tank while draining it. What is the rate at which water has to be pumped in so that it gets filled in 10 minutes completely?
 a) 3 times b) 4 times c) 5 times d) 2 times

Solve 20 AMCAT Questions given below

- 1) 36 men can complete a piece of work in 18 days. In how many days will 27 men complete the same work?
 a) 12 days b) 18 days c) 22 days d) 24 days
- 2) 39 persons can repair a road in 12 days, working 5 hours a day. In how many days will 30 persons, working 6 hours a day, complete the work?
 a) 10 days b) 13 days c) 14 days d) 15 days
- 3) If 7 spiders make 7 webs in 7 days, then 1 spider will make 1 web in how many days?
 a) 1 days b) 7 days c) 8 days d) 49 days
- 4) Ronald and Elan are working on an assignment. Ronald takes 6 hours to type 32 pages on a computer, while Elan takes 5 hours to type 40 pages. How much time will they take, working together on two different computers to type an assignment of 110 pages?
 a) 7 hrs, 30 mins b) 8 hrs c) 8 hrs, 30 mins d) 8 hrs 25 mins
- 5) A and B can do a work in 12 days, B and C in 15 days, C and A in 20 days. If A, B and C work together, they will complete the work in?
 a) 5 days b) 10 days c) $\frac{47}{6}$ days d) $\frac{47}{6}$ days
- 6) A and B can complete a work in 15 days and 10 days respectively. They started doing the work together but after 2 days B had to leave and A alone completed the remaining work. The whole work was completed in?
 a) 8 days b) 10 days c) 12 days d) 15 days
- 7) A, B and C together can complete a piece of work in 10 days. All the three started working at it together and after 4 days A left. Then B and C together completed the work in 10 more days. A alone could complete the work in?
 a) 15 days b) 16 days c) 25 days d) 50 days
- 8) One pipe can fill a tank three times as fast as another pipe. If together the two pipes can fill the tank in 36 minutes, then the slower pipe alone will be able to fill the tank in:
 a) 81 minutes b) 108 minutes c) 114 minutes d) 192 minutes

- 9) A large tanker can be filled by two pipes A and B in 60 minutes and 40 minutes respectively. How many minutes will it take to fill the tanker from empty state if B is used for half the time and A and B fill it together for the other half?
 a) 15 minutes b) 20 minutes c) 27.5 minutes d) 30 minutes
- 10) Three taps A, B and C can fill a tank in 12, 15 and 20 hours respectively. If A is open all the time and B and C are open for one hour each alternately, the tank will be full in?
 a) 6 hrs b) 20/3 hrs c) 7 hrs d) 7.5 hrs
- 11) Two pipes can fill a tank in 20 and 24 minutes respectively and a waste pipe can empty 3 gallons per minute. All the three pipes working together can fill the tank in 15 minutes. The capacity of the tank is:
 a) 60 gallons b) 100 gallons c) 120 gallons d) 180 gallons
- 12) Ram and Shyam together do a work in 8 days. Both of them began to work. After 3 days Ram fell ill. Shyam completed the remaining work in 15 days. In how many days can Ram complete the whole work?
 a) 12 days b) 17 days c) 16 days d) 15 days
- 13) Two workers A and B were employed for a work. A takes 8 hour more than the time taken by A and B together. If B takes 4.5 hours more than the time taken by A and B together, how long would A and B take together to complete the work?
 a) 7 hrs b) 6 hrs c) 5 hrs d) 4 hrs
- 14) If 5 persons can do 5 times of a work in 5 days, then 10 persons can do 10 times of that work in:
 a) 10 days b) 8 days c) 5 days d) 2 days
- 15) Two taps can fill a cistern in 6 min. and 7 min. respectively. If these taps are opened alternatively for a minute, in what time will the cistern be filled?
 a) 5.67 minutes b) 6.25 minutes c) 5 minutes d) 45/7 minutes
- 16) Two taps A and B can fill a cistern in 28 min. and 42 min. respectively. Third tap C can empty it in 42 min. If all the three taps are opened, the time taken to fill the cistern is:
 a) 30 minutes b) 35 minutes c) 28 minutes d) 42 minutes
- 17) 49 pumps can empty a reservoir in $6\frac{1}{2}$ days, working 8 hours a day. If 196 pumps are used for 5 hours a day, then the same work will be completed in:
 a) 2.6 days b) 3 days c) 2.5 days d) 2 days
- 18) 16 men complete one-fourth of a piece of work in 12 days. What is the additional number of men required to complete the work in 12 more days?
 a) 48 days b) 36 days c) 30 days d) 16 days
- 19) A can do a piece of work in 4 hours; B and C together can do it in 3 hours, while A and C together can do it in 2 hours. How long will B alone take to do it?
 a) 8 hrs b) 10 hrs c) 12 hrs d) 24 hrs
- 20) A alone can finish a piece of work in 10 days which B alone can finish in 15 days. If they work together and finish it, then out of total wages of Rs. 225, the amount (in rupees) that A will get, is
 a) Rs.90 b) Rs.135 c) Rs.45 d) Rs.140

Practice Exercise

- 1) If 8 men make 8 chairs in 8 days, then 1 man will make 1 chair in how many days?
 a) 1 days b) 8 days c) 4 days d) 2 days
- 2) If 12 men can do a piece of work in 15 days working for 6 hours a day, In how many days will 18 men can do the same work, working 3 hours a day?
 a) 16 days b) 12 days c) 10 days d) 20 days
- 3) 12 men can build a wall 100 meters long, 3 meters high and 0.5 metres thick in 25 days. In how many days will 20 men build wall 60 metres long, 4 metres high and 0.25 metres thick?
 a) 3 days b) 12 days c) 6 days d) 8 days
- 4) If two men or three women can do a work in 28 days, in how many days will 1 man and 9 women can do that work?
 a) 10 days b) 9 days c) 7 days d) 8 days
- 5) If two men or three women or six children can do a work in 32 days, in how many days will two men and two women and two children do that work?
 a) 16 days b) 15 days c) 7 days d) 8 days
- 6) Amit is 30 % more efficient than Girish, If Girish can complete a task in 39 days. In how many days can Amit complete the same task?
 a) 36 days b) 39 days c) 30 days d) 42 days
- 7) A hotel has provisions for 250 persons for 50 days. If after 8 days, 50 more persons joined the hotel, how long will the food last at the same rate?
 a) 30 days b) 32 days c) $33\frac{1}{3}$ days d) 35 days
- 8) In one Army Camp had food sufficient for 45 soldiers for 16 days. After 6 days, 30 soldiers joined the camp. For how many days, the remaining soldiers can stay in the camp without getting additional food?
 a) 6 days b) 8 days c) 9 days d) 7 days
- 9) In a fort, ration for 800 people was sufficient for 30 days, after 12 days, more people came and the food lasted for only 12 more days. How many people came in the fort?
 a) 200 b) 300 c) 400 d) 150
- 10) A father can do a job as fast as his two sons working together. If one son does the job in 3 hours and the other in 6 hours, how many hours does it take the father to do the job?
 a) 2 hours b) 3 hours c) 1.5 hours d) 4 hours
- 11) Jatin and Hari undertook a piece of work for Rs.2000. Jatin alone can do it 24 days while Hari alone can do it in 30 days. With the help of Suresh, they finish the work in 12 days. How much should Suresh get for his work?
 a) Rs.400 b) Rs.200 c) Rs.250 d) Rs.1800
- 12) Harish and Jeetu can do a piece of work in 18 days, Jeetu and Mohan in 15 days, Mohan and Harish in 10 days. How long would all take to finish the work together?
 a) 9 days b) 11 days c) 20 days d) 18 days
- 13) In the above question, who among the following is most efficient?
 a) Harish b) Jeetu c) Mohan d) None
- 14) A and B can do a piece of work in 12 days. B and C together do it in 15 days. If A is twice as efficient as C. In how many days will B alone can do the work?
 a) 15 days b) 20 days c) 16 days d) 60 days



- 15) A, B and C can do a job in 24 days, 15 days and 60 days respectively working alone. They start working together. A left after 6 days and B left after working for 8 days of the initial day. How many more days are required to complete the whole work?**
- a) 5 days b) 15 days c) 8 days d) 10 days
- 16) Farooq and Ahmed can do the work in 45 days and 40 days respectively. They began the work together but Farooq left after some days and Ahmed finished the remaining work in 23 days. After how many days did Farooq leave?**
- a) 7 days b) 8 days c) 9 days d) 11 days
- 17) A, B and C can do a piece of work in 24, 30 and 40 days respectively. They start to work together but C leaves 4 days before the completion of the work. In how many days is the work done?**
- a) 7 days b) 11 days c) 20 days d) 18 days
- 18) A and B together can do a piece of work in 7 days. If A alone does twice as much work as B in a given time, find how long A alone would take to do the work?**
- a) $10\frac{1}{2}$ days b) 8 days c) 9 days d) 21 days
- 19) Amit can finish a piece of work in 5 days whereas Farooq can finish the same work in 20 days, if they start working on alternate days starting with Amit, then In how many days they can complete the work?**
- a) 8 days b) 4 days c) 6 days d) 10 days
- 20) A, B and C can do a piece of work in 11 days, 20 days and 55 days respectively, working alone. How soon can the work be done if A is assisted by B and C on every alternate day?**
- a) 8 days b) 4 days c) 6 days d) 10 days
- 21) A can do a piece of work in 36 days, B in 24 days and C in 72 days. All the three began the work together but A left after 8 days and B left 12 days before the completion of the work. How many days in all did C put in the entire work was finished?**
- a) 10 days b) 20 days c) 30 days d) 23 days
- 22) Machines A and B produce 1200 clips in 4 and 6 hours respectively. If they work alternately for 1 hour, A starting first, then 4800 clips will be produced in:**
- a) 18 hours b) 19 hours c) 30 hours d) 20 hours
- 23) A can do a piece of work in 25 days which B alone can do in 20 days. A started the work and was joined by B after 10 days. Find the time taken to finish the work.**
- a) $6\frac{2}{3}$ days b) $18\frac{2}{3}$ days c) 16 days d) $16\frac{2}{3}$ days
- 24) A, B and C together earn Rs. 300 per day, while A and C together earn Rs. 188 and B and C together earn Rs. 152. The daily earning of C is?**
- a) Rs.50 b) Rs.60 c) Rs.45 d) Rs.40
- 27) Three labourers A, B, C were given a contract of Rs. 750 for doing a certain piece of work. All the three together can finish this work in 8 days. A and C together can do it in 12 days, while A and B together can do it in 16 days. What is the share given to C?**
- a) Rs.375 b) Rs.300 c) Rs.250 d) Rs.125
- 26) Two men and three boys can do a piece of work in 8 days and three men and two boys can do it in 7 days. If the daily wages of a boy be Rs. 9 what will be the daily wages of a man?**
- a) Rs.40 b) Rs.15 c) Rs.18 d) Rs.63

- 25) A alone can do a work for 12 days. Along with B, he finishes the work and earns Rs.2800 and If B earns Rs.4200 for himself. What is the daily wage of B?
- a) Rs.425 b) Rs.525 c) Rs.450 d) Rs.550
- 28) A can lay railway track between two given stations in 16 days and B can do the same job in 12 days. With help of C, they did the job in 4 days only. Then, C alone can do the job in:
- a) $9\frac{1}{5}$ days b) $9\frac{2}{5}$ days c) 10 days d) $9\frac{3}{5}$ days
- 29) A is thrice as efficient B and therefore is able to finish a job in 60 days less than B. Working together, they can do it in:
- a) $22\frac{1}{2}$ days b) 20 days c) 21 days d) 19 days
- 30) A machine A can print one lakh books in 15 hours, machine B can print the same number of books in 10 hours while machine C can print them in 12 hours. All the machines are started at 9 A.M. while machine C is closed at 11 A.M. and the remaining two machines complete work. At what time will the work (to print one lakh books) be finished.
- a) 1:30 A.M. b) 12 noon c) 2:00 P.M. d) 1:00 P.M.
- 31) Two pipes A and B can fill a tank in 36 hours and 45 hours respectively. If both the pipes are opened simultaneously, how much time will be taken to fill the tank?
- a) 20 hours b) 18 hours c) 14 hours d) 10 hours
- 32) Two pipes can fill a tank in 10 hours and 12 hours respectively while the third pipe empties the full tank in 20 hours. If all the pipes operate simultaneously, in how much time will the tank be filled?
- a) 7 hours b) 8 hours c) $7\frac{1}{2}$ hours d) None
- 33) Taps A and B can fill a bucket in 12 minutes and 15 minutes respectively. If both are opened and A is closed after 3 minutes. How much further time would it take for B to fill the bucket??
- a) 8 mins, 15 sec b) 8 mins, 30 sec c) 5 mins, 15 sec d) 4 mins, 30 sec
- 34) Three pipes A, B and C can fill a tank independently in 12, 15 and 20 hours respectively. They were operated simultaneously for 4 hours then pipe B was closed. How much more time will the tank take to get full?
- a) 2 hrs b) 1.8 hrs c) 1.5 hrs d) 1.6 hrs
- 35) If two pipes function simultaneously the reservoir will be filled in 12 hours, one pipe fills the reservoir 10 hours faster than the other. How many hours it takes the second pipe to fill the reservoir?
- [Accenture 2008]
- a) 20 hrs b) 15 hrs c) 25 hrs d) 30 hrs

Check The Answers

1	B	6	C	11	B	16	C	21	D	26	C	31	A
2	D	7	D	12	A	17	B	22	B	27	B	32	C
3	C	8	A	13	C	18	A	23	D	28	D	33	A
4	D	9	C	14	B	19	A	24	D	29	A	34	C
5	A	10	A	15	A	20	A	25	A	30	C	35	D



TIME, SPEED AND DISTANCE

1. Speed, Time and Distance:

$$\text{Speed} = \left(\frac{\text{Distance}}{\text{Time}} \right), \quad \text{Time} = \left(\frac{\text{Distance}}{\text{Speed}} \right), \quad \text{Distance} = (\text{Speed} \times \text{Time}).$$

2. km/hr to m/sec conversion:

$$x \text{ km/hr} = \left(x \times \frac{5}{18} \right) \text{ m/sec.}$$

3. m/sec to km/hr conversion:

$$x \text{ m/sec} = \left(x \times \frac{18}{5} \right) \text{ km/hr.}$$

4. If the ratio of the speeds of A and B is $a : b$, then the ratio of the

the times taken by them to cover the same distance is $\frac{1}{a} : \frac{1}{b}$ or $b : a$.

5. Suppose a man covers a certain distance at x km/hr and an equal distance at y km/hr. Then,

the average speed during the whole journey is $\left(\frac{2xy}{x+y} \right)$ km/hr.

6. RELATIVE SPEED

Case 1: Two bodies are moving in opposite directions at speed V_1 & V_2 respectively. The relative speed is defined as $V_r = V_1 + V_2$

Case 2: Two bodies are moving in same directions at speed V_1 & V_2 respectively. The relative speed is defined as $V_r = |V_1 - V_2|$

7. Circular Motion

The relative velocity of 2 bodies moving around a circle in the same direction is taken as $(V_1 - V_2)$ and while moving in opposite direction is taken as $(V_1 + V_2)$

First Meeting Three or more bodies start moving simultaneously from the same point on the circumference of the circle. They will 1st meet again in the LCM of the times that the fastest runner will take in totally overlapping each of the slower runners

First meeting time = Circumference / Relative velocity

First Meeting at starting point The first meeting at the starting point will occur after a time that is obtained by the LCM of the times that each of the bodies takes the complete one full round.



Classroom Exercise

- 1) The speeds of a bus and car are 36 kmph and 48 kmph respectively. If the car covers a certain distance in 12 hours, In how many hours will it take for the bus to cover the same distance?
 a) 16 hrs b) 9 hrs c) 16 hrs d) None
- 2) Girish goes to office at a speed of 6 kmph and returns to his home at a speed of 4 kmph. If he takes 8 hours in all, what is the distance between his office and his home?
 a) 1.5 km b) 3.6 km c) 2.4 km d) 1.6 Km
- 3) Ajay and David travel the same distance at the rate of 6 kmph and 10 kmph respectively. If Ajay takes 30 minutes longer than David, the distance travelled by each is
 a) 6 km b) 10 km c) 7.5 km d) 8 Km
- 4) A car travels from town A to town B with the speed of 30 kmph, one hour later bus starts from town A with the speed of 50 kmph and reaches town B, 3 hours before the car reaches. Find the distance between A and B.
 a) 60 km b) 100 km c) 150 km d) 300 Km
- 5) A train travels a distance 840 km at a uniform speed, if the speed of the bus is 10 kmph more it takes 2 hours less to cover the same distance then the original speed of the bus was
 a) 80 kmph b) 70 kmph c) 60 kmph d) 40 kmph
- 6) Farooq covers two - third of his journey at 40 km/hr and the remaining distance at 20 km/hr. If he takes 8 hours in all, What is the total distance of his journey?
 a) 180 km b) 120 km c) 240 km d) 360 Km
- 7) During his journey, A man travels $\frac{1}{3}$ of the distance at the speed of 40 kmph, $\frac{1}{4}$ of the journey at the distance of 75 kmph and the rest at the speed of 50 kmph. If he takes 6 hours in the entire journey, what is the distance of his journey?
 a) 300 kms b) 240 kms c) 120 kms d) 480 kms
- 8) Excluding stoppages, the speed of a bus is 54 Kmph and including stoppages, it is 45 kmph. For how many minutes does the bus stop per hour?
 a) 4 min b) 6 min c) 8 min d) 10 min
- 9) Walking $\frac{4}{5}$ th of my usual speed, A person miss his bus by 5 minutes. What is usual time he takes to reach bus stop?
 a) 35 mins b) 30 mins c) 25 mins d) 20 mins
- 10) Walking $\frac{3}{5}$ th of my usual speed, A person reaches his destination 20 minutes late. What is usual time I take to reach the destination?
 a) 35 mins b) 30 mins c) 25 mins d) 20 mins
- 11) While walking $\frac{6}{5}$ times his normal speed, Tarun reaches his destination 20 minutes early. What is normal time he takes to reach the destination?
 a) 2 hrs b) 1 hrs, 40 mins c) 1 hrs, 30 mins d) 1 hrs, 15 mins
- 12) A bus covers a distance between station A and station B in 45 minutes. If the speed of the train is reduced by 5 km/hr, then the same distance is covered in 48 min. What is the distance between the stations A and B ?
 [CapGemini]
 a) 80 km b) 60 km c) 50 km d) 48 km
- 13) Tarun starts from his house to his office at a speed of 54 kmph, and reaches 8 minutes early. Next he comes back from his office at a speed of 45 kmph, and he reaches 4 minutes late. Find the distance of his office to his house?

- a) 45 km b) 54 km c) 60 km d) None of these

14) Arun goes to his office at a speed of 36 kmph, and reaches 25 minutes late, and the next day he goes to his office at a speed of 60 kmph, and he reaches 15 minutes late. Find the distance of his house to his office?

- a) 40 km b) 60 km c) 66 km d) 48 Km

15) A car travels first 210 km at 70 kmph and the remaining 440 km at 44 kmph. What is the average speed of the car for the whole journey?

- a) 50 kmph b) 75 kmph c) 60 kmph d) 80 kmph

16) A bike covers half of the journey at 40 kmph and the remaining distance at 10 kmph. What is the average speed of the bike for the whole journey?

- a) 12 kmph b) 16 kmph c) 18 kmph d) 24 kmph

17) A car covers 5/9 of the journey at the speed of 50 kmph and the rest of the journey at 80 kmph. What is his average speed in his journey?

- a) 55 kmph b) 52.5 kmph c) 50 kmph d) 60 kmph

18) A man walks 1/2 of the journey on a straight road with a speed of 20 kmph, the 1/3 of the journey with a speed of 10 kmph and the rest with a speed of 20 kmph. What is the average speed of the car for the whole journey?

- a) 12 kmph b) 18 kmph c) 14 kmph d) 15 kmph

19) A car travels 1/3 of the distance on a straight road with a speed of 10 kmph, the next 1/3 with a speed of 20 kmph and the last 1/3 with a speed of 60 kmph. What is the average speed of the car for the whole journey?

- a) 12 kmph b) 36 kmph c) 45 kmph d) 18 kmph

20) In a 200 m race, A gives B a head start of 10 meters and beats him by 10 meters. Find the ratio of their speeds.

- a) 20 : 19 b) 10 : 9 c) 5 : 4 d) 4 : 3

21) In a 200 m race, A gives B a head start of 20 meters and beats him by 20 meters. If the speed of B is 12 m/s, then what is the speed of A?

- a) 16 m/s b) 10 m/s c) 20 m/s d) None

22) In a 500 m race, A beats B by 200 m or by 20 seconds. In the same race B beats C by 250 m. Find the speed of C (in m/sec)?

- a) 8 m/s b) 10 m/s c) 7.5 m/s d) 5 m/s

23) In a 400 meter race, A beats B by 40 m, and C by 60 m, then by what distance does B beat C in a separate 1800 m race

- a) 80 m b) 100 m c) 25 m d) 75 m

24) In a race of 600 meters, Amit beats Bimal by 60 meters and in a race of 900 meters Bimal beats Charan by 100 meters. By how many meters will Amit beat Charan in a 400 meter race?

- a) 48 m b) 80 m c) 20 m d) 40 m

25) In a race of 700 meters, Karan beats Mitesh by 100 meters and in a race of 400 meters Mitesh beats Jignesh by 100 meters. By how many meters will Karan beat Jignesh in a 1400 meter race?

- a) 480 m b) 400 m c) 500 m d) 100 m

26) In a 500 m race, David gives Pankaj a head start of 140 m. If the speeds of David and Pankaj are in the ratio 4 : 3 then who wins and by what distance?

- a) David, 15 m b) Pankaj, 15 m c) Pankaj, 20 m d) David, 20 m



Practice Exercise

- 1) If the ratio of speeds of three cars is 2 : 3 : 5 then the ratio of the times taken by them to travel the same distance is ?**
 - a) 5 : 3 : 2
 - b) 20 : 15 : 6
 - c) 15 : 10 : 6
 - d) 6 : 10 : 15
- 2) The speeds of a bike and car are 36 kmph and 54 kmph respectively. If the bike takes 20 mins more than car a certain distance, What is the distance covered by each?**
 - a) 40 km
 - b) 36 km
 - c) 48 km
 - d) 44 Km
- 3) Walking $\frac{4}{7}$ th of his normal speed, a man takes 3 hours more than the normal time. Find the normal time.**
 - a) 6 hours
 - b) 5 hours
 - c) 8 hours
 - d) 4 hours
- 4) While walking $\frac{7}{5}$ times his normal speed, Arun reaches his destination 40 minutes early. What is normal time?**
 - a) 2 hrs
 - b) 2 hrs, 40 mins
 - c) 2 hrs, 30 mins
 - d) 2 hrs, 20 mins
- 5) Gogi walks from his home to his school at a speed of 5 kmph, and reaches 30 minutes late, and next day he increases his speed by 1 kmph, and still reaches 5 minutes late. Find the distance of his home to his school?**
 - a) 12.5 km
 - b) 25 km
 - c) 20 km
 - d) None of these
- 6) A man covers a distance on a bike, had he moved 3 kmph faster he would have taken 40 min less. If he had moved 2 kmph slower he would have taken 60 min more, then the distance he covered is**
 - a) 14 kms
 - b) 12 kms
 - c) 20 kms
 - d) 24 kms
- 7) Rajshree goes to her office at a speed of 20 km/h and returns to her home at a speed of 5 km/h. If she takes 10 hours in all. What is the distance between her office and her home?**
 - a) 48 km
 - b) 20 km
 - c) 40 km
 - d) 30 Km
- 8) Girish goes to office at a speed of 6 kmph and returns to his home at a speed of 4 kmph. If she takes 15 hours in all, what is the distance between his office and his home?**
 - a) 15 km
 - b) 36 km
 - c) 24 km
 - d) 12 Km
- 9) A bus travels a distance 840 km at a uniform speed, if the speed of the bus is 10 kmph more it takes 2 hours less to cover the same distance then the original speed of the bus was**
 - a) 80 kmph
 - b) 70 kmph
 - c) 60 kmph
 - d) 40 kmph
- 10) Excluding stoppages, the speed of a bus is 40 kmph and including stoppages, it is 36 kmph. For how many minutes does the bus stop per hour?**
 - a) 4 min
 - b) 6 min
 - c) 8 min
 - d) 10 min
- 11) Harish had to cover a distance of 80 km. However, he started 1 hour later than his scheduled time and raced at a speed of 4 km/hr higher than his originally planned speed and reached the finish at the time he would reach it. Find the speed at which he travelled during the journey?**
 - a) 20 kmph
 - b) 16 kmph
 - c) 12 kmph
 - d) 10 kmph
- 12) A boy rides his cycle from his house to his school at a speed of 20 kmph, and reaches 10 minutes late. Next day, he rides to his school from his house at a speed of 30 kmph, and he reaches 7 minutes early. Find the distance of his house to his school?**
 - a) 15 km
 - b) 17 km
 - c) 22 km
 - d) None of these

- 13) A car travels from Mumbai to Pune at the speed of 90 kmph and on his return journey he decreases his speed by 30 kmph. What is his average speed in his journey?
 a) 75 kmph b) 72 kmph c) 80 kmph d) 22.5 kmph
- 14) Ramanlal, during his journey, travels for 20 minutes at a speed of 30 kmph, another 30 minutes at a speed of 20 kmph, and 1 hour at a speed of 27 kmph and 10 minutes at a speed of 18 kmph. What is the average speed in the entire journey?
 a) 25 kmph b) 30 kmph c) 50 kmph d) 60 kmph
- 15) A man walks 1/2 of the journey on a straight road with a speed of 20 kmph, the 1/3 of the journey with a speed of 10 kmph and the rest with a speed of 20 kmph. What is the average speed of the car for the whole journey?
 a) 12 kmph b) 18 kmph c) 14 kmph d) 15 kmph
- 16) A tourist covers half of his journey by train at 60 kmph, half of the remaining by bus at 60 kmph and the rest by cycle at 10 kmph. What is the average speed of the tourist in kmph during his entire journey?
 a) 36 kmph b) 24 kmph c) 30 kmph d) 18 kmph
- 17) Shanti beats Preeti by 30 meters in a race of 300 metres, whereas Preeti beats Deepika by 40 meters in a race of 240 meters. By how many meters could Shanti beats Deepika in a race of 200 meters ?
 a) 100 m b) 200 m c) 50 m d) 150 m
- 18) In a 100 meter race, A beats B by 20 m, and C by 40 m, then by what distance does B beat C in a separate 200 m race
 a) 80 m b) 50 m c) 25 m d) 75 m
- 19) In a kilometer race, A beats B by 100 m and B beats C by 100 m. By what distance does A beat C in the same race.
 a) 100 m b) 200 m c) 190 m d) 119 m
- 20) In a 200 m race, Amar beats Babu by 40 m or 5 seconds. Find the speed of Amar.
 a) 10 m/s b) 8 m/s c) 7.5 m/s d) 8.5 m/s
- 21) In a 100 m race, A can beat B by 25 m and B can beat C by 4 m. In the same race, A can beat C by ____?
 [Amcat]
 a) 21 m b) 26 m c) 28 m d) 29 m

Check The Answers

1	C	6	B	11	B	16	B
2	B	7	C	12	B	17	C
3	D	8	B	13	B	18	B
4	D	9	C	14	A	19	C
5	A	10	B	15	D	20	A



PROBLEMS ON TRAINS, BOATS

- 1) The speeds of two buses which started from two towns A and B at the same time towards each other are 66 kmph and 42 kmph respectively. The distance between A and B is 540 km. At what distance from A will the two buses meet?
 a) 270 km b) 300 km c) 330 km d) 360 km
- 2) Amritsar and Delhi are two stations 650 km apart. A train starts from Amritsar and moves towards Delhi at the rate of 25 km/hr. After two hours another train starts from Delhi at the rate of 35 km/hr. How far from Amritsar will they cross each other?
 a) 250 km b) 300 km c) 350 km d) 360 km

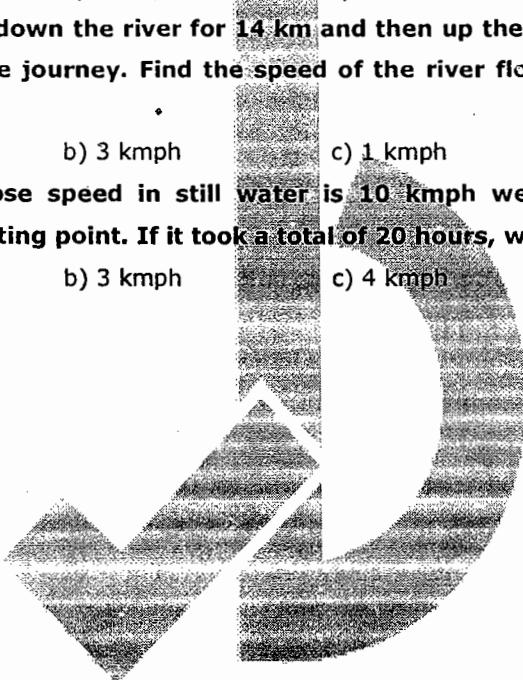
Directions for the question [3 - 4]:

A Bhopal Express started from Bhopal to Hyderabad at 7 pm at a speed of 60 kmph. Another train Superfast express started from Hyderabad to Bhopal at 4 am next morning at a speed of 90 kmph. The distance between Bhopal and Hyderabad is 800 km.

- 3) How far from Hyderabad will the two trains meet?
 a) 164 km b) 156 km c) 132 km d) 128 km
- 4) At what time will the two trains meet?
 a) 5 : 32 am b) 5 : 28 am c) 5 : 36 am d) 5 : 44 am
- 5) Two bikes start from A towards B, one at 8 AM with 15 kmph and the other at 10 AM with 27 kmph. At what time will they meet?
 a) 11:30 AM b) 11:40 AM c) 12:30 PM d) 12 Noon
- 6) Two trains for Mumbai leave Delhi at 6 am and 7 am and travel at 100 kmph and 125 kmph respectively. How many kilometers from Delhi will the two trains be together?
 a) 400 km b) 500 km c) 600 km d) None
- 7) A dog sees a cat. It estimates that the cat is 40 leaps away. The cat sees the dog and starts running with the dog in hot pursuit. If in every second, the dog makes 5 leaps and the cat makes 6 leaps and one leap of the dog is equal to 2 leaps of the cat. Find the time in which the cat is caught by the dog?
 a) 8 seconds b) 20 seconds c) 12.5 seconds d) None of these
- 8) Two trains start at the same time from two stations A and B towards each other. They arrive at B and A respectively in 25 hours and 16 hours after they have passed each other. If the speed of the train that started from A is 60 kmph, then what is the speed of the second train is?
 [L &T, ACCENTURE]
 a) 40 kmph b) 75 kmph c) 60 kmph d) 50 kmph
- 9) How many seconds will a train 400 m long running at the rate of 48 kmph take to pass a telegraph pole?
 a) 25 sec b) 30 sec c) 40 sec d) 48 sec
- 10) How many seconds will a train 220 m long running at 72 kmph take to cross a platform of 180 m length?
 a) 15 sec b) 18 sec c) 20 sec d) 25 sec
- 11) A train running at 108 kmph crosses a man standing on the platform of length 500 m in 40 seconds. What is the length of the train?
 a) 1600 m b) 1400 m c) 1100 m d) 1200 m

- 12) A train crosses a bridge of 100 m long in 24 sec and another bridge of 160 m length in 30 sec. what is the length of the train?**
- a) 160 m b) 140 m c) 200 m d) None
- 13) A train crosses a platform 100 m long in 60 seconds at a speed of 45 km/hr. The time taken by the train to cross an electric pole?**
- a) 8 sec b) 52 sec c) 60 sec d) 48 sec
- 14) Two trains 200 m and 150 m long running on parallel rails at the rate of 40 km/hr and 45 km/hr respectively. In how much time will they cross each other, if they are running in the same direction?**
- a) 72 sec b) 132 sec c) 192 sec d) 252 sec
- 15) Two trains of 440 m and 560 m long are running in the same direction. They cross each other in 180 seconds. If the speed of slower train is 48 kmph, what is the speed of the faster train?**
- a) 48 kmph b) 68 kmph c) 72 kmph d) 92 kmph
- 16) Two trains for Hyderabad leave Mumbai at 8:30 am and 10:30 am respectively and travel at 60 kmph and 75 kmph respectively. How many kilometers from Mumbai will the two trains meet?**
- a) 400 km b) 500 km c) 600 km d) None
- 17) Two trains cross each other in 25 sec when they are running in opposite direction. The speeds of two trains are 42 kmph and 30 kmph respectively. If the length of the first train is 280 m, what is the length of second train?**
- a) 180 m b) 360 m c) 240 m d) 220 m
- 18) Two trains travel in the opposite directions at 36 kmph and 45 kmph and a man sitting in slower train passes the faster train in 8 seconds. The length of the faster train is**
- a) 80 m b) 100 m c) 120 m d) 180 m
- 19) Tarun and Suresh are heading towards each other. Now after meeting they arrive at others starting point in 49 mins and 25 mins. If they meet 35 meters from Tarun's starting point, then the initial distance between them was?**
- a) 80 m b) 100 m c) 60 m d) 40 m
- 20) Two trains start at the same time from two stations A and B towards each other. They arrive at B and A respectively in 25 hours and 16 hours after they have passed each other. If the speed of the train that started from A is 56 kmph, then the speed of the second train is.**
- a) 70 kmph b) 80 kmph c) 85 kmph d) 90 kmph
- 21) A man can row upstream at 8 km/hr and downstream at 10 km/hr. Find the rate of the stream.**
- a) 2 kmph b) 3 kmph c) 4 kmph d) None
- 22) A man can row down the stream at 20 kmph. The speed of the flow is 6 kmph. What is the speed of the man against the stream?**
- a) 8 kmph b) 10 kmph c) 16 kmph d) None
- 23) A man takes 3 hours to row a boat 12 km in downstream of a river and 2 hours to cover a distance of 6 km upstream. Find the speed of the man in still water?**
- a) 2.5 kmph b) 3 kmph c) 3.5 kmph d) 4 kmph
- 24) A boat can row 24 km down the stream in 4 hours. If the speed of the flow is 2 kmph, find the time required for the boat to travel the same distance against the stream?**
- a) 18 hrs b) 12 hrs c) 15 hrs d) 24 hrs

- 25) A man can row 8 kmph in still water. In a stream which is flowing at 4 kmph it takes 3 hour to row both ways. How far is the place?
a) 7 km b) 8 km c) 9 km d) 18 km
- 26) A motorboat whose speed in still water is 15 kmph goes 30 km downstream and comes back in a total 4 hours 30 minutes. Determine the speed of the stream.
a) 2 kmph b) 3 kmph c) 4 kmph d) 5 kmph
- 27) Ajay can row a certain distance downstream in 6 hours and return the same distance in 9 hours. If the stream flows at the rate of 3 kmph, find the speed of Ajay in still water?
a) 12 kmph b) 13 kmph c) 14 kmph d) 15 kmph
- 28) A boat sails down the river for 10 km and then up the river for 6 km. The speed of the river flow is 1 km/hr. What should be the speed of the boat for the trip to take 4 hours duration?
a) 2 kmph b) 3 kmph c) 4 kmph d) 5 kmph
- 29) A motorboat went down the river for 14 km and then up the river for 9 km. It took a total of 5 hours for the entire journey. Find the speed of the river flow if the speed of the boat in still water is 5 kmph?
a) 2 kmph b) 3 kmph c) 1 kmph d) 1.5 kmph
- 30) A motor boat whose speed in still water is 10 kmph went 91 km downstream and then returned to its starting point. If it took a total of 20 hours, what is the speed of the stream?
a) 6 kmph b) 3 kmph c) 4 kmph d) 8 kmph



PERMUTATION & COMBINATION

1. Factorial Notation:

Let n be a positive integer. Then, factorial n , denoted $n!$ is defined as:

$$n! = n(n - 1)(n - 2) \dots 3.2.1.$$

Examples:

- i. We define $0! = 1$.
- ii. $4! = (4 \times 3 \times 2 \times 1) = 24$.
- iii. $5! = (5 \times 4 \times 3 \times 2 \times 1) = 120$.

2. Permutations:

The different arrangements of a given number of things by taking some or all at a time, are called permutations.

Examples:

- i. All permutations (or arrangements) made with the letters a, b, c by taking two at a time are (ab, ba, ac, ca, bc, cb).
- ii. All permutations made with the letters a, b, c taking all at a time are: ($abc, acb, bac, bca, cab, cba$)

3. Number of Permutations:

Number of all permutations of n things, taken r at a time, is given by:

$${}^n P_r = n(n - 1)(n - 2) \dots (n - r + 1) = \frac{n!}{(n - r)!}$$

Examples:

- i. ${}^6 P_2 = (6 \times 5) = 30$.
- ii. ${}^7 P_3 = (7 \times 6 \times 5) = 210$.
- iii. Cor. number of all permutations of n things, taken all at a time = $n!$.

4. An Important Result:

If there are n subjects of which p_1 are alike of one kind; p_2 are alike of another kind; p_3 are alike of third kind and so on and p_r are alike of r^{th} kind,
such that $(p_1 + p_2 + \dots + p_r) = n$.

Then, number of permutations of these n objects is = $\frac{n!}{(p_1).(p_2)!\dots(p_r)!}$

5. Combinations:

Each of the different groups or selections which can be formed by taking some or all of a number of objects is called a **combination**.

Examples:

1. Suppose we want to select two out of three boys A, B, C. Then, possible selections are AB, BC and CA.
- Note: AB and BA represent the same selection.
2. All the combinations formed by a, b, c taking ab, bc, ca .
3. The only combination that can be formed of three letters a, b, c taken all at a time is abc .
4. Various groups of 2 out of four persons A, B, C, D are:

AB, AC, AD, BC, BD, CD.

5. Note that ab ba are two different permutations but they represent the same combination.



6. Number of Combinations:

The number of all combinations of n things, taken r at a time is:

$${}^nC_r = \frac{n!}{(r!)(n-r)!} = \frac{n(n-1)(n-2) \dots \text{to } r \text{ factors}}{r!}$$

Note:

i. ${}^nC_n = 1$ and ${}^nC_0 = 1$.

ii. ${}^nC_r = {}^nC_{(n-r)}$

Examples:

i. ${}^{11}C_4 = \frac{(11 \times 10 \times 9 \times 8)}{(4 \times 3 \times 2 \times 1)} = 330.$

ii. ${}^{16}C_{13} = {}^{16}C_{(16-13)} = {}^{16}C_3 = 16 \times 15 \times 14 / 3! = 560.$

Practice Exercise

- 1) How many three digit numbers can be formed using the digits 1, 2, 3, 4, 5, and 6, (repetition of digits is not allowed)?

a) 150 b) 100 c) 120 d) None
- 2) Find the 4-digited numbers can be formed by using digits 1, 2, 4, 6 and 7 that are divisible by 4 (repetition of digits is allowed).

a) 150 b) 175 c) 125 d) None
- 3) How many numbers can be formed using the digits 2, 3, 5, 6, 7 and 8 that are more than 500 but less than 5000 (repetition of digits is allowed)?

a) 648 b) 540 c) 432 d) 576
- 4) How many 4-digit numbers can be formed using the digits 0, 1, 2, 4, 5 and 6 that are divisible by 5 (repetition of digits is not allowed)?

a) 118 b) 120 c) 108 d) None
- 5) How many 3-digit numbers can be formed using the digits 0 to 9 that such that the number do not contain 3 and 6 (repetition of digits is allowed)?

a) 1000 b) 448 c) 512 d) None
- 6) How many integers, greater than 999 but not greater than 4000, can be formed with the digits, 0, 1, 2, 3, and 4, if repetition of digits is allowed? [CAT]

a) 499 b) 500 c) 375 d) 376
- 7) A number lock consists of 4 rings each marked with 10 different numbers. In how many cases the locks cannot be opened? [SNAP 2008]

a) 4^{10} b) 103 c) 10^4 d) 9999
- 8) Find the number of 10 digit numbers formed 1, 2, 3, 4 and 8 which are divisible by 4, when repetition is allowed? [TCS]

a) 8×5^{10} b) 5^{10} c) 8×5^8 d) 7×5^8
- 9) In how many ways we can arrange 5 boys and 2 girls, such that girls always sit together?

a) 1500 b) 720 c) 1440 d) None
- 10) In how many different ways can the letters of the word 'SOFTWARE' be arranged in such a way that the vowels do not come together?

a) 8! b) 7! c) $8! - 5! \times 6!$ d) None



- 11) In how many ways can the letters of the word 'ACUMEN' be rearranged such that the vowels always appear together?** [CTS]
- a) 216 b) 720 c) 116 d) 144
- 12) How many number of three digit numbers can be formed using the digits 2, 3, 4, 5 in which no repetition of digits are possible?** [CTS]
- a) 216 b) 720 c) 116 d) 144
- 13) A credit card number has 5 digits (between 1 to 9). The first two digits are 12 in that order, the third digit is bigger than 6, and the fourth digit is 3 times the 5th digit. How many different credit card combinations are possible?** [CTS]
- a) 6 b) 9 c) 10 d) 27
- 14) In how many different ways can the letters of the word 'LEADING' be arranged in such a way that the vowels always come together?** [TCS]
- a) 360 b) 480 c) 720 d) 5040
- 15) How many ways can Jason sit with his five friends in a row of six seats, if Jason insists on sitting one of the corner of the row?** [TCS]
- a) 120 b) 360 c) 720 d) 240
- 16) In how many ways can the letters of the word 'ERGONOMICS' be rearranged such that the vowels always appear together?** [AMCAT, TCS]
- a) $7! / 6!$ b) $6! / 2!$ c) $7! \times 4!$ d) $(7! \times 4!) / 2!$
- 17) How many different seven letter words can be formed (the words need not be meaningful) using the letters of the word PACIFIC such that the first letter is P and the last letter is F?** [AMCAT]
- a) 30 b) 60 c) 120 d) 24
- 18) A number lock consists of 3 rings each marked with 10 different numbers. How many combinations are possible such that the 0 is not the first number?**
- a) 1000 b) 728 c) 999 d) 900
- 19) How many 3 digit numbers can be formed from the digits 2, 3, 5, 6, 7 and 9, which are divisible by 5 and none of the digits is repeated?**
- a) 5 b) 10 c) 15 d) 20
- 20) How many ways can one arrange the word EDUCATION such that relative positions of vowels and consonants remains same?** [INFOSYS]
- a) 2880 b) 1440 c) 720 d) 360
- 21) In how many different ways can a six letter word can be formed from the letters of the word 'TABLES' such that the word always starts with a vowel and ends with a consonant?**
- a) 120 b) 360 c) 24 d) 192
- 22) How many vehicle registration plate numbers can be formed with digits 1, 2, 3, 4, 5 (no digits being repeated) if it is given that registration number can have 1 to 5 digit number plates?** [TCS]
- a) 205 b) 100 c) 325 d) 120
- 23) There were 21 men in the party, how many handshakes are possible such that every man shakes a hand with other without repetition?** [TCS]
- a) 180 b) 210 c) 21 d) 22
- 24) In a party, John and wife invited 6 families where each guest family consists of 4 members. Find the number of handshakes such that no guest and host families shake hands among themselves.**
- a) 325 b) 324 c) 288 d) None

- 25) There were 19 students ($S_1, S_2, S_3, \dots, S_{19}$) attending a party, if S_5 wants to shake hands with the others, then in how many handshakes are possible?
 a) 18 b) 210 c) 171 d) 20
- 26) A camp-fire was attended by 46 friends. After shaking hands, each of them sat on the round table and clinked their mug with the friends to his immediate left and immediate right. How many times did the mugs clink? [TCS]
 a) 46 b) 92 c) 1035 d) None
- 27) In a meeting, if the total number of handshakes held among the men is 36, then find the number of men present in the meeting?
 a) 8 b) 10 c) 9 d) 7
- 28) In a party, the number of handshakes among the men is 55 in number where as the number of handshakes among the women is 28, if every man is shaking a hand with every other woman, then how many handshakes are possible?
 a) 88 b) 171 c) 80 d) None
- 29) If there are 18 points on a plane, then find the number of straight lines formed.
 a) 18 b) 306 c) 19 d) 153
- 30) If there are 15 points on a plane, if there are 5 collinear points then find the number of straight lines formed.
 a) 10 b) 105 c) 96 d) 153
- 31) A single tennis tournament is held in which 30 men participate. In a knockout tournament how many matches are required to determine the winner?
 a) 30 b) 29 c) 435 d) 31
- 32) There were 30 stations on a railway track, how many tickets are required for a station master to issue a ticket from one station to another?
 a) 45 b) 60 c) 435 d) 870
- 33) There are N stations on a railroad and every station issues ticket to other station. Some more station are added. Now they have to issue 38 tickets additional or more. What are number of stations before and after adding? [INFOSYS]
 a) 11 and 13 b) 9 and 11 c) 10 and 12 d) 6 and 10
- 34) A lady gives dinner party to five guests to be selected from 9 friends .The number of ways of forming the party of 5, given that two of the friends will not attend the party together is?
 a) 56 b) 126 c) 91 d) None of these
- 35) In an exam there are total 12 questions. From the first 4 questions a student has to answer 2 questions which are compulsory. And he has to answer 5 from the rest. In how many ways can he answer questions?
 a) 356 b) 336 c) 216 d) 501
- 36) The buyer of a certain shop must choose 2 out of 4 available shirts and 4 out of 5 available trousers. How many different ways he can select shirts and trousers available?
 a) 30 b) 20 c) 15 d) 60
- 37) A company could advertise about its new product in 4 magazines, 3 newspapers and 2 television channels. But in a later move it decided to give advertisements in only 2 of the magazines, one of the newspapers and one the TV channels. In how many ways can it be done? [AMCAT]
 a) 30 b) 36 c) 72 d) 44

- 38) A coach has to form a team 'X' by selecting seven players from the players in three groups, A, B and C which consists of six, four and three players respectively. In how many ways can he form the team, if it is required to select at least two players from each group?
- a) 735 b) 690 c) 825 d) 630

Directions [39-41]: Sixteen teams have been invited to participate in ABC world cup tournament. The tournament is conducted in three stages. In first stage the teams are divided into two groups. Each group consists of eight teams, with each team playing with the other team in its group exactly once. At the end of the first stage, the top four teams from each group advances to the second stage while the rest are eliminated. The second stage comprises of several rounds. A round involves one match for each team of its group such that the winner of a match in this stage advances to the next stage, while the loser is eliminated. The undefeated team from each group advances to the final stage where is declared the winner and claims the Gold Cup.

- 39) What is the total number of matches played in a tournament?
- a) 56 b) 60 c) 63 d) 58
- 40) What is the number of rounds in the second stage of the tournament?
- a) 6 b) 8 c) 3 d) 4
- 41) The minimum number of wins needed for a team in the first stage to guarantee its advancement to the next stage is
- a) 5 b) 6 c) 7 d) 4
- 42) In a chess competition involving some boys and girls of a school, every student had to play exactly one game with every other student. It was found that in 45 games both the players were girls, and in 190 games both were boys. The number of games in which one player was a boy and the other was a girl is?
- a) 200 b) 216 c) 235 d) 256
- 43) If there are 6 routes from Agra to Delhi and 5 ways to go from Delhi to Bhopal, How many ways are possible for going from Agra to Bhopal?
- a) 30 b) 6^5 c) 5^6 d) $6! + 5!$
- 44) In an examination 10 questions are to be answered choosing at least 4 from each section A and section B. If section A and section B consists of 6 questions. In how many ways can these 10 questions be answered ? [TCS]
- a) 66 b) 18 c) 72 d) 132
- 45) In CAT entrance examination paper there are 3 sections, each containing 5 questions. A candidate has to solve 4, choosing at least one from each section. The number of ways he can choose is? [AMCAT]
- a) 720 b) 250 c) 455 d) 15
- 46) In a hockey tournament, every team plays a match with other team exactly once, if the total the number of matches played were 105. How many teams have participated in the hockey tournament?
- a) 12 b) 15 c) 10 d) 14
- 47) In a party, Chris and wife invited 10 families where each guest family consists of 4 members. Find the number of handshakes such that no guest and host families shake hands among themselves.
- a) 800 b) 870 c) 200 d) 700



48) In a metro railway system, every station sells tickets for every other station. Some new stations are added for which 46 sets of additional tickets were required. How many stations were there originally and how many new stations were added?

- a) 5 original, 6 new b) 6 original, 5 new
 c) 11 original, 2 new d) 11 original, 3 new

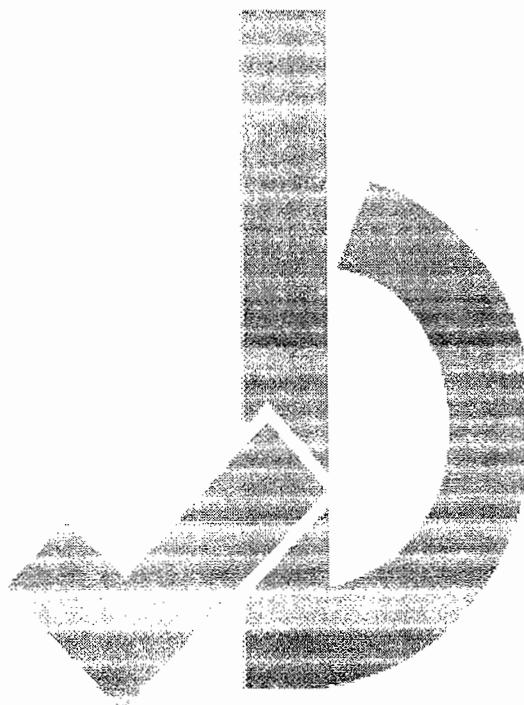
49) The number of triangles that can be formed by choosing the vertices from a set of 12 points, seven of which lie on the same straight line is?

[AMCAT]

- a) 105 b) 115 c) 175 d) 185

50) How many diagonals are there in a closed figure having 19 sides?

- a) 282 b) 128 c) 171 d) 192



Check The Answers

1	C	6	D	11	D	16	D	21	D	26	A	31	B	36	D	41	D	46	B
2	B	7	D	12	D	17	A	22	C	27	C	32	D	37	B	42	A	47	A
3	D	8	C	13	B	18	D	23	B	28	A	33	B	38	D	43	A	48	C
4	C	9	C	14	C	19	C	24	C	29	D	34	C	39	C	44	A	49	D
5	B	10	C	15	D	20	A	25	A	30	C	35	B	40	A	45	C	50	C



PROBABILITY

1. Experiment:

An operation which can produce some well-defined outcomes is called an experiment.

2. Random Experiment:

An experiment in which all possible outcomes are known and the exact output cannot be predicted in advance, is called a random experiment.

Examples:

- Rolling an unbiased dice.
- Tossing a fair coin.
- Drawing a card from a pack of well-shuffled cards.
- Picking up a ball of certain colour from a bag containing balls of different colours.

Details:

- When we throw a coin, then either a Head (H) or a Tail (T) appears.
- A dice is a solid cube, having 6 faces, marked 1, 2, 3, 4, 5, 6 respectively. When we throw a die, the outcome is the number that appears on its upper face.
- A pack of cards has 52 cards.

It has 13 cards of each suit, name **Spades, Clubs, Hearts and Diamonds**.

Cards of spades and clubs are **black cards**.

Cards of hearts and diamonds are **red cards**.

There are 4 honours of each unit.

There are **Kings, Queens and Jacks**. These are all called **face cards**.

3. Sample Space:

When we perform an experiment, then the set S of all possible outcomes is called the **sample space**.

Examples:

- In tossing a coin, $S = \{H, T\}$
- If two coins are tossed, the $S = \{HH, HT, TH, TT\}$.
- In rolling a dice, we have, $S = \{1, 2, 3, 4, 5, 6\}$.

4. Event:

Any subset of a sample space is called an **event**.

5. Probability of Occurrence of an Event:

Let S be the sample and let E be an event.

Then, $E \subseteq S$.

$$\therefore P(E) = \frac{n(E)}{n(S)}$$

6. Results on Probability:

- $P(S) = 1$
- $0 \leq P(E) \leq 1$
- $P(\emptyset) = 0$
- For any events A and B we have : $P(A \cup B) = P(A) + P(B) - P(A \cap B)$
- If A denotes (not-A), then $P(A) = 1 - P(A)$.



Practice Exercise

- 1) Out of all the 2 digit numbers from 1 to 100, a two digit number is chosen at random. What is the probability that the number is not divisible by 7?
- a) $\frac{14}{90}$ b) $\frac{13}{100}$ c) $\frac{13}{90}$ d) $\frac{77}{90}$
- 2) A box contains 6000 cards numbered 1 to 6000. One card is drawn at random from the box. Find the probability that the number is neither divisible by 4 nor 6?
- a) $\frac{1}{3}$ b) $\frac{5}{6}$ c) $\frac{2}{3}$ d) $\frac{3}{5}$
- 3) A number is chosen at random from the first 120 natural numbers. The probability of the number chosen being a multiple of 5 or 10 is:
- a) $\frac{1}{5}$ b) $\frac{1}{6}$ c) $\frac{1}{7}$ d) $\frac{1}{9}$
- 4) A number is chosen at random from the first 120 natural numbers. The probability of the number chosen being a multiple of 3 or 5 or 7 is
- a) $\frac{38}{120}$ b) $\frac{39}{120}$ c) $\frac{68}{120}$ d) $\frac{39}{120}$
- 5) A box contains 8 slips numbered 1 to 8. Three slips are drawn simultaneously at random from the box. If the numbers obtained are arranged in an order, then find the probability that the numbers form an arithmetic progression:
- a) $\frac{10}{8c3}$ b) $\frac{12}{8c3}$ c) $\frac{9}{8c3}$ d) None
- 6) A bag contains 100 tickets numbered 1, 2, 3,... 100. If a ticket is drawn out of it at random, what is the probability that the ticket drawn has digit 3 appearing on it.
- a) $\frac{19}{100}$ b) $\frac{21}{100}$ c) $\frac{32}{100}$ d) $\frac{23}{100}$
- 7) Three numbers are chosen from 1 to 30 randomly. The probability that they are not consecutive is. [AMCAT]
- a) $\frac{1}{145}$ b) $\frac{144}{145}$ c) $\frac{139}{140}$ d) $\frac{1}{140}$

Directions for the questions [8-9]:

A husband and a wife appear in an interview for two vacancies for the same post. The probability of husband's selection is $(1/7)$ and that of the wife's selection is $(1/5)$. What is the probability that

8) One of them will be selected?

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

9) None of them will be selected?

- a) $\frac{24}{35}$ b) $\frac{20}{35}$ c) $\frac{2}{7}$ d) $\frac{24}{35}$

Directions for the questions [10-11]:

A bag contains 5 red balls and 4 black balls. When two balls are drawn, find the probability of getting both red balls.

10) With replacement?

- a) $\frac{5}{81}$ b) $\frac{25}{9}$ c) $\frac{5}{9}$ d) $\frac{25}{81}$



11) Without replacement?

a) $\frac{5}{18}$

b) $\frac{5}{9}$

c) $\frac{5}{81}$

d) $\frac{25}{81}$

Directions for the questions [12-14]:**Three dices were rolled simultaneously on the ground, then what is the probability that****12) Sum of the number on the dices is 8?**

a) $\frac{15}{216}$

b) $\frac{18}{216}$

c) $\frac{21}{216}$

d) $\frac{24}{216}$

13) Same numbers on the three dices?

a) $\frac{1}{6}$

b) $\frac{2}{6}$

c) $\frac{2}{36}$

d) $\frac{1}{36}$

14) Sum of the number on the dices is 13? [TCS]

a) $\frac{15}{216}$

b) $\frac{18}{216}$

c) $\frac{21}{216}$

d) $\frac{24}{216}$

**15) Ajay and Fatima rolled three dices each time, the sum of the numbers when Ajay rolled is 17,
What is the probability that Fatima gets the number more than Ajay**

a) $\frac{1}{216}$

b) $\frac{2}{216}$

c) $\frac{2}{36}$

d) $\frac{1}{36}$

**16) A speaks truth 3 out of 4 times, and B speaks 7 out of 8 times. What is the probability that
they will contradict each other in stating the same statement?**

a) $\frac{7}{32}$

b) $\frac{5}{11}$

c) $\frac{5}{14}$

d) $\frac{5}{16}$

**17) In a stock of 50 radios contains 5 defective ones. Two radios are selected at random from the
stock. What is the probability that only one is defective?**

a) $\frac{8}{49}$

b) $\frac{2}{45}$

c) $\frac{9}{49}$

d) $\frac{7}{49}$

**18) From a group of 7 men and 4 women, a committee of 6 persons is formed. What is the
probability that the committee will consist of exactly 4 men?**

a) $\frac{3}{11}$

b) $\frac{2}{11}$

c) $\frac{6}{11}$

d) $\frac{5}{11}$

19) What is the probability that a leap year selected at random has 53 Sundays? [TCS]

a) $\frac{6}{7}$

b) $\frac{1}{7}$

c) $\frac{2}{7}$

d) 1

**20) In a month of February of a non-leap year, the probability that it will have 5 Saturdays is
[TCS]**

a) $\frac{1}{7}$

b) $\frac{6}{7}$

c) $\frac{2}{7}$

d) 0

**21) Three cards are drawn from a well-shuffled pack of 52 cards. Find the probability that they are
a king, a queen and a jack**

a) $\frac{64}{5525}$

b) $\frac{64}{5225}$

c) $\frac{16}{5525}$

d) $\frac{25}{5525}$

**22) Two cards are drawn at random from a pack of 52 playing cards. Find the probability of getting
all the two cards are honored cards.**

a) $\frac{15}{221}$

b) $\frac{14}{221}$

c) $\frac{20}{221}$

d) $\frac{4}{52}$



23) A card is drawn from a pack of 52 cards. The card is drawn at random. What is the probability that it is neither a Diamond nor a Queen?

a) $\frac{4}{13}$

b) $\frac{2}{13}$

c) $\frac{9}{13}$

d) $\frac{6}{13}$

Direction for Question [24-25]:

Three balls are drawn at random, from a bag containing 6 white, 5 green and 4 red balls. What is the probability that

24) The three balls are of different color?

a) $\frac{67}{91}$

b) $\frac{5}{91}$

c) $\frac{1}{455}$

d) $\frac{24}{91}$

25) The three balls are of same color?

a) $\frac{68}{455}$

b) $\frac{80}{455}$

c) $\frac{34}{455}$

d) $\frac{24}{91}$

Directions for the questions: [26-28]

Two persons L and M decided to meet between 5 pm and 6 pm. The person who comes first will wait for the other for not more than 15 minutes.

26) If L arrives the place at 5:10, what is the probability that they can meet?

a) $\frac{5}{11}$

b) $\frac{6}{11}$

c) $\frac{5}{12}$

d) $\frac{5}{13}$

27) If M arrives the place at 5:15, what is the probability that they can meet?

a) $\frac{1}{2}$

b) $\frac{1}{3}$

c) $\frac{2}{3}$

d) $\frac{1}{5}$

28) What is the probability that they can meet?

a) $\frac{9}{16}$

b) $\frac{5}{16}$

c) $\frac{7}{16}$

d) $\frac{9}{16}$

29) A and B picks a card at random from a well shuffled cards, one after the other replacing if every time till one of them gets a diamond card. If A begins the game, then the probability that B wins the game?

a) $\frac{5}{9}$

b) $\frac{3}{7}$

c) $\frac{4}{9}$

d) $\frac{4}{7}$

30) Tarun and Hitesh were rolling two dices simultaneously, one after the other alternatively till one of them gets a doublet. If Tarun begins the game, then the probability that Hitesh wins the game?

a) $\frac{5}{11}$

b) $\frac{4}{11}$

c) $\frac{6}{11}$

d) $\frac{3}{11}$

31) A five-digit number is formed by using digits 1, 2, 3, 4 and 5 without repetition. What is the probability that the number is divisible by 4?

a) $\frac{1}{5}$

b) $\frac{5}{6}$

c) $\frac{4}{5}$

d) $\frac{3}{11}$



32) A bag contains 3 red, 4 white and 7 black balls. Two balls are drawn at random, find the probability both are black?

a) $\frac{1}{7}$

b) $\frac{2}{7}$

c) $\frac{3}{13}$

d) $\frac{13}{40}$

33) A fair coin is tossed 10 times, find the probability that two heads occurs on them?

a) $\frac{5}{1024}$

b) $\frac{10}{1024}$

c) $\frac{45}{1024}$

d) None

34) The probabilities that a problem can be solved by Amit, Binny, Charan and Dheeraj are $\frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \frac{1}{6}$. Find the probability that problem can be solved.

a) $\frac{1}{3}$

b) $\frac{2}{5}$

c) $\frac{3}{5}$

d) $\frac{2}{3}$

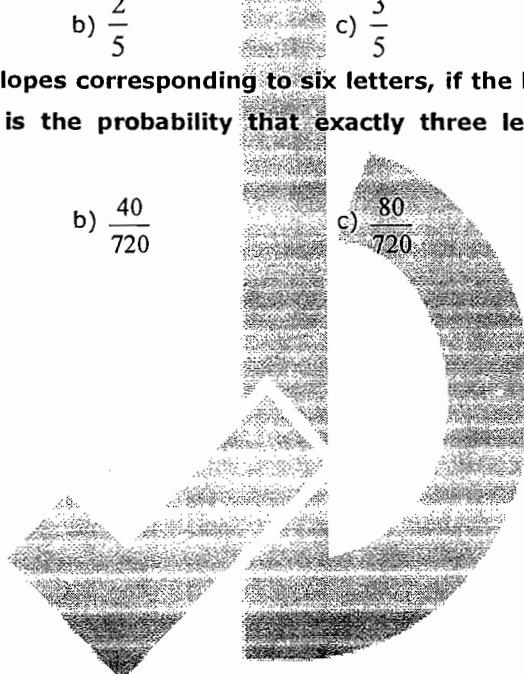
35) There are six envelopes corresponding to six letters, if the letters are placed in the envelopes at random. What is the probability that exactly three letters are not placed in the right envelopes?

a) $\frac{20}{720}$

b) $\frac{40}{720}$

c) $\frac{80}{720}$

d) None



Check The Answers

1	D	6	A	11	A	16	D	21	C	26	C	31	A
2	C	7	B	12	C	17	C	22	C	27	A	32	C
3	A	8	C	13	D	18	D	23	C	28	C	33	B
4	C	9	D	14	C	19	C	24	D	29	B	34	D
5	B	10	D	15	A	20	D	25	C	30	A	35	B



DATA INTERPRETATION

Direction for the questions [1-5]: The table above shows the number of people who responded to a survey about their favourite style of music. Use this information to answer the following questions to the nearest whole percentage.

Age	15 - 20	21 - 30	31 +
Classical	6	4	17
Pop	7	5	5
Rock	6	12	14
Jazz	1	4	11
Blues	2	5	15
Hip - Hop	9	3	14
Ambient	2	4	2
	33	37	78

- 1) What percentage of respondents under 31, indicated that Blues is their favourite style of music?
 a) $22\frac{2}{5}\%$ b) 10 % c) $14\frac{2}{7}\%$ d) $7\frac{1}{7}\%$
- 2) What percentage of respondents aged 15-20 indicated a favourite style other than Rock music?
 a) $82\frac{2}{11}\%$ b) $81\frac{9}{11}\%$ c) $18\frac{2}{11}\%$ d) 30 %
- 3) Approximately what percentage of the total sample indicated that Jazz is their favourite style of music?
 a) 10 % b) 16 % c) 18 % d) 11 %
- 4) What percentage of the total sample were aged 21-30?
 a) 25 % b) 31 % c) 30 % d) 14 %
- 5) The respondents indicated that Rock is their favourite style of music forms what percentage compared to that respondents who indicated Jazz is their favourite style of music?
 a) 50 % b) 200 % c) 100 % d) 150 %

Direction for the questions [6-10]:

The table above shows the unit sales of the TT950 motorcycle in six European countries over a six month period. These motorcycles are imported into each country by a main dealer. Use this information to answer the following questions.

Country	Jan	Feb	Mar	Apr	May	Jun	Total
Germany	34	47	45	54	56	60	296
UK	40	44	36	47	47	46	260
France	37	32	32	32	34	33	200
Belgium	14	14	14	16	17	14	89
Spain	29	29	28	31	29	31	177
Italy	22	24	24	26	25	23	144
Total	176	190	179	206	208	207	1166

- 6) What percentage of the overall total was sold to the German importer?
 a) 22.0 % b) 25.4 % c) 35.8 % d) 14.1 %
- 7) What percentage of the overall total was sold in May?
 a) 24.1 % b) 25.6 % c) 17.9 % d) 20.3 %
- 8) Which month showed the biggest increase in total sales from the previous month?
 a) March b) April c) May d) June
- 9) In how many months was the motorcycle sales is more than its average sales in Spain ?



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

10) The sales of Belgium in January forms what percent over the sales of Germany in May?

a) 50 % b) 20 % c) 25 % d) 15 %

Directions for questions 11-15:

Read the following information and answer the questions that follow:

The following data was obtained of the four persons, A, B, C and D.

- a) The total saving of all the four persons put together is Rs.18,800.
- b) The salary of D is more than B by Rs. 4,000.
- c) The salary of A is Rs. 2,000 more than that of B's expenditure.
- d) The savings of B is Rs. 8,000.
- e) The savings of C is Rs. 2,000 less than that of A.
- f) The expenditure of B is Rs. 4,000 more than of C's salary.
- g) A's saving is 50% of B's savings.
- h) The expenditure of B is Rs.10,000.

11) Who among the following has the highest salary?

- a) A b) B c) C d) D

12) What is the ratio of expenditure of A to the expenditure of B?

- a) 1 : 2 b) 1 : 3 c) 2 : 1 d) 4 : 5

13) What is the difference between the salaries of B and C? (in rupees)?

- a) 10,000 b) 12,000 c) 4,000 d) 8,000

14) What is expenditure of D?

- a) 20,000 b) 17,200 c) 4,800 d) 17,000

15) Who among the following has the lowest saving?

- a) A b) B c) C d) D

Directions for questions 16-19:

Read the following information and answer the questions that follow:

Four countries, India, Brazil, China and Argentina have the production of Iron. The following data was obtained for the two years 2010 and 2011.

- a) The total production of all the countries put together is 230 tonnes in 2011.
- b) In 2010, Argentina has produced 10 tonnes less than that of the year 2011.
- c) The production of India in 2011 is 60 tonnes and it is 50% more compared to its previous year.
- d) In 2010, Brazil has produced 10 tonnes more than China's production in 2011 and has 10 % increased compared to next year.

e) China has produced 50 tonnes of Iron in 2011.

f) The percentage increase of China is 15% more than that of Brazil.

16) What is the production of Iron of Argentina in 2010? (in tonnes)

- a) 40 b) 44 c) 50 d) 60

17) Which country has produced highest quantity of Iron in 2011?

- a) India b) Brazil c) Argentina d) China

18) What is the percentage increase of Brazil from 2010 to 2011?

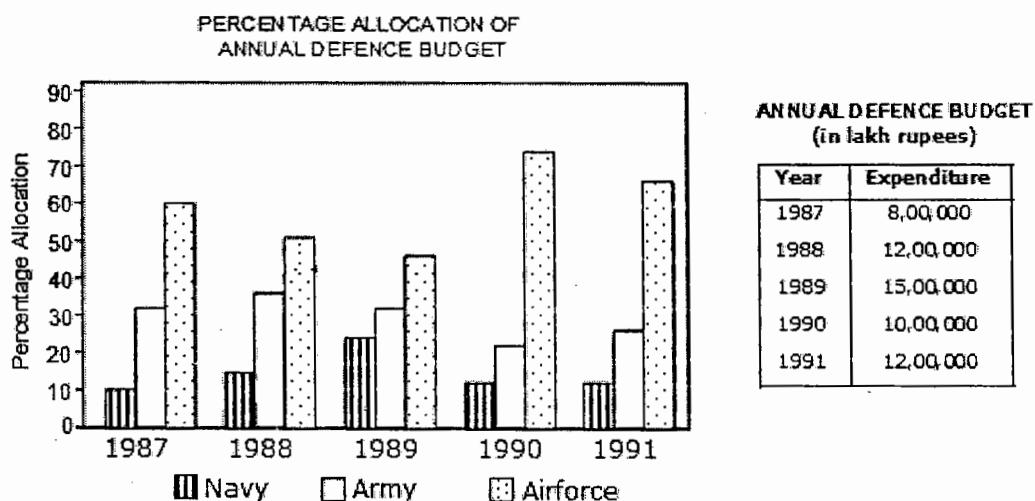
- a) 50 % b) 25 % c) 10 % d) 15%

19) What is the production of Iron of India in 2010? (in tonnes)?

- a) 60 b) 66 c) 50 d) 40

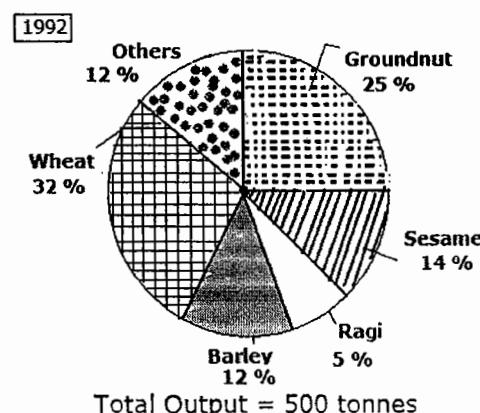
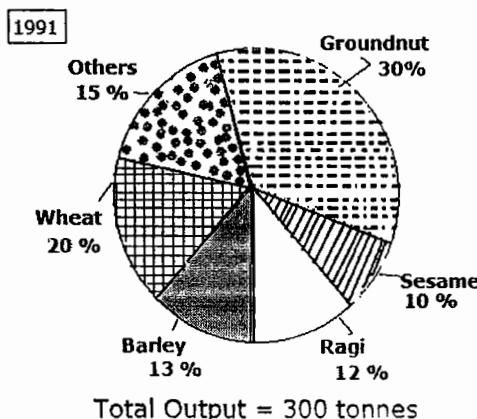


Directions for questions [25-28]: Study the following graph and answer the questions that follow.



- 25) Of the following years, the year in which allocations for Army was the highest was
 a) 1991 b) 1987 c) 1989 d) 1988
- 26) Of the money allocated for Navy in 1991, one third was for the procurement of weapons and the remaining was used to pay salaries. What was the amount of money spent on paying salaries (in Rs.crore)
 a) 4000 b) 400 c) 800 d) 8000
- 26) In 1990, if there were 60,000 Air force personnel and 10% of the total money allocated for Air force was spent on paying their salaries, what was the average annual salary of each employee? (Approximately)
 a) Rs. 67,000 b) Rs. 1,08,000 c) Rs. 1,17,000 d) Rs. 84,000
- 28) Of the following years, the year in which the money allocated for Air force had the highest increase compared to that in the previous year is
 a) 1988 b) 1989 c) 1990 d) 1991

Direction for the questions [29-33]: These questions are based on the following pie charts, which give the distribution of production in 1991 and 1992 of crops.

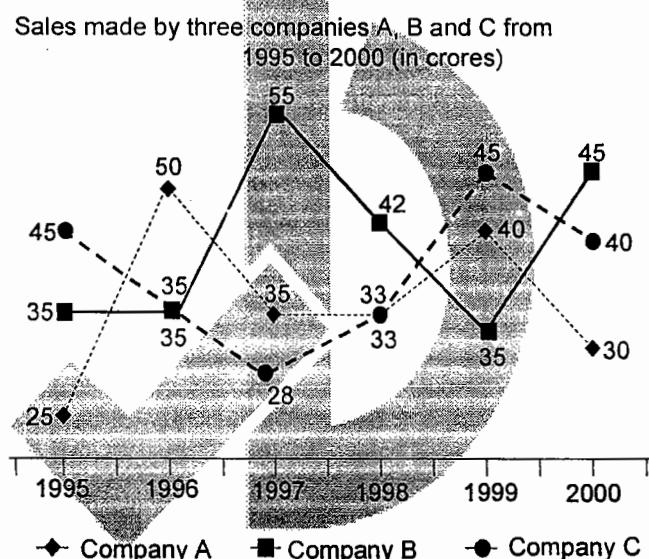


- 29) The percentage increase in the production of Wheat from 1991 to 1992 is
 a) $33\frac{1}{3}\%$ b) $166\frac{2}{3}\%$ c) $66\frac{2}{3}\%$ d) $266\frac{2}{3}\%$

- 30) The percentage increase in production from 1991 to 1992 is the lowest for which of the following crops
 a) Others b) Sesame c) Barley d) Groundnut
- 31) What is the ratio of Sesame in 1991 to the Barley in 1992?
 a) 2 : 1 b) 1 : 2 c) 3 : 2 d) 2 : 3
- 32) The production of wheat in 1992 is same as the combined production of _____ in 1991
 a) Barley & Others b) Groundnut & Wheat c) Ragi & Groundnut d) None of these
- 33) If the production of Ragi increases by 5 % points in 1993 over that of 1992 and the total output increases by 10% in 1993 from 1992, then the production of Ragi in 1991 forms what percent of that of 1993 is
 a) 70.23% b) 65.45% c) 60.91% d) 55.72%

Direction for the questions [34-38]:

These questions are based on the following graph which gives the sales of three companies A, B and C for the six years from 1995 to 2000. (in crores)



- 34) In how many years, the sales of company A is more than company B over the given period?
 a) 1 b) 2 c) 3 d) 4
- 35) What is the average sales of company A over the given period?
 a) 34 b) 38 c) 35.5 d) 39
- 36) What is the difference between the average sales of company B and company C over the given period?
 a) 4 b) 6 c) 5 d) 3.5
- 37) The percentage increase in the sales of company B in 1997 over the previous year is?
 a) 53 % b) 60 % c) 57.14 % d) 62 %
- 38) Which of the following is not true?
 a) The percentage increase of company A from 1995 to 1996 is 100 %.
 b) The sales of company B and company C is same in one of the given period.
 c) The sales of company B is more than company A and company C in not more than 2 years.
 d) The sales of Company C in 1996 is same to sales of company B in 1999.



Practice Exercise

Direction for questions [1-5]: These questions are based on the tabular charts given below.

Chart I shows the income of Raman, Dhawan and Charles. **Chart II** represents their expenses in terms of percentage of their income. **Chart III** shows the distribution of expenses by Raman on different items.

Chart I Income (in rupees)

Days	Raman	Dhawan	Charles
Sun	800	800	800
Mon	400	600	800
Tue	800	400	600
Wed	900	700	500
Thurs	600	300	700
Fri	600	900	400
Sat	900	600	800

Chart II Expenses in percentage of income

Days	Raman	Dhawan	Charles
Sun	70	40	50
Mon	90	60	30
Tue	80	40	50
Wed	30	50	60
Thurs	60	90	70
Fri	100	50	90
Sat	80	70	40

Chart III Distribution of expenses on different items by Raman (in percentages of expenses)

Days	Travel	Shopping	Food
Sun	20	20	15
Mon	8	15	20
Tue	-	10	25
Wed	-	-	25
Thurs	10	30	20
Fri	25	-	12
Sat	8	20	-

- 1) The expenses (in Rs.) for Raman were maximum on which day?**
a) Thursday b) Friday c) Saturday d) Monday

2) What were the minimum expenses on Wednesday for any of the person?
a) Rs.270 b) Rs.200 c) Rs.300 d) Rs.360

3) The savings for Dhawan were more than that of Charles for how many days?
a) 3 b) 2 c) 4 d) 1

4) How much amount Raman spent on travelling on Thursday?
a) Rs.30 b) Rs.48 c) Rs.36 d) Rs.72

5) The ratio of Raman spent on Monday to Tuesday on food?
a) 3 : 5 b) 4 : 5 c) 9 : 20 d) 20 : 9

Directions for Questions [11 to 14]:

Read the following information and answer the questions that follow:

Brad Pitt owns four companies, namely Mysoft, Cybervision, Twilight Electricals and Synomach. The following data was obtained for the year 2004-05. [Cognizant 2011]

- a) The sales of Mysoft is 4 crores less than the sales of Synomach.
 - b) The expense of Cybervision is equal to the profit of Twilight Electricals and is equal to 7 crores.
 - c) Synomach incurred an expenses of Rs. 14 crores.
 - d) The expenses of Twilight Electricals is 5 crores more than the profit of Synomach.
 - e) Mysoft sales is 2 crores more than its expense.
 - f) The profit of Cybervision is 1 crore less than that of Twilight Electricals.
 - g) The expense of Synomach is 1 crore more than the sales of Mysoft.
 - h) The expense of Synomach is 3 crore less than its sales.

Note: Sales - expenses = Profit

- 11) What is the total profit earned by all the four companies during the year 2004-05?
 a) Rs. 15 crores b) Rs. 17 crores c) Rs. 18 crores d) Rs. 20 crores
- 12) What is the total expense incurred by all the four companies during the year 2004-05?
 a) Rs. 10 crores b) Rs. 20 crores c) Rs. 30 crores d) Rs. 40 crores
- 13) What is the total sales of all the four companies during the year 2004-05?
 a) Rs. 50 crores b) Rs. 55 crores c) Rs. 58 crores d) Rs. 60 crores
- 14) Which company earned the highest profit?
 a) Mysoft b) Cybervision c) Twilight Electricals d) Synomach

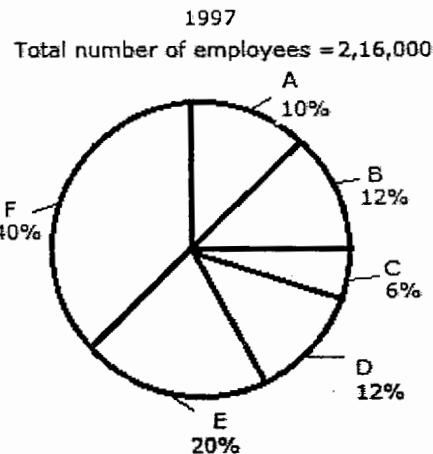
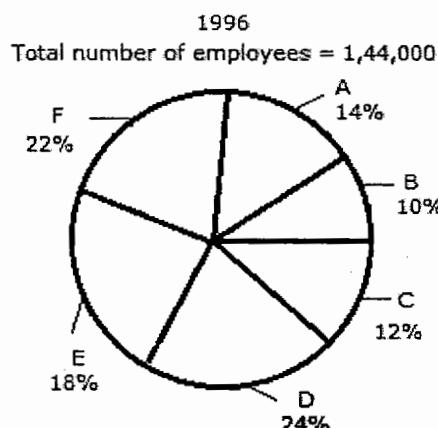
Directions for the questions [15-16]

The following pie charts represent the percentage distribution (by type of employees) among the total employees in an organization, for the two years 1996 and 1997.

These questions are based on the following data. Each question consists of two statements, I and II.

Study the data and mark your answer as

- a) If only **statement I** is true.
- b) If only **statement II** is true.
- c) If neither **statement I** nor **statement II** is true.
- d) If both **statement I** and **statement II** are true



- A) Line employees B) Supervisors C) Clerks D) Executives E) Managers F) Peons**

15)

- I) The total number of Managers and Peons in 1996 is same as the number of Peons in 1997.
- II) The number of Managers in 1996 is same as the number of Executives in 1997.

16)

- I) The number of Managers as a percentage of the number of Supervisors in 1996 is more than that in 1997.
- II) The decrease in the number of Executives from 1996 to 1997 is less than 50%

Check The Answers

1	C	5	C	9	A	13	C
2	A	6	C	10	C	14	C
3	A	7	A	11	C	15	B
4	C	8	B	12	D	16	B



DATA SUFFICIENCY

Give answer (A) if the data in **Statement I alone** sufficient to answer the question.

Give answer (B) if the data in **Statement II alone** sufficient to answer the question.

Give answer (C) if the data either in **Statement I or in Statement II alone** are sufficient to answer the question.

Give answer (D) if the data even in **both Statements I and II together are not** sufficient to answer the question.

Give answer (E) if the data in **both Statements I and II together** necessary to answer the question.

1) How many days are there in present month?

- I. Next month has 30 days.
- II. Previous month has 29 days.

2) How many Sundays are there in the month of February?

- I. January 18th was a Sunday.
- II. February 10th was Saturday.

3) Is Arun taller than Sachin?

[Infosys]

- I. Dinesh is of the same height as Arun and Sachin.
- II. Sachin is not shorter than Dinesh.

4) In a certain code language, '13' means 'stop smoking' and '59' means 'injurious habit'. What is the meaning of '9' and '5' respectively in that code?

[Infosys]

- I. '157' means 'stop bad habit'.
- II. '839' means 'smoking is injurious'.

5) How many boys are there in the class?

- I. The number of Boys are 24 more than the number of girls.
- II. The percentage of boys is 65 percentage of the class.

6) Amit purchased an article and sold it to Bhaskar at a profit of 10%, Bhaskar sold it to Girish at a loss of 10%, find the cost price of article when Girish purchased?

- I. Amit purchased the article at Rs.25G.
- II. Bhaskar purchased the article at Rs.275.

7) A man purchased four dozen bananas and two kgs of mangoes for Rs.75. Find the cost of each banana?

- I. The cost of 4 bananas and one mango is Rs.8.
- II. The number of mangoes that weigh for a kg is three.

8) Find the total cost of 5 pens and 4 pencils?

- I. The total cost of 3 pens and 5 pencils is Rs.20.
- II. The cost of each pen and each pencil in rupees is a positive integer.

9) Is X is divisible by 20?

- I. X is divisible by 15.
- II. X is divisible by 12.

10) Is X is divisible by 28?

- I. X is divisible by 20.
- II. X is divisible by 84.



11) Is X is divisible by 4?

- I. X is an even number greater than 2.
- II. When X is divided by 100, the remainder obtained is divisible by 4.

12) What is the value of (a + b + c)?

- I. $3a + 5b + 6c = 29$.
- II. $7a + 5b + 4c = 21$.

13) Is $a + b + c < 200$, where a, b, c are positive integers?

- I. $5a + 6b + 7c = 1000$.
- II. $6a + 5b + 4c = 1200$.

14) Is $\frac{1}{A} > \frac{1}{B}$?

- I. B is less than A.
- II. A is a negative integer.

15) Is $p > q$?

- I. $pq = 15$.
- II. $q^2 = 9$.

16) What is the time in country X when the time in country Y is 7:00 a.m.?

- I. The difference in the timings of X and Y is 6 hours.
- II. Country Y's time is ahead of country X.

17) How many students are there in the queue?

- I. Raman is tenth from the front end.
- II. Raman is standing at the middle of the queue.

18) How many students are there in the queue?

- I. Raju is 16th from either end of the row.
- II. Shanti is 4 places left of Raju who is 9th from the left end of the row.

19) A team of 3 members have to be selected from a five members A, B, C, D and E. Is B selected?

- I. If A is selected, E cannot be selected.
- II. If D is selected, C cannot be selected.

20) P, Q, R and S are four teams. Each team plays with every other team exactly once. Which team won the match between R and S?

- I. P lost every match.
- II. Only 3 matches were drawn.

21) In how many days does the work get completed, if A and B work on alternate days?

- I. A alone can do the work in 20 days, while B can do the same work in 30 days.
- II. B started the work.

22) How much time will A and B together take to finish a job ?

- I. A can finish a portion of the job working alone in 10 days & B can finish the remaining portion in 8 days.
- II. A works twice as fast as B.



23) Six shows A, B, C, D, E and F are scheduled on six days of a week, one on each day from Monday to Saturday. If the show C is scheduled on Tuesday, which show is scheduled on Friday?

- I. The show A is immediate followed the show B. The show D is scheduled on Thursday.
- II. There are three shows between D and E and the show D is not the first show among the given shows.

24) How many girls are present in the class of 84 students?

- I. Two-third the number of boys is equal to half the number of girls.
- II. Half the number of boys along with Two – third the number of girls form a group of 50 students.

25) How is B related to A?

- I. A is the son of C, who is the brother of B.
- II. A is the father of D, who is the son of B.

26) How is L related to P?

- I. L is the father of Q, who is the brother of R, who is the daughter of P.
- II. L is the son-in-law of M and N, the spouse of M has only daughter called P.

27) How many daughters does Mr. Rohit Das have?

- I. Each daughter of Mr. Rohit Das have exactly two brothers.
- II. Each son of Mr. Rohit Das has exactly two sisters.

28) Each of the five friends P, Q, R, S and T is of a different height. Who among them is the 2nd shortest?

- I. R is taller than Q and S but shorter than T.
- II. P is taller than Q, who is taller than S.

29) What is Sonia's present age?

- I. Sonia's present age is 5 times Deepak's present age.
- II. Five years ago her age was twenty-five times Deepak's age at that time.

30) How many doors are there in the bungalow?

- I. A thief can enter the bungalow through any one of the doors and exit through any one of the windows in 180 ways.
- II. There are 45 windows in the bungalow.