REASONING MATERIAL
FOR
CAMPUS RECRUITMENT TRAINING
(CRT)

CONTENTS

NUMBER SERIES

Series: A series is a sequence of numbers. These numbers are called terms of the sequence.

Types of Series:

1. **Arithmetic Series**: It is the one in which the difference between any two consecutive terms is always the same and is called the common difference.

Eg: 2, 4, 6, 8, 10, ….
Here, 2nd term – 1st term = 3rd term – 2nd term = …. = 2.
Hence, 2, 4, 6, 8, 10, …. is an Arithmetic Series.

Note: This is Arithmetic Series of the first order.

2. **Geometric Series:** It is the one in which the ratio of any two consecutive terms is always the same and is called the common ratio.

Eg: **Series**   **Common Ratio**   **Next term**

1) 3, 6, 12, 24, ….

$$\frac{6}{3} = \frac{12}{6} = ... = 2$$

24 x 2 = 48

2) 4, - 8, 16, - 32, ….

$$\frac{-8}{4} = \frac{16}{-8} = ... = -2$$

- 32 x – 2 = 64

3) $\frac{1}{4}, \frac{1}{12}, \frac{1}{36}, ...$

$$\frac{\frac{1}{12}}{\frac{1}{4}} = \frac{\frac{1}{36}}{\frac{1}{12}} = ... = \frac{1}{3}$$

$$\frac{1}{36} \times \frac{1}{3} = \frac{1}{108}$$

4) $a, a^2, a^3, ...$

$$\frac{a^2}{a} = \frac{a^3}{a^2} = ... = a$$

$$a^3 \times a = a^4$$

3. **Series of Squares, Cubes and so on:** Simple powers of natural numbers like squares, cubes, etc. or their combinations are sometimes used to form some series.

Eg: 1) 1, 4, 9, 16, 25, …

Sol: Clearly, Each term in this is a perfect square i.e. $1^2, 2^2, 3^2, 4^2, 5^2$

So, next term is $6^2 = 36$

Eg: 2) 1, 8, 27, …
Sol: Clearly, Each term in this is a perfect cube i.e. $1^3, 2^3, 3^3$

So, next term is $4^3 = 64$

Eg: $\frac{1}{8}, \frac{4}{27}, \frac{9}{64}, ...$

Sol: Clearly, Each term's Numerator in this is a perfect square i.e. $1^2, 2^2, 3^2$.

Each term in this is a perfect cube i.e. $1^3, 2^3, 3^3$.

So, next term is $\frac{4^2}{5^3} = \frac{16}{125}$.

4. **Arithmetic Series of Second Order:** It is the one in which the difference between successive terms themselves form an arithmetic series of first order.

Eg: 1, 4, 10, 19, …

Sol: The difference between the successive terms are 3, 6, 9, …
It is an Arithmetic Series with common difference 3.
So, next term is 19 + 12 = 31.

5. **Arithmetic Series of Third Order:** It is the one in which the difference between successive terms themselves form an arithmetic series of second order.

Eg: 2, 9, 17, 28, 44, …

Sol: The difference between the successive terms are 7, 8, 11, 16, …
Again the difference here is 1, 3, 5, …. Here, the next term will be 7.
Add this 7 to 16 of the first set (7, 8, 11, 16, …).

So, that series will become 7, 8, 11, 16, 23, ….
Now add this 23 to 44 in the given series (2, 9, 17, 28, 44, …)
So, the next term is 44 + 23 = 67.

6. **Arithmetico-Geometric Series:** It is the one in which each successive term is obtained by first adding a fixed number to the previous term and then multiplying it by another fixed number.

Eg: 1, 8, 22, 50, 106, …

Sol: Clearly, here each successive term is obtained by first adding 3 to the previous term and multiplying it by 2.
So, the next term = (106 + 3) x 2 = 109 x 2 = 218

7. **Geometrico-Arithmetic Series:** It is the one in which each successive term is obtained by first multiplying or dividing the previous term by a fixed number and then adding or subtracting respectively another fixed number.

Eg: 1, 2, 6, 22, …
Sol: Clearly, here each successive term is obtained by first multiplying 4 to the previous term and subtracting 2 from it.
So, the next term = (22 x 4) - 2 = 88 - 2 = 86

8. **Double Series:** It consists of two series combined into a single series. The alternating terms of this series form an independent series.

Eg: 1, 2, 3, 6, 5, 18, 7, 54, …

Sol: The terms at odd places are 1, 3, 5, 7, ….
    It is an Arithmetic Series with common difference 2.
    The terms at even places are 2, 6, 18, 54, …
    It is a Geometric Series with common ratio 3.
    So, the next term in the series will be 7 + 2 = 9.

9. Series of Date or Time:

Eg: Find the wrong one in the following series.
3 – 2 – 2008, 13 – 2 – 2008, 23 – 2 – 2008, 5 – 3 – 2008

Sol: Here, each successive date differs by 10 days.
    Since 2008 is a leap year, 5 – 3- 2008 should be replaced by
    4 – 3 - 2008

Eg: Find the wrong one in the following series.
3.35, 5.00, 6.25, 7.40, 9.15

Sol: Here, each successive time differs by 1 hr 25 min.
    Therefore, 7.40 should be replaced by 7.50.

10. Numbers followed by their L.C.M. or H.C.F.:

Eg: 1, 2, 3, 6, 4, 5, 6, 60, 5, 6, 7, ….?

Sol: Let us divide this series into 3 parts.
    1st part = 1, 2, 3, 6
    2nd part = 4, 5, 6, 60
    3rd part = 5, 6, 7, …
    Clearly, it is understood that in 1st and 2nd parts fourth numbers 6, 60 are the L.C.M.'s of 1,2,3 and 4,5, 6 respectively.
    So, the next term in 3rd part = L.C.M. of 5, 6, 7 = 210

Eg: 8, 4, 4, 7, 8, 1, 3, 9, ?

Sol: Let us divide this series into 3 parts.
    1st part = 8, 4, 4
    2nd part = 7, 8, 1
    3rd part = 3, 9, …

Clearly, it is understood that in 1st and 2nd parts third number is H.C.F. of first two numbers.
So, next term in 3rd part = H.C.F. of 3, 9 = 3.

11. Numbers followed by their product:

Eg: 2, 3, 6, 18, 108, ?

Sol: Here, 2 x 3 = 6
     3 x 6 = 18
     6 x 18 = 108
  So, the next term will be 18 x 108 = 1944.

12. Digit Sum:

Eg: 12, 15, 21, 24, ….

Sol: 12 + 1 + 2 = 15
   15 + 1 + 5 = 21
   21 + 2 + 1 = 24
  So, the next term will be 24 + 2 + 4 = 30.

13. **Alpha – Numeric Series:** This kind of series involves the use of both the letters of the alphabet as well as the numbers.

- ∑   It is a two-line series.
- ∑   One line is a number series while the other line is an alphabet series.
- ∑   The terms of both the series follow the same pattern.
- ∑   One of these two series is completely known and we have to find the required number in the incomplete series.

Eg: 2, 8, 20, 44
   3, a, b, c
   Find a, b, c in the series.

Sol: In first line, the rule followed is x 2 + 4.
   We have to follow the same way for second line.
   3 x 2 + 4 = 10,
   10 x 2 + 4 = 24,
   24 x 2 + 4 = 52
   So, a = 10, b = 24 and c = 52.

EXERCISE – 1

Choose the missing term from the given options.

1. 1, 9, 25, ?, 81, 121
  a) 64   b) 36
  c) 49   d) 91

2. 5, 8, 13, 20, 29, ?
  a) 30   b) 38
  c) 32   d) 33

3. 10, 13, 19, 22, 28, 31, ?
  a) 37   b) 39
  c) 34   d) 38

4. 6, 12, 21, ?, 48
  a) 33   b) 38
  c) 40   d) 45

5. 2, 5, 9, 14, ?, 27
  a) 21   b) 20
  c) 25   d) 22

6. 6, 11, 21, 36, 56, ?
  a) 42   b) 51
  c) 91   d) 81

7. 10, 18, 28, 40, 54, 70, ?
  a) 88   b) 87
  c) 85   d) 86

8. 120, 99, ?, 63, 48, 35
  a) 82   b) 80
  c) 70   d) 63

9. 1, 6, 15, ?, 45, 66, 91
  a) 25   b) 26
  c) 27   d) 28

10. 2, 5, 9, 19, 37, ?
  a) 73   b) 75
  c) 76   d) 78

11. 4, 8, 28, 80, 244, ?
  a) 278   b) 428
  c) 628   d) 728

12. 1000, 1100, 9900, 10890, 9801, ?
   a) 10241   b) 10423
   c) 10781   d) 10929

13. 0, 6, 24, 60,120, 210, ?
   a) 240   b) 290
   c) 336   d) 504

14. 1, 4, 27, 16, ?, 36, 343
   a) 25   b) 87
   c) 120   d) 125

15. 4, 6, 12, 14, 28, 30, ?
   a) 32   b) 60
   c) 62   d) 64

16. 1, 3, 3, 6, 7, 9, ?, 12, 21
   a) 10   b) 11
   c) 12   d) 13

17. 3, 20, 63, 144, 275, ?
   a) 354   b) 468
   c) 548   d) 554

18. 120, 99, 80, 63, 48, ?
   a) 35   b) 38
   c) 39   d) 40

19. 589654237, 89654237, 8965423, 965423, ?
   a) 58965   b) 65423
   c) 89654   d) 96542

20. 6, 18, 3, 21, 7, 56, ?
   a) 8   b) 9
   c) 63   d) 64

21. 2, 15, 4, 12, 6, 7, ?, ?
   a) 8, 8   b) 8, 0
   c) 3, 8   d) None of these

22. 20, 20, 19, 16, 17, 13, 14, 11, ?, ?
   a) 10, 10   b) 10, 11
   c) 13, 14   d) 13, 16

23. 0, 2, 3, 5, 8, 10, 15, 17, 24, 26, ?
   a) 28   b) 30
   c) 32   d) 35

24. 13, 35, 57, 79, 911, ?
   a) 1110   b) 1112
   c) 1113   d) 1315

25. 625, 5, 125, 25, 25, ?, 5
   a) 5   b) 25
   c) 125   d) 625

EXERCISE – 2

Find the number which is not fit for the series.

1. 4, 10, 22, 46, 96, 190, 382
   a) 4   b) 10
   c) 96   d) 382

2. 380, 188, 92, 48, 20, 8, 2
   a) 8   b) 20
   c) 48   d) 188

3. 24576, 6144, 1536, 386, 96, 24
   a) 96   b) 386
   c) 1536   d) 6144

4. 1, 3, 10, 21, 64, 129, 356, 777
   a) 21   b) 129
   c) 10   d) 356

5. 3, 4, 10, 32, 136, 685, 4116
   a) 10   b) 32
   c) 136   d) 4116

6. 2, 6, 24, 96, 285, 568, 567
   a) 6   b) 24
   c) 285   d) 567

7. 4, 10, 22, 46, 96, 190, 382
   a) 25   b) 46
   c) 109   d) 221

8. 1, 3, 12, 25, 48
   a) 3   b) 12
   c) 25   d) 48

9. 93, 309, 434, 498, 521, 533
   a) 309   b) 434
   c) 498   d) 521

10. 3, 2, 8, 9, 13, 22, 18, 32, 23, 42
   a) 8   b) 9
   c) 13   d) 22

11. 3, 10, 27, 4, 16, 64, 5, 25, 125
   a) 3   b) 4
   c) 10   d) 27

12. 2, 5, 10, 17, 26, 37, 50, 64
   a) 17   b) 26

1

c) 37   d) 64

13. 121, 143, 165, 186, 209
   a) 143   b) 165
   c) 186   d) 209

14. 125, 126, 124, 123, 127, 129
   a) 126   b) 124
   c) 123   d) 129

15. 105, 85, 60, 30, 0, - 45, - 90
   a) 105   b) 160
   c) 0   d) – 45

16. 3, 4, 8, 17, 32, 58
   a) 17   b) 3
   c) 58   d) 32

17. 2, 5, 12, 17, 26, 37
   a) 17   b) 12
   c) 26   d) 5

18. 2, 4, 10, 32, 128, 652
   a) 128   b) 652
   c) 32   d) 4

19. 232, 213, 194, 173, 156, 137
   a) 213   b) 194
   c) 173   d) 156

20. 9, 7, 11, 9, 13, 12, 15, 13, 17
   a) 7   b) 13
   c) 12   d) 15

Directions: (21 – 25)

In each of the following series, two terms have been underlined. Mark your choice as
a – if both the underlined terms are correct.
b – if first one is correct and the second one is wrong.
c – if first one is wrong and the second one is correct.
d – if both the terms are wrong.

21. 4, 7, 9, 10, 13, 15, 16, 19

22. 2, 5, 12, 25, 41, 61
23. 3, 10, 29, 66, 127, 218

24. 4, 6, 10, 12, 16, 14, 22

25. 2, 3, 6, 11, 18, 30, 38

LETTER SERIES

Type – 1:

∑   A series of single, pairs of groups or combination of letters and numerals is given.
∑   The terms of the series form a certain pattern as regards the position of the letters in the English alphabet.
∑   You have to decipher the pattern and accordingly, find the missing term or wrong term in the given series.

Examples:

1. A, C, F, J, ?, ?

Sol: A (B) C, C (D, E) F, F (G, H, I) J, J (K, L, M, N) O, O (P, Q, R, S, T) U
      So, the next terms are O, U.

2.   AC, FH, KM, PR, ?

Sol: See all the first letters of the given series.
      A (B, C, D, E) F, F (G, H, I, J) K, K (L, M, N, O) P (Q, R, S, T) U
   Now, see all the second letters of the given series.
   C (D, E, F, G) H, H (I, J, K, L) M, M (N, O, P, Q) R (S, T, U, V) W
   So, the next term will be UW.

3.   BMO, EOQ, HQS, ?

Sol: See all the first letters of the given series.
   B (C, D) E, E (F, G) H, H (I, J) K

Now, see all the second letters of the given series.
M (N) O, O (P) Q, Q (R) <u>S</u>
   Now, see all the third letters of the given series.
    O (P) Q, Q (R) S, S (T) <u>U</u>
So, the next term will be KSU.

4.   ?, WFD, UHG, SKI, QOL

Sol: See all the first letters of the given series from last term.
    Q (R) S, S (T) U, U (V) W, W (X) <u>Y,</u>
Now, see all the second letters of the given series from first term.
<u>E</u> (-) F, F (G) H, H (I, J) K, K(L, M, N) O
   Now, see all the third letters of the given series.
   <u>B</u> (C) D, D (E, F) G, G (H) I, I (J, K) L
So, the missing term will be YEB.

Type – 2:

Alpha-Numeric Series: It is a jumbled combination of Alphabetic and Numeric series.

Examples:

1. Z1A, X2D, V6G, T21J, R88M, ?

Sol: The series formed by the numerals 1, 2, 6, 21, 88,… follow the pattern
     x 1 + 1, x 2 + 2, x 3 + 3, x 4 + 4, …
So, numeral in the desired term = 88 x 5 + 5 = <u>445</u>
Observe the first letters of all the terms.
Z (Y) X, X (W) V, V (U) T, T (S) R, R (Q) <u>P</u>
   Observe the second letters of all the terms.
   A (B, C) D, D (E, F) G, G (H, I) J, J (K, L) M, M (N, O) <u>P</u>
   So, the next term in the series will be P445P.

2. Find the odd man out from the following series.
   G4T, J10R, M20P, P43N

  Sol: Observe the pattern followed by the first letter in all the terms.
    G (H, I) J, J (K, L) M, M (N, O) P
    Observe the pattern followed by the second letter in all the terms.
    T (S) R, R (Q) P, P (O) N
    Observe the pattern followed by the numerals in all the terms.
   Here, if x 2 + 1 rule is satisfied then second term should be J9R.
   This rule can be applied to whole series except the second term.
   So, J10R is the odd man.

Type – 3:

Continuous Pattern Series:
  ∑   This type of series usually consists of a small letters which follow a certain pattern.
  ∑   But some letters will be missing from the series.
  ∑   These missing letters are then given in a proper sequence as one of the choices.
  ∑   You have to choose the correct alternative.

Example:

1.   aab _ aaa _ bba _
   1) baa   2) abb
   3) bab   4) aab   5) bbb

Sol:

Step 1: Fill the first blank space by 'b' so that you can have two a's followed by two b's.
Step 2: Fill the second blank space either by 'a' so that you have four a's followed by two b's or 'b' so that you have three a's followed by three b's.

Step 3: The last space must be filled by 'a'.
Step 4: So, now you can have two possible answers: 'baa' and 'bba'. But, only baa appears in the choices. Thus 1 is the answer.
Step 5: In case, you have both the possible answers in the choices, you have to chose the one that forms a more prominent pattern, which is aabb/aaabbb/aa. Thus, your answer should be 'bba'.

EXERCISE – 3

Choose the missing term from the given options.

1. C, Z, F, X, I, V, L, T, O, ?, ?
   a) O, P   b) P, Q
   c) R, R   d) S, R

2. Z, S, W, O, T, K, Q, G, ?, ?
   a) N, C   b) N, D
   c) O, C   d) O, D

3. GH, JL, NQ, SW, YD, ?
   a) EJ   b) FJ
   c) EL   d) FL

4. AZ, CX, FU, ?
   a) IR   b) IV
   c) JQ   d) KP

5. ajs, gpy, ?, sbk, yhq
   a) dmv   b) mve
   c) oua   d) qzi

6. PMT, OOS, NQR, MSQ, ?
   a) LUP   b) LVP
   c) LVR   d) LWP

7. BMX, DNW, FOU, ?
   a) GHO   b) GPS
   c) HPS   d) HPT

8. BZA, DYC, FXE, ?, JVI
   a) HUG   b) HWG
   c) UHG   d) WHG

9. ABD, DGK, HMS, MTB, SBL, ?
   a) XKW   b) ZAB
   c) ZKU   d) ZKW

10. DHL, PTX, BFJ, ?
   a) CGK   b) KOS
   c) NRV   d) RVZ

11. WFB, TGD, QHG, ?
   a) NIJ   b) NIK
   c) NJK   d) OIK

12. AZY, BUT, CXW, DWV, ?
   a) EVA   b) EVU
   c) VEU   d) VUE

13. UPI, ?, ODP, MBQ, IAW
   a) RHJ   b) SHJ
   c) SIJ   d) THK

14. DEF, HIJ, MNO, ?
   a) STU   b) RST
   c) RTB   d) SRQ

15. AYD, BVF, DRH, ?, KGL
   a) FMI   b) GMJ
   c) GLJ   d) HLK

16. EJO, TYD, INS, XCH, ?
   a) NRW   b) MRW
   c) MSX   d) NSX

17. A, CD, GHI, ?, UVWXY
   a) LMNO   b) MNO
   c) MNOP   d) NOPQ

18. AYBZC, DWEXF, GUHVI, JSKTL, ?
   a) MQORN   b)
MQNRO
   c) NQMOR   d)
QMONR

19. PERPENDICULAR, ERPENDICULA, RPENDICUL, ?
   a) PENDICUL   b) PENDIC
   c) ENDIC   d) None of these

20. ATTRIBUTION, TTRIBUTIO, RIBUTIO, IBUTI, ?
   a) IBU   b) UT
   c) UTI   d) BUT

21. D-4, F-6, H-8, J-10, ?, ?
   a) K-12, M-13   b) L-12, M-14
   c) L-12, N-14   d) K-12, M-14

22. 2B, 4C, 8E, 14H, ?
   a) 16K   b) 20I
   c) 20L   d) 22L

23. 3F, 6G, 11I, 18L, ?
   a) 21O   b) 25N
   c) 25P   d) 27P

24. W-144, ?, S-100, Q-81, O-64
   a) U-121   b) U-122
   c) V-121   d) V-128

25. 2Z5, 7Y7, 14X9, 23W11, 34V13, ?
   a) 27U24   b)
45U15
   c) 47U15   d)
47V15

26. N5V, K7T, ?, E14P, B19N
   a) H9R   b) H10Q
   c) H10R   d) I10R

2

27. Q1F, S2E, U6D, W21C, ?
 a) Y44B b) Y66B
 c) Y88B d) Z88B

28. 2A11, 4D13, 12G17, ?
 a) 36I19 b) 36J21
 c) 48J21 d) 48J23

29. J2Z, K4X, I7V, ?, H16R, M22P
 a) I11T b) L11S
 c) L12T d) L11T

30. Find the odd man out from 1CV, 5FU, 9IT, 15LS, 17OR
 a) 5FU b) 15LS
 c) 9IT d) 17OR

Odd Man out

In this oddman out section we need choose the word or pair thatdifferent from remaining words or pairs.
For Example:
1.a, apple b, mango c, watermelon d, guava
Explanation:
Here expect ' C' all of other are grow on trees. So watermelonis the the odd man here.

Exercise:-4

1. a.irran:asia b.candera:Australia
c.norway:europe d.algeria:aferica
Ans: (b)
explanation
In all other pairs ,second is continent to which the country denotedby the first belongs.

2. a.scapel: surgeon b. chisel:solder
c.awl:cobbler d.knife:chef
Ans:(b)
explanation:
In all other pairs ,first is tool used by the second.
3. a.mulder:proteins b.curie:redium
c.becquerel:radioactivity d.einstein:television
Ans: (d)
explanation:
In all other pairs ,first is name of o scientist who discovered the second.
4. a.sheep:bleat b.horse:neigh
c.ass:grunt d.owl:hoot
Ans: (c)
explanation:
In all other pairs second one is the sound made by the first.
5. a.door:bang b.piano:play
c.rain:ptler d.drum:be
Ans: (b)
explanation:
In all other pairs ,second one is sound made by the first.
6. a.chandragupta:mouryan b.bardar:mugal
c.krisha:kushan d.mahavira:jainism
Ans: (d)
Explanation:
In all other pairs ,second one is the name of the dynasty found by the first.
7. a.Ammeter:current b.hygrometer:presure
c.odometer:speed d.seismograph:earthquakes
Ans: (b)
explanation:
In all oter pairs ,first one is the instrument used to measure the second.
8. a.solder:tin b.haematite:iran
c.bauxite:aluminium d.malachite:copper

1

ans: (a)
Explanation:
In all other pairs ,first name of the metal of which the
second is an ore.on the other hand ,solder is an alloy.
9. a.whale:manmal b.salamander:insect
c.snake:reptile d.frog:pmphibiam
ans: (b)
Explanation:
In all other pairs ,first one is the animal which is belong
to second type.
10. a. profit:loss b. wise:foolish
c. virtue:vice d. seduce:attract
Ans: (d)
Explanation:
In all ther pairs ,the words are antonyms to each other.
11. a. onomatology:names b. nidology:nests
c. phycology:algae d. concology:shells
Ans: (d)
Explanation:
In all other pairs first one is the study of the second one.
12. a. aphid:paper b. mon th:wool
c. termite:wood d.locust:plant
Ans: (a)
Explanation:
In all other pair ,first on e the insect which damages
the second.
13. a. Deer: flesh b. mongoose:sanke
c. crow: carrion d. carne:fish
Ans: (a)
Explanation:
In all other pairs first one is feeds on the second.
14. a.cockroach:antenna b. lizard:flagella
c. hydra: tentacles d. plasmodium:cilia
Ans: (b)
Explanation:
In other pairs ,second is organ for movement of the first.
15. a. malaria:protozoa b. yeast:fungi
c. typhoid:bacteria d. polious
Ans: (c)
Explanation:
In all other pairs ,first diseasecaused by the second one.
16. a. Phyrohelimeter:radiation b.calorimeter:heat
c. planimeter :area d.barometer:humidity
Ans: (d)
Explanation:
In all other pairs ,first is the instrument to measure the
second.
17. a.chaff:wheat b.grit:pulses
c.grain:crop d. dregs:wine
Ans: (c)
Explanation:
In all other pairs ,first is the waste obtained from
the second.
18. a. Broom:swep b. spoon:feed
c. nut:crack d.saop:bathe
Ans: (c)
Explanation:
In all other pairs ,first one is used for purpose of second.
19. a. proteins:marasmus b. sodium:rickets
c. iodine:gotire d. iron:anaemia
Ans: (b)
Explanation:
In all other pairs .second one is the disease caused by the
deficiency of the the first.
20. a. apple:jam b. leamon:citrus
c. orange:squash d. tomato:pury
Ans: (b)
Explanation:

In all other pairs ,second one is the form in which the first
is preserved.
21. a. Cow:fodder b. crow:carrion
c. poultry:farm d. vulture:prey
Ans: (c)
Explanation:
In all other pairs ,second is the food over which
the first feeds.
22. a. fish:pisciculture b. birds:horticulture
c. bees:apiculture d. slikworm:sericulture
Ans: (b)
Explanation:
In all other pairs ,second one the name given to the
artifical rearing of the first.
23. a .backsmith:anvil b. carpenter:saw
c. barber:scissor d.goldsmith:ornaments
e. sculpter:chisel
Ans: (d)
Explanation:
In all other pairs,second is the tool used by the first.
24. a. cow:calf b. dog: bitch
c. lion:cub d. tortoise:turtle
e. insect:larva
Ans: (b)
Explanation:
In all other pairs second onis young of the first.
25. a. sprinkle:four b. happies:merrient
c. mist:fog d. sad:unhappy
Ans: (d)
Explanation:
In all other pairs ,second one is the higher intensity than
the first.
26. a. chia:beiling b. russia:moscow
c. japan:singapore d. spain: madrid
Ans: (c)
Explanation:
In all other pairs second one is the capital of the first.
27. a.daring:timid b. beatiful:pretty
c. clear:vague d. youth:adult
Ans: (b)
Explanation:
In all other pairs ,second one is the antonym of the first.
28. a.fish:shoal b. cow:herd
c. sheep:flock d. man:mod
Ans: (d)
Explanation:
In all other pairs ,secind one is the colllective group
of the first.
29. a.Lion:roar b. snake:hiss
c. bees:hum d. frog:bleat
Ans: (d)
Explanation:
In all other pairs second one is the noise produced by the
first.
30. a.Farmer:plough b. butcher:chopper
c. author: book d. jockey:tack
Ans: (c)
Explanation:
        In all other pairs ,second on is the tool used by first one.

ANALOGY

EXERCISE – 6

**Directions: In each of the following questions,there is a certain relationship
between two given words
on one side of : : and one word is given on another side of : :while another word is**

to be found from the given alternatives,having the same relation with this word as the words of the given pair bear. Choose the correct alternative.

1 . Moon : Satellite : : Earth :?
(A) Sun (B) Planet (C)Solar System (D) Asteroid
Ans: (B)
Explanation: Moon is a satellite and Earth is a Planet .

2 . Forecast : Future : : Regret :?
(A) Present (B) Atone (C)Past (D)Sins
Ans: (C)
Explanation: Forecast is for Future happenings and Regret is for past actions .

3. Influenza : Virus : : Typhoid : ?
(A) Bacillus (B)Parasite (C)Protozoa (D) Bacteria
Ans: (D)
Explanation: First is the disease caused by the second .

4. Fear : Threat : : Anger : ?
(A)Compulsion (B)Panic (C)Provocation (D)Force
Ans: (C)
Explanation: First arises from the second .

5. Melt : Liquid : : Freeze : ?
(A)Ice (B)Condense (C)Solid (D)Crystal
Ans: (C)
Explanation: First is the process of formation of the second .

6. Clock : Time : : Thermometer : ?
(A)Heat (B)Radiation (C)Energy (D)Temperature
Ans: (D)
Explanation: First is an instrument used to measure the second .

7. Muslim : Mosque : : Sikhs : ?
(A)Golden Temple (B)Medina (C)Fire Temple (D)Gurudwara
Ans: (D)
Explanation: Second is the pace of worship for the first
. 8. Paw : Cat : : Hoof : ?
(A)Horse (B)Lion (C)Lamb (D)Elephant
Ans: (A)
Explanation: First is the name given to the foot of the second .

9. Eye :Myopia : : Teeth : ?
(A)Pyorrhea (B)Cataract (C)Trachoma (D)Eczema
Ans: (A)
Explanation: Second is a disease of the first
.
10. Tractor : Trailer : : Horse : ?
(A)Stable (B)Cart (C)Saddle (D)Engine
Ans: (B)
Explanation: Second is pulled by the first
. 11. Scribble : Write : : Stammer : ?
(A)Walk (B)Play (C)Speak (D)Dance
Ans: (C)
Explanation: First is an improper form of the second
.
12. Flower : Bud : : Plant : ?
(A) Seed (B)Taste (C)Flower (D)Twig
Ans: (A)
Explanation: First develop from the second .

13. Errata : Books : : flaws:?
(A)Manuscripts (B)Metals (C)Speech (D)Charter
Ans: (B)
Explanation: Errata comprises from the books.Similarly, Flaws are the defects in the metals.

14. Gun : Bullet : : Chimney : ?
(A)Ground (B)House (C)Roof (D)Smoke
Ans: (D)
Explanation: Second comes out of the first .

15. Breeze : Cyclone : : Drizzle : ?
(A)earth quake (B)Storm (C)Flood (D)Down pour
Ans: (D)
Explanation: Second is more intense than the first .

16. Car : Garage : : Aeroplane : ?
(A)Port (B)Depot (C)Hanger (D)Harbour
Ans: (C)

Explanation: First is temporarily parked in the second .
17. Race : Fatigue : : Fast : ?
(A)Food (B)Appetite (C)Hunger (D)Weakness
Ans: (C)
Explanation: First causes the second .
18. Candle : Wax : : Paper :?
(A)Wood (B)Tree (C)Bamboo (D)Pulp
Ans: (D)
Explanation: First is made from the second
. 19. Acting : Theater : : Gambling : ?
(A)Casino (B)Club (C)Bar (D)Gymn
Ans: (A)
Explanation: Second is the place for performing the first .
20. Venerate : Worship : : Extol : ?
(A)Glorify (B)Homage (C)Compliment (D)Recommend
Ans: (A)
Explanation: The words in each pair are synonyms .
21. Water : Convection : : Space : ?
(A)Conduction (B)Transference (C)Vacuum (D)Radiation
Ans: (D)
Explanation: Second is the mode of transference of heat by the first .
22. Growth : Death : : Increase : ?
(A)Ease (B)decrease (C)Tease (D)Cease
Ans: (D)
Explanation: Second puts an end to the activity denoted by the first .
23. Oxygen : Burn : : Carbon dioxide : ?
(A)Isolate (B)Foam (C)Extinguish (D)Explode
Ans: (C)
Explanation: Oxygen helps in burnings while carbon dioxide extinguished fires .
24. Dog : Bark : : Goat : ?
(A)Bleat (B)Howl (C)Grunt (D)Bray
Ans: (A)
Explanation: Second is noise produced by the first .
25. Grain : Stock : : Stick : ?
(A)Heap (B)Bundle (C)Collection (D)String
Ans: (B)
Explanation: Second is collection of the first .
26. Nurture : Neglect : : Denigrate : ?
(A)Reveal (B)Extol(C)Recognize (D)Calumniate
Ans: (B)
Explanation: The words in each pair are antonyms .
27. Planet : Orbit : : Projectile : ?
(A)Trajectory (B)Track (C)Milky way (D)Path
Ans: (A)
Explanation: Second is the path traced by the first .
28. Genuine : Authentic : : Mirage : ?
(A)Image (B)Transpiration (C)Reflection (D)Illusion
Ans: (D)
Explanation: The words in each pair are synonyms .
29. Cobbler : Leather : : Carpenter : ?
(A)Furniture (B)Wood (C)Hammer (D)Chair
Ans: (B)
Explanation: Second is the raw material used by the first .
30. Rupee : Indian : : Yen : ?
(A)Turkey (B)Bangladesh (C)Pakistan (D)Japan
Ans: (D)
Explanation: Rupee is the currency of India . Similarly , Yen is the currency of Japan

EXERCISE -7

**Directions: There is a certain relation between two given words on one side of : :
and one word is given on another side of : : while another word is to be found from
the given alternatives, having the same relation with this word as the given pair has.
Select the best alternative.**
1. Dog : Rabies : : Mosquito : ?
(a)Plague (b)Death (c)Malaria (d)Sting
Ans: (c)
Exp: The bite of the first causes the second.

2. Man : Biography : : Nation : ?
(a)Leader (b)People (c)Geography (d)History
Ans: (d)
Exp: Second contains the story of the first.
3. Doctor : Diagnosis : : Judge : ?
(a)Court (b)Punishment (c)Lawyer (d)Judgement
Ans: (d)
Exp: The function of a doctor is to diagnose a disease and that of a judge is to
give judgement.
4. Horse : Jockey : : Car : ?
(a)Mechanic (b)Chauffeur (c)Steering (d)Brake
Ans: (b)
Exp: Horse is friven by a jockey .
Similarly,car is driven by a chauffeur.
5. Fog : Visibility : : AIDS : ?
(a)Health (b)Resistance (c)Virus (d)Death
Ans: (b)
Exp: First impairs the second.
6. Porcupine : Rodent : : Mildew :?
(a)Fungus (b)Germ (c)Insect (d)Pathogen
Ans: (a)
Exp: Porcupine is a rodent and mildew is a fungus.
7. Reading : Knowledge : : Work:?
(a)Experience (b)Engagement (c)Employment (d)Experiment
Ans: (a)
Exp: Second is acquired from the first.
8. Scrap : Food : : Lees : ?
(a)Bread (b)Tea (c)Wine (d)Rice
Ans: (c)
Exp: First is the left over of the second.
9. Conscience : Wrong : : Police : ?
(a)Thief (b)Law (c)Discipline (d)Crime
Ans: (d)
Exp: First prevents the second.
10. Cricket : Bat : : Hockey : ?
(a)Field (b)Stick (c)Player (d)Ball
Ans: (b)
Exp: In cricket ball is hit with a bat.
Similarly,in Hockey ,the ball is hit with a stick.
11. Glucose : Carbohydrate : : Soyabean : ? (a)Proteins (b)Vitamins (c)Minerals
(d)Legumes
Ans: (a)
Exp: Glucose is rich in carbohydrates and Soyabean is rich in proteins.
12. Jeopardy:Peril:: Jealousy:?
(a)Envy(b)Insecurity(c)Lust(d)Sin
Ans:(a)
Exp:First is a more intense form of the second.
13. Pigeon:Peace::White flag:?
(a)friendship(b)Victory(c)Surrender(d)War
Ans:(c)
Exp:Pigeon is a symbol of peace and white flag is a symbol of surrender.
14. Teheran:Iran::Beijing:?
(a)China(b)Japan(c)Turkey(d)Malaysia
Ans:(a)
Exp:Teheran is the capital of Iran and Beijing is the capital of China.
15. Enough:Excess:Sufficiency:?
(a)Adequacy(b)Surplus(c)competency(d)Inport
Ans:(b)
Exp:Sufficiency indicates 'enough' and Surplus indicates 'excess.
16. Squint:Eye::Squeeze:?
(a)Tongue(b)Cloth(c)Throat(d)Hand
Ans:(d)
Exp:To squint is to constrict the eyes and squeeze is to constrict the hands.
17. Hermit:Solitude::Intruder:?
(a)Thief(b)Privacy(c)Burglar(d)Alm
Ans:(c)
Exp:The words in each pair are synonyms.
18. Tea:Cup::Tobacco:?

(a)Leaves(b)Hookah(c)Toxin(d)Cheroot
Ans:(d)
Exp:Tea is contained in the cup.
Tobacco is contained cheroot.
19. Market:Demand::Farming:?
(a)Farmer (b)Monsoons(c)Foodgrain(d)Supply
Ans:(b)
Exp:Market depends on Demand and Farming depends on Monsoons.
20. Skirmush:War::Disease:?
(a)Medicine(b)Patient(c)Epidemic(d)Infection
Ans:(c)
Exp:Second is a more intense form of the first.

CODING – DECODING

Code: It is a system of 'signals'.

Coding: It is a method of transmitting a message between the sender and the receiver without a third person knowing it.

1. Letter Coding: In this, the letters in a word are replaced by certain other letters according to a specific rule to form its code.

Eg: In a certain code ROAST is written as PQYUR, then how is SLOPPY coded in that language.

    1) MRNAQN   2) NRMNQA
    3) RANNMQ   4) QNMRNA

Sol:

So, Option 4 is the answer.
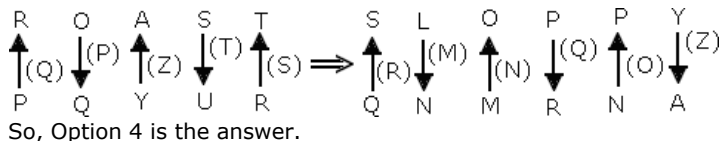
Note: This type of letter coding is also known as 'Rule Coding'.

Decoding: It is a method of finding the word by analyzing the given code.

Eg: If the word ROAD is coded as WTFI, what could be the word coded as GJFY?

    1) BETA   2) BEAT
    3) NEAT   4) LATE

Sol:

So, Option 2 is the answer.
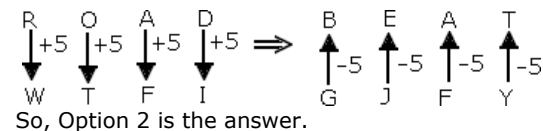
2. Direct – Coding: If some particular letters are made codes for particular letters, without there being any set pattern then it is called Direct – Coding.

Eg: If EARTH is coded as QPMZS in a certain language then how is HEART coded in that language?

    1) SQPZM   2) SQMPZ
    3) SQPMZ   4) SPQZM

Sol: It is clear that HEART consists of same letters as EARTH.
    Four choices given also consist of the same letter codes as the code for EARTH.
    This indicates that it is a problem based on direct-coding.
    Thus, we have:

Letter	E	A	R	T	H

Code	Q	P	M	Z	S

So, the HEART becomes SQPMZ. So, the answer is 3.

3. Number or Symbol Coding: In this, either numerical codes are assigned to a word or alphabetical codes are assigned to the numbers.

Case 1: When numerical or symbol codes are assigned to words.

Eg: 1. If E = 5, PEN = 35, then SAGE = ?

   1) 27   2) 32

   3) 29   4) 36

Sol: If A = 1, B = 2, ..., Z = 26, then we have

     PEN = P + E + N = 16 + 5 + 14 = 35

    Similarly, SAGE = 19 + 1 + 7 + 5 = 32

    Hence, 2 is the answer.

Eg: 2. If RED is coded as 6720, then how would GREEN be coded?

      1) 1677199   2) 16717209

      3) 1677209   4) 9207716

Sol:

      RED → DER → 4-5-18 (Values for the letters) → 6-7-20 (Adding 2 to each)

      GREEN → NEERG → 14-5-5-18-7 (Values for the letters) → 16-7-7-20-9

                                                            (Adding 2 to each)

      Hence, 3 is the answer.

Note:

1. The letters and numbers are correlated to each other in no other way except in relation to the position of the letters in the English alphabet. So, either this relation holds or the coding has to be done as per a set of given rules.

2. In all other cases, the question is one of direct-coding.

Case 2: When alphabetical codes are assigned to numbers.

Observe the following digits and their codes along with the exceptions I and II and choose the correct option.

Digit	3	8	0	7	4	6	9	2	5	1
Code	H	$	R	A	M	%	L	K	E	έ

Exception – I: If a number begins and ends with a non-zero odd digit, then the first and the last digits are to be coded as Y and # respectively.

Exception – II: If a number begins and ends with an even digit (including zero), then the first and the last digits are to be coded as β and X respectively.

1. What will be the code for 173548?

1) έAHEK$ 2) έAREM$

3) έAHEM$ 4) έAHME$

Sol: 1 is coded as έ, 7 as A, 3 as H, 5 as E, 4 as M, 8 as $.

    So, the code for 173548 is έAHEM$.

    Answer is 3.

2. What does R%LAKέ represent?

1) 069725   2) 697210

3) 069751   4) 069721

Sol: The codes for 0, 6, 9, 7, 2 and 1 are R, %, L, A, K and έ respectively.

    So, R%LAKέ represents 069721.

    Answer is 4.

3. What will be the code for 764981?

1) A5ML$ έ   2) Y%ML$έ

3) Y%ML$#   4) A%ML$#

Sol: As the number begins and ends with an odd digit, so 7 shall be coded as Y and 1 as #.
The codes for 6, 4, 9, 8 are %, M, L, $ respectively.
So, the required code is Y%ML$#.
Answer is 3.

4. What will be the code for 278140?
1) βA$ɛMR
2) βA$ɛMX
3) KA$ɛMR
4) YA$ɛM#

Sol: As 278140 have even digits at the first and last place, so 2 shall be coded as β, and 0 as X.
The codes for 7, 8, 1, 4 are A, $, ɛ, M respectively.
So, the required code is βA$ɛMX.
Answer is 2.

4. Substitution: Here some particular words are assigned certain substituted names. Then a question is asked which should be answered in the substituted code language.
Eg: If 'diamond' is called 'silver', 'silver' is called gold', 'gold' is called 'emerald' and 'emerald' is called 'ruby', which is the costliest jewel?
1) Diamond
2) Gold
3) Silver
4) Emerald
5) Ruby

Sol: We know that Diamond is Costliest among all the jewels given.
But, diamond is called silver.
So, silver is the costliest jewel. Answer is 3.

5. Deciphering Message Word Codes:

∑   Here, you are given with some message in the coded language and the code for a particular word or message is asked.
∑   To analyze such codes, any two messages bearing a common word are picked up.
∑   The common code-word will thus represent that word.
∑   Proceeding similarly by picking up all possible combinations of two, the entire message can be decoded and the codes for individual words found.

Eg: In a certain language, 'rbm std bro pus' means 'the cat is beautiful', 'tnh pus std' means 'the dog is brown', 'pus dim bro pus cus' means 'the dog has the cat'. What is code for 'has'?
1) pus
2) bro
3) dim
4) cus
5) std

Sol:
∑   In the 3rd statement, the code-word 'pus' occurs twice and the word 'the' also occurs twice.
∑   So, the code for 'the' is pus.
∑   In the 1st and 3rd statements, the common code-word 'pus' stands for 'the'.
∑   So, the other common code-word 'bro' stands for the other common word 'cat'.
∑   Similarly, in the 2nd and 3rd statements, the common code-word 'dim' stands for the common word 'dog'
∑   Thus, in the 3rd statement, the remaining code-word i.e. 'cus' stands for the 'dog'.
∑   Answer is 4.

6. Deciphering Number and Symbol Codes for Messages:

∑   Here, a few groups of numbers or symbols, each coding a certain message, are given.
∑   Through a comparison of the given coded messages, taking two at a time, you are required to find the number or symbol code for each word and then formulate the code for the given message.
Eg: If '253' means 'books are old', '546' means 'man is old' and '378' means 'buy good books'. What stands for 'are' in that code?
1) 2
2) 4
3) 5
4) 6

Sol:
∑   In 1st and 2nd Statements, the common digit is 5 and the common word is 'old'.
∑   So, '5' means 'old'.
∑   In the 1st and 3rd Statements, the common code is '3' and the common word is 'books'.
∑   So, '3' means 'books'.
∑   Thus, in the 1st Statement, '2' means 'are'.
∑   Answer is 1.

EXERCISE - 8

1. If in a certain language GAMBLE is coded as FBLCKF, how is FLOWER coded in that code?
    a) GKPVFQ
    b) EMNXDS
    c) GMPVDS
    d) HNQYGT

2. If CHAMPION is coded as HCMAIPNO, how is NEGATIVE coded?
    a) ENAGITEN
    b) NEAGVEIT
    c) MGAETIVE
    d) EGAITEVN

3. If HUNTER is coded as UHNTRE, how is MANAGE coded?
    a) MAANGE
    b) MNAAEG
    c) AMNAEG
    d) EGNAAM

4. If CAB is coded as WUV, how is DEAF coded?
    a) XYUZ
    b) UWYV
    c) XWUY
    d) UYXZ

5. If FOUGHT is coded as EQRKCZ, how is MALE coded?
    a) LCII
    b) NZMD
    c) KCMI
    d) NBIF

6. If CALENDER is coded as CLANAEDR, how is CIRCULAR coded?
    a) ICCRLURA
    b) CRIUCALR
    c) CRIUCLRA
    d) ICRCLUAR

7. If EXPLAINING is coded as PXEALNIGNI, how is PRODUCED coded?
    a) ORPBUDEC
    b) ROPUDECD
    c) ORPUDECD
    d) DORPDECU

8. If REMOTE is coded as ROTEME, which word would be coded as PNIICC?
    a) NPIICC
    b) PICCIN
    c) PINCIC
    d) PICNIC

9. If TRIANGLE is coded as SQHZMFKD, which word would be coded as DWZLOKD?
    a) EXAMPLE
    b) FIGMENT
    c) DISMISS
    d) DISJOIN

10. If MACHINE is coded as LBBIHOD, which word would be coded as SLTMFNB?
    a) RKSLEMA
    b) TKULGMC
    c) RMSNEOA
    d) TMUNGOC

11. If TWENTY is coded as 863985, how is TWELVE coded?
    a) 863203
    b) 863584
    c) 863903
    d) 863063

12. If STEADY is coded as 931785 and ENTRY is coded as 12345, how is SEDATE coded?
    a) 918731
    b) 954185
    c) 814195
    d) 614781

13. If MORALE is coded as 296137 and CHARCOAL is coded as 45164913, how is ALLOCHRE coded?
    a) 19943785
    b) 13394567
    c) 16693895
    d) 13396875

14. If NAKED is coded as 84123 and MISTAKE is coded as 9765412, how is STAIN coded?
    a) 98175   b) 89483
    c) 68194   d) 65478

15. If 35796 is coded as 44887, how is 46823 coded?
    a) 57914   b) 55914
    c) 55934   d) 55714

16. If 13479 is coded as AQFJL and 5268 is coded as DMPN, how is 396824 coded?
    a) 57914   b) 55914
    c) 55934   d) 55714

17. If 15789 is coded as XTZAL and 2346 is coded as NPSU, how is 23549 coded?
    a) NPTUL   b) PNTSL
    c) NPTSL   d) NBTSL

18. If sand is called air, air is called plateau, plateau is called well, well is called island and island is called sky then from where will Rita draw water?
    a) Well   b) Island
    c) Sky   d) Air

19. If black means white, white means green, green means pink, pink means blue, blue means red, red means orange, orange means violet, then what is the colour of the sky?
    a) Orange   b) Pink
    c) Red   d) Blue

20. If lead is called stick, stick is called nib, nib is called needle, needle is called rope and rope is called thread, what will be fitted in a pen to write with it?
    a) Stick   b) Lead
    c) Needle   d) Nib

21. If 'pit nae tom' means 'apple is green'; 'uae ho tap' means 'green and white' and 'ho tom ka' means 'shirt is white'; which of the following represents apple in that language
    a) nae   b) tom
    c) pit   d) ho

22. If 'pre nat bis' means 'smoking is harmful'; 'vog dor nat' means 'avoid harmful habit' and 'dor bis yel' means 'please avoid smoking'; which of the following means 'habit' in that language.
    a) vog   b) nat
    c) dor   d) bis

23. If 'pul to nop' means 'fruit is good'; 'nop ko tir' means 'tree is tall' and 'pul ho sop' means eat good food; which of the following means 'fruit' in that language.
    a) pul   b) ta
    c) nap   d) Data Insufficient

24. If 467 means 'leaves are green'; 485 means 'green is good' and 639 means 'they are playing'; which digit stands for 'leaves' in that code?
    a) 4   b) 6
    c) 7   d) 3

25. If 256 means 'Red colour chalk'; 589 means 'green colour flower' and 245 means 'white colour chalk'; which digit stands for 'white' in that code?
    a) 2   b) 4
    c) 5   d) Cannot be determined

26. If REQUEST is coded as S2R52TU, how is ACID coded?
    a) 1394   b) IC94
    c) BDJE   d) None of these

27. If A = 1, B = 3 and so on, find the total value of the letters of the word INDIAN.
    a) 86   b) 88
    c) 89   d) 96

28. If DEAL is coded as 4-5-1-12, how is LADY coded?
    a) 12-4-1-25   b) 12-1-4-25

c) 10-1-4-23   d) 12-1-4-22

29. If A = 2, M = 26 and Z = 52, then BET = ?
    a) 44   b) 54
    c) 64   d) 72

30. If A = 26, SUN = 27, then CAT = ?
    a) 24   b) 27
    c) 57   d) 58

31. If BAT = 23 and CAT = 24, how is BALL coded?
    a) 27   b) 28
    c) 32   d) 120

32. If GO = 32, SHE = 49, then SOME = ?
    a) 56   b) 58
    c) 62   d) 64

33. If AT = 20, BAT = 40, then CAT = ?
    a) 30   b) 50
    c) 60   d) 70

34. If ZIP = 198 and ZAP = 246, then VIP = ?
    a) 174   b) 222
    c) 888   d) 990

35. If DEER = 1225 and HIGH = 5645, then HEEL = ?
    a) 2328   b) 3449
    c) 4337   d) 5229

Directions: (36 – 40)

By observing the following table which consists of Numbers and their respective letter codes, choose the correct alternatives.

Number	5	1	3	0	2	4	8	7	6	9
Code	X	L	M	P	D	B	E	F	K	J

36. 1723846
    a) LFMEKB   b) LMFEBK
    c) LFMEBK   d) LFEMBK

37. 862941
    a) EDKJBL   b) EKDJLB
    c) EKJDBL   d) EKDJBL

38. 430675
    a) BMKPFX   b) BMPKFX
    c) BMPKXF   d) BMPFKX

39. 790853
    a) FJPEXM   b) FPJEXM
    c) FJPEMX   d) FPJEMX

40. 901273
    a) JPLDFM   b) JPDLFM
    c) JLPDFM   d) JPLDMF

DIRECTIONS

Directions: There are 4 directions namely
1. East (E)
2. West (W)
3. North (N)
4. South (S)

Cardinal Directions: There are 4 Cardinal Directions namely
1. North East (NE)
2. North West (NW)
3. South East (SE)
4. South West (SW)

Note: The following figure shows the four main directions and four cardinal directions which helps you to know the directions.

Examples:

1. John faces towards North. Turning to his right, he walks 25 m. He then turns to his left and walks 25 m. He then turns to his left and walks 30 m. Next, he moves 25 m to his right. He then turns to his right again and walks 55 m. Finally, he turns to the right and moves 40 m. In which direction is he now from his starting point?

   1) South   2) South-East
   3) North-West   4) South-West

Sol:
   ∑ First draw the diagram as per the given data.

   ∑ John turns towards right from North.
   ∑ So, he walks 25 m towards east up to B, turns left and moves 30 m up to C, turns right and goes 25 m up to D.
   ∑ At D, he turns to right towards the south and walks 55 m up to E.
   ∑ Next, he again turns to right and walks 40 m up to F, which his final position.
   ∑ F is to the South-East of A.
   ∑ So, he is now facing South-East from his starting point.

∑ Hence, answer is 4.

2. On Sunday, Ravi started from home on a bike 8 km south, turned right and traveled 5 km and turned right and again traveled 5 km and turned left and traveled 8 km. How many km will he have to travel to reach his home?
    1) 12 km   2) 13 km
    3) 14 km   4) None of these

Sol:
∑   First draw the diagram as per the given data.

∑   It is clear that Ravi started from home at P, moved 8 km south up to Q, turned right and moved 5 km up to R, turned right again and moved 10 km up to S and finally turned left and moved 8 km up to T.
∑   Thus, his distance from starting
        position P = PT = PS + ST = QR + ST = (5 + 8) km = 13 km
∑   So, 2 is the answer.

EXERCISE - 9

1. Anitha walks 3 miles towards north and then turns right and walks 4 miles. Find how far is she from her starting point.
    a) 5 miles away   b) 6 miles away
    c) 4 miles away   d) 3 miles away
2. Krishna moving towards east and turns left walks for a while and then again turns left walks for a while

    and turns 45° to his right. Which direction he is facing now?
    a) South-West   b) North-East
    c) North-West   d) South-East
3. Sanjay walks 20 m towards north. He then turns left and walks 40 m and again he turns left and walks 20 m. Then he turns to his right and walks 50 m. How far is he from his starting point?
    a) 90 m away   b) 180 m away
    c) 100 m away   d) None of these

4. Vishnu driving towards North-East. After driving 25 km he turns 45° to his left and drives for 8 km. Then he turns to his right and drives 12 km. How far is he from his starting point?
    a) 20 km away   b) 45 km away
    c) 38 km away   d) None of these
5. A man is moving towards east and walks for 3 km then turns to his left and walks 4 km. Then he again moves towards east and walks 4 km. Then he again turns to his left and walks for 3 km. Find how far he is from his starting point?
    a) 5 km   b) 14 km
    c) 12 km   d) 10 km

6. A man is facing towards west and turns through 45° clockwise, again 180° clockwise and then turns

    through 270° anti clockwise. In which direction he is facing now?
    a) West   b) North-West
    c) South   d) South-West

7. You are facing east. You turn 100° in the clockwise direction and then 145° in the anti clockwise direction. Which direction are you facing now?
    a) East   b) North-East
    c) North   d) South-West
8. A river flows west to east and on the way turns left and go in a semi-circle round a hillock, and then turns left at right angles. In which direction is the river finally flowing?
    a) West   b) East
    c) North   d) South
9. I go north, turn right, then right again and then go to the left. In which direction I am facing now?
    a) North   b) South
    c) East   d) West

10. Kiran is standing at the centre of a circular field. She goes down south to the edge of the field and then turning left she walk along the boundary of the field equal to three-eighths of its length. Then she turns west and go right across to the opposite point on the boundary. In which direction she is from the staring point?
    a) North-West   b) North
    c) South-West   d) West

11. A boy starting from a point and walks towards south-east and walks for 25 m then turns to his right and walks for 25 m. Again he turns to his right and walks for the same distance and again he turns to this right and walks for 25 m. How far is he from his starting point and which direction he is facing?
    a) At Starting point facing North-East
    b) At Starting point facing South-East
    c) At Ending point facing North-West
    d) At Ending point facing North-East

12. Two persons staring from the same point and moving in opposite directions. One is moving towards north and run for 8 miles and the other runs for 15 miles. Person moving in the north direction turn to his right and runs for 15 miles. The other person turns to his right and walks for 8 miles. Find the distance between the two persons?

    a) 23 miles   b) $23\sqrt{2}$ miles

    c) $3\sqrt{2}$ miles   d) None of these

13. A is to the North of B and B is to the west of C then A is in which direction to C?
    a) South-West   b) North-East
    c) North-West   d) South-East

14. Kamal is South-West of Sujan and East of Kumar. Kumar is North of Krishna. Then Sujan is in which direction to Krishna?
    a) South-West   b) North-East
    c) North-West   d) South-East

15. Madhav walks 10 km 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 w.r.t. the starting point?
    a) 5 km West   b) 5 km North-East
    c) 7 km East   d) 7 km West

16. Ravi walks a distance of 3 km towards North, then turns to his left and walks for 2 km. He again turns left and walks for 3 km. At this point he turns to his left and walks for 3 km. How many km is he from the starting point?
    a) 1 km   b) 2 km
    c) 3 km   d) 5 km

17. Naresh walked 40 m towards North, took a left turn and walked 20 m. He again took a left turn and walked 40 m. How far and in which direction is he from the starting point?
    a) 20 m East   b) 20 m North
    c) 100 m South   d) None of these

18. Navitha walks 14 m towards west, then turns to her right and walks 14 m and then turns to her left and walks 10 m. Again turning to her left she walks 14 m. What is the shortest distance (in m) between her starting point and the current position?
    a) 10 m   b) 24 m
    c) 28 m   d) 38 m

19. Ratan leaves for his office from his house. He walks towards East. After moving a distance of 20 m, he turns South and walks 10 m. Then he walks 35 m towards the West and further 5 m towards the North. He then turns towards East and walks 15 m. What is the straight distance (in m) between his initial and final positions?
    a) 0 m   b) 5 m
    c) Cannot be determined d) None of these

20. A lizard runs 20' towards East and turns to right, runs 10' and turns to right, runs 9' and again turns to left, runs 5' and then turns to left, runs 12' and finally turns to left and runs 6'. Now, which direction is the rat facing?
    a) East   b) West
    c) North   d) South

21. Sunny walked 30 m towards East, took a right turn and walked 40 m. Then he took a left turn and walked 30 m. In which direction is he now from the starting point?
    a) North-East   b) East
    c) South-East   d) South

22. Ram starts at point A, walks straight to point B which is 4 ft away. He turns left at 90° and walks to C which is 4 ft away, turns 90° right and goes 3 ft to P, turns 90° right and walks 1 ft to Q, turns left at

90° and goes to R, which is 1 ft away and once again turns 90° right and goes to S, 3 ft away. What is the distance between A and S?

a) 4 ft   b) 5 ft

c) 7 ft   d) 8 ft

23. Sham went to meet his aunt from his home 5 km away in the North-East direction. From there he came 4 km in south direction to meet his grand father. How far away and in which direction is he now?

a) 3 km in the North   b) 3 km in the East

c) 4 km in the East   d) 4 km in the West

24. Arjun starts from a point A travels 3 km east to B and then turns left and travels thrice the distance to reach C. He again turns left and travels five times the distance he covered between A and B and reaches his destination D. The shortest distance between the starting point and the destination is

a) 12 km   b) 15 km

c) 16 km   d) 18 km

25. Pavan walks 10 m towards South. Turning to the left, he walks 20 m and then moves to his right. After moving a distance of 20 m, he turns to the right and walks 20 m. Finally, he turns to the right and moves a distance of 10 m. How far and in which direction is he from the starting point?

a) 10 m North   b) 20 m South

c) 20 m North   d) 10 m South

26. Babu is facing towards South. He turned right and walked 20 m. Then turned right again and walked 10 m. Then turned left and walked 10 m and then turning right walked 20 m. Then turned right again walked 60 m. In what direction is he from the starting point?

a) North   b) North-West

c) East   d) North-East

27. Venu walks 1 km towards East and then turns to South and Walks 5 km. Again he turns to East and walks 2 km, after this he turns to North and walks 9 k. Now, how far is he from the starting point?

a) 3 km   b) 4 km

c) 5 km   d) 7 km

28. Uday turns left and goes another 20 m after going 50 m to the South of his house. Then, turning to the North, he goes 30 m and then starts walking to his house. In which direction is he walking now?

a) North-West   b) North

c) South-East   d) East

29. Bobby walks 10 m in front and 10 m to the right. Then every time turning to his left, he walks 5, 15 and 15 m respectively. How far is he now from his starting point?

a) 5 m   b) 10 m

c) 20 m   d) 23 m

30. A clock is so placed that at 12 noon its minute hand points towards north-east. In which direction does its hour hand point at 1.30 P.M.?

a) East   b) West

c) North   d) South

BLOOD RELATIONS

The following table helps you to determine the correct relation in the given problems.

Mother's or father's son	Brother

Mother's or father's daughter	Sister
Mother's brother	Maternal Uncle
Father's brother	Paternal Uncle
Mother's sister	Maternal Ant
Father's sister	Paternal Aunt
Mother's or father's mother	Grandmother
Mother's or father's father	Grandfather
Son's wife	Daughter-in-law
Daughter's husband	Son-in-law
Husband's or wife's sister	Sister-in-law
Husband's or wife's brother	Brother-in-law
Brother's son	Nephew
Brother's daughter	Niece
Sister's husband	Brother-in-law
Brother's wife	Sister-in-law
Uncle or Aunt's son or daughter	Cousin
Grandson's or Granddaughter's daughter	Great grand daughter

1. Jumbled Up Descriptions:

∑   In this type of problems, you are given a round about description in the form small relationships.
∑   You have to analyze the whole chain of relations and decode the direct relationship between the persons concerned.

Example:

1. Pointing towards Kavitha, Chandu said, "I am the only son of her mother' son". How is Kavitha related to Chandu?

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

  Sol: Kavitha's mother's son ⟳ Kavitha's brother

    So, Chandu is the son of Kavitha's brother or Kavitha is Chandu's Aunt.

2. Relation Puzzle:

∑   In this type of problems, mutual blood relations of more than two persons are mentioned.
∑   You have to analyze the given information, work out a family chart and then answer the question.
Example: Read the following relations carefully, analyze and the answer the following questions.

1. Rana is son of Anil's father's sister. Sunil is son of Deepa who is the mother of George and grandmother of Anil. Amit is father of Tina and grandfather of Rana. Deepa is wife of Amit.

    a)   How is Rana related to Deepa?
    1) Nephew   2) Grandson
    3) Son   4) Data inadequate

  Sol: Deepa is wife of Amit and Amit is grandfather of Rana.
    So, Rana is Deepa's grandson.
     2 is the Answer.

    b)   How is George's wife related to Teena?
    1) Niece   2) Sister
    3) Sister-in-law   4) Data inadequate

  Sol: Tina is Amit's daughter, George is Deepa's son and Amit is Deepa's husband.
  So, George is Tina's brother and his wife is Tina's sister-in-law.
  3 is the answer.

3. Coded Relations:

∑   In this type of problems, the relationships are represented by certain specific codes or symbols.
∑   You have to analyze some given codes to determine the relationship between a set of persons or you have to express a given relationship in the coded format.

Example: Read the following information carefully and answer the following.

1. 'A X B' means 'A is the brother of B'.
2. 'A ÷ B' means 'B is the father of A'.
3. 'A + B' means 'A is the sister of B'.
4. 'A - B' means 'A is the mother of B'.

a)   Which of the following means 'Q is the paternal uncle of K'?
1) K X P ÷ M X Q   2) K X B ÷ N X Q X D
3) Q X L ÷ R X K   4) Both 1 and 2

Sol:
∑   **Option 1:** K X P ÷ M X Q means 'K is the brother of P whose father is M, who is the brother of Q'.
∑   Thus, K is the child of M, who is the brother of Q.
∑   So, Q may be the paternal uncle or aunt of K.
∑   **Option 2:** K X B ÷ N X Q X D means 'K is the brother of B, whose father is N, who is the brother of Q, who in turn is the brother of D'.
∑   Thus, N is the father of K, and Q is the brother of N.
∑   So, Q is the paternal uncle of K.
∑   **Option 3:** Q X L ÷ R X K means 'Q' is the brother of L whose father is R, who is the brother of K'.
∑   Thus, R is the father of Q and R is the brother of K.
∑   So, K may be the paternal uncle or aunt of Q.
∑   Thus, only Option 2 represents the correct relation.

b)   Which of the following statements are superfluous to answer the above question?
1) 1 only   2) Only 3 and 4
3) 3 only   4) 2 only

Sol: Here, it is very clear that only 1 and 2 are used to answer the above question, while 3 and 4 are superfluous.
      Hence, the answer is 2.

EXERCISE – 10

1)   Pointing a man, a woman said, "His mother is the only daughter of my mother". How is the woman related to man?
              a) Mother   b) Grandmother
              c) Sister   d) None

2)   Pointing a man, a woman said, "His mother is the daughter of my mother's only daughter". How is the man related to woman?
              a) Son   b) Father
              c) Brother   d) Grandson

3)   Pointing a Woman, Madav said, "I'm the only son of his father's son". How   Woman is related to Madav?
              a) Nephew   b) Uncle
              c) Either father or uncle   d) Father

4)   Mallika's mother's husband's mother's granddaughter related to Mallika?
              a) Daughter   b) aunt
              c) Sister   d) none

5)   How is my mother's mother-in-law's only son related to me?
              a) Father   b) Uncle
              c) Grandfather   d) none

6)   How is my father's brother's only sibling related to me?
              a) Brother   b) cousin
              c) Father   d) uncle

Directions: (7 – 10)

∑   Five persons are sitting around dining table K, L, M, N and O.
∑   K is the mother of M, who is wife of O.
∑   N is the brother of K and L is the husband of K.

7) How is L related to O?
   a) Father   b) Mother-in- law
   c) Brother-in -law   d) Father-in- law

8) How is K related to O?
   a) Sister   b) Mother
   c) Mother-in- law   d) Brother-in –law

9) How is N related to L?
   a) Son   b) cousin
   c) Brother   d) Brother-in-law

10) How is M related to L?
   a) Aunt   b) niece
   c) Daughter   d) Daughter-in-law

Directions: (11 – 17)

∑   Seeta, Rajender and Surinder are children of Mr and Mrs. Agarwal.
∑   Renu, Raja and Sunil are children of Mrs. and Mr Malhotra
∑   Sunil and Seeta are married couple and Ashok and Sanjay are their children.
∑   Getta and Rakesh are children of Mr and Mrs. Gupta.
∑   Geeta is married to Surender and has three children named Rita, Sona and Raju.

11) How is Rajender related to Raju?
   a) Brother   b) Uncle
   c) Brother-in-law   d) Cousin

12) How is Rajender related to Ashok?
   a) Brother-in-law   b) Maternal Uncle
   c) Uncle   d) Cousin

13) How is Rakesh related to Sunder?
   a) Brother   b) Uncle
   c) Brother-in-law   d) Cousin

14) What is surname of Sanjay?
   a) Malhotra   b) Gupta
   c) Agarwal   d) None

15) How is Rakesh related to Rita?
   a) Brother   b) Uncle
   c) Brother-in-law   d) Maternal Uncle

16) Renu is Surname is-----?
   a) Sister   b) Sister-in –law
   c) Cousin   d) Aunty

17) Raja's surname is ------?
   a) Gupta's   b) Malhotra
   c) Agarwal   d) None

Directions: (18 – 22)

Use the relations defined below to these questions.

A * B means A is sister of T
A + B means A is brother of T
A - B means A is son of T
A / B means A is daughter of B
A = B means A is father of T
A X B means A is mother of T

18) Which of the following means A is the uncle of B?

a) B + D x A   b) A + C = B

c) B + D / A   d) A + D / B

19) Which of the following means X is the grandfather of Y?
- a) X = Z + Y   b) Z x Y
- c) Both (a) and (b)   d) Neither (a) nor (b)

20) Which of the following means P is the mother of Q and R?
- a) Q * R/P   b) Q/ P x R
- c) Q + P = R   d) None

21) Which of the following means D is son of A?
- a) E= D + A   b) D - E +A
- c) E x D –A   d) P * R + Q

22) Which of the following means P is the sister of Q?
- a) Q + R –   b) Q * R-P
- c) P= Q + R   d) P * R + Q

Directions: **(23 – 27)**

Use the relations defined below to these questions.
- ∑   P ( ) Q means P is mother of Q
- ∑   P of Q means P is father of Q
- ∑   P / Q means P is sister of Q
- ∑   P x Q means P is brother of Q
- ∑   P + Q means P is daughter of Q
- ∑   P - Q means P is son of Q

23) If T – P / Q is given, then how is Q related to T?
- a) Nephew   b) brother
- c) aunt   d) None of these

24) What does L ( ) M / N means
- a) M is the sister of N   b) N is the sister of M
- c) M is the niece of N   d) Both (a) and (b)

25) If P of Q + R then which of the following is true?
- a) P and R are sister's to each other.   b) P is the mother of Q
- c) R is the sister of P   d) Q is the mother of R

26) If Y x Z ( ) K is given, how is Z related to K?
- a) Z and Y are brother's to each other   b) K is the aunt of Y
- c) Z is the son of K   d) None of these

27) If S x J + T is given then which of the following is true?
- a) T is the aunt of S   b) T is the niece of S
- c) S is the uncle of T   d) S is the brother of J

Analytical Reasoning

Arrangements:

Exercise:-11

1. In a row of girls of sheetal who is 10th from the left and Lina who is 9th from the right change their seats. Sheetal becomes 15th from the left. How many girls are there in a row?
      1. 16   2. 23   3. 32   4. 25

2. Five boys are so standing that they from a circle. Ajay is between Ramesh and Dominic, Soloman is to the left of Babu. Ramesh is to the left of Soloman. Who is the right of Ajay?

	1. Dominic	2. Soloman	3. Babu	4. Ramesh

3. In a row of 16 boys when Prakash was shifted by two places towards the left, he became 7th from the left end. What was his earlier position from the right end of the row?
   1. 12th   2. 10th   3. 14th   4. 8th

4. Five boys are sitting in a row. A is on the right of B, E is on the left of B, but to the right of C. If A is on the left of D. Who is sitting in the middle.
   1. E   2. B   3. A   4. C

5. Some boys are sitting in row. P is sitting 14th from the left and Q is 7th from the right. If there are four boys between P and Q, how many boys are there in the row?
   1. 19   2. 21   3. 25   4. 23

6. If (i) six persons, A, B, C, D, E and F are standing in a circle, not necessarily in the same order. (ii) B is between F and C. (iii) A is between E and D and (iv) F is to the left of D, which of the following is between A and F?
   1. B   2. C   3. D   4. E

7. In a row of boys, Anil is 15th from the left and Vishakh is 7th from the right. If they interchange their positions. Vishakh becomes 15th from the right. How many boys are there in the row?
   1. 21   2. 25   3. 29   4. Can't be determined

8. Five persons were playing card game sitting in a circle all facing the center. Mukund was to the left of Rajesh, Vijay was to the right of Anil and between Anil and Nagesh. Who was to the right of Nagesh?
   1. Rajesh   2. Vijay   3. Anil   4. Mukund

9. In front of a camera, Mr. X is sitting to the left of that man, who is at the center of the row, but Mr. X is to right of Mr. Y . Mr. P is to the right of Mr. Z and Mr. R is the right of Mr. P. Mr. R is second from the man, sitting at the center. Who is sitting at the center of the row?
   1. Mr. X   2. Mr. Y   3. Mr. Z   4. Mr. R

10. A ranks fifth in a class. B is eighth from the last. If C is sixth after A and just in middle of A and B, how many students are there in the class?
    1. 25   2. 26   3. 23   4. 24

11. Suresh is 7 ranks ahead of Ashok in the class of 39. If Ashok's rank is 17th from the last, what is Suresh's rank from the start?
    1. 15   2. 14   3. 24   4. 16

12. In a row of children Munni is nirth from the left of Tunni is thirteenth from the right. When they exchange places, Munni will be seventeenth from the left. Which of the following will be the new position of Tunni from the right?
    1. 20th   2. 7th   3. 21st   4. 9th

13. Some boys are sitting in a row, P is sitting 14th from the left and Q is seventh from the right. If there are four boys between P and Q, how many boys are there in the row?
    1. 19   2. 21   3. 25   4. 23

14. In a row of trees, one tree is the 9th from either end of the row. How many trees are there in the row?
    1. 17   2. 19   3. 16   4. 18

15. In a certain class, Rakesh is 29th from the top and mohan is 16th from the bottom in the alphabetical arrangements of names. If they have 7 boys between them what is the number of students in the class?
    1. 52   2. 45   3. 36   4. 35

16. Rakesh ranks seventh in a class of twenty. What is his rank from the last?
    1. 15th   2. 13th   3. 14th   4. 8th

17. Of the five villages: 1) Phulwade is smaller than Dhanwade 2) Ambawade is bigger than Khelwade 3) Sonewade is bigger than Dhanwade but is not as big as Kelwade. Which is biggest village?
    1. Ambawade   2. Phulwade   3. Dhanwade   4. Kelwade

18. It (A) Ashok is taller than Suresh (B) Raju is taller than Ashok (C) Chandu is shorter than Suresh, then chandu is _____

1. taller than ashok   2. As tall as suresh   3. taller than suresh   4. shorter than Ashok

19. Five boys Rakesh, Anil, Mahesh, Suresh and Manjit are sitting in a circle.
    A) Anil is sitting between Rakesh and Suresh B) To Manjit's right suresh is seated.
    Who is seated to Mahesh's left?
    1. Anil   2. Suresh   3. Manjit   4. Rakesh

20. Four girls are swimming in a stream. 1) Harjeet is further ahead of Manjula 2) Neena is behind Manjula 3) Ruchi is between Manjula and Neena.
    Who is second from the last?
    1. Neena   2. Manjula   3. Ruchi   4. Harjeet

21. Five poles are standing in a row. M is on the left of N, O is on the right of P, which is on the right of N. If L is on the left of M, which pole is in center?
    1. L   2. M   3. N   4. O

22. Five boys are sitting in a row. Sanjay is just on the one side of Pradeep but not just on any side of Timur. Kailash is just on one side of Ramesh who is sitting left of all and Timur is not sitting just on any side of Kailash who are sitting on either side of Sanjay?
    1. Kailash & Pradeep   2. Ramesh & Pradeep   3. Only Pradeep   4. Pradeep & Timur

23. Six families A, B, C, D, E and F are living in houses in a row. B has F and D as neighbours, E has A and C as neighbours. A does not live next to D. Who are F's next door neighbours?
    1. B and E   2. B and D   3. B and C   4. Data Insufficient

24. Sudha is taller than Pushpa but shorter than Malati. Geeta is shorter than Vinu and Vinu is not as tall as Pushpa. Who should be in the middle if they stand in a row according to height?
    1. Pushpa   2. Malati   3. Sudha   4. Geeta

25. Among five friends, Manish is taller than Harish, but not as tall as Jayesh. Jayesh is taller than Vijay and Sharad. Vijay is shorter than Harish but taller than one who is shortest among them. Who is the fourth in the descending order of their heights?
    1. Manish   2. Harish   3. Sharad   4. Can't be determined

26. If Shirish is taller than Charu but shorter than Raju and Charu is just as tall as Dilip but taller than Ashok, then Dilip is _____
    1. Just as tall as Shirish   2. Shorter than Charu
    3. Taller than Raju   4. Taller than Ashok

27. While going to the school, Anil was behind Sunil and Rohit was ahead of Madan. Ramesh was in between Anil and Rohit. Who was leading?
    1. Anil   2. Sunil   3. Rohit   4. Madan

28. Priti scored more than Rahul. Yamuna scored as much as Divya. Lotika scored less than Manju. Rahul scored more than Yamuna. Manju scored less than Divya. Who scored the lowest?
    1. Yamuna   2. Manju   3. Lotika   4. Rahul

29. Two ladies and two men are playing bridge – a card game and seated at north, east, south and west of a table. No lady is facing east. Persons sitting opposite to each other are not of the same sex. One man is facing south. Which directions are the ladies facing?
    1. East & West   2. South & East   3. North & West   4. North East

30. P, Q, R, S, and T are sitting in a row. Q is between P and T. To find out who among them is in the middle, which of the following information given in the statements A and B is/are sufficient?
    A. P is left of Q and right of S   B. R is at the right end
    1. Only (B) is sufficient   2. Only (A) is sufficient
    3. Either (A) or (B) is sufficient   4. Both (A) and (B) together are needed

Directions (Questions 31-34): Read the following information carefully and answer the questions given below:

Six boys A, B, C, D, E and F are marching in a line. They are arranged according to their height, the tallest are being at the back and the shortest in front.
F is between B and A
E is shorter than D but taller than C who is taller than A
E and F have two boys between them
A is not the shortest among them all

31. Where is E?
    1. Between A & B   2. Between C & A   3. Between D & C   4. In front of C

32. Who is the tallest?
    1. B   2. D   3. F   4. A

33. If we start from the shortest which boy is fourth one in the line?
    1. E   2. A   3. D   4. C

34. Who is the shortest?
    1. C   2. D   3. B   4. F

Directions (Questions 35-37): Study the following information carefully and answer the questions given below.

i.   Five courses A, B, C, D and E each of one month duration are to be taught from January to May one after the other not necessarily in same order by lecturers, P, Q, R, S and T.
ii.   P teaches course B but not in the month of April or May
iii.   Q teaches course A in the month of March
iv.   R teaches in the month of January but does not teach course C or D

35. Which course is taught by S?
    1. C   2. E   3. Either C or D   4. D

36. Which lecture's course immediately follows after course B?
    1. Q   2. P   3. S   4. T

37. Which course is taught in the month of January?
    1. C   2. D   3. E   4. Data inadequate

Directions (Questions 38-40): Six persons A, B, C, D, E and F sitting forming a circle and one is facing other front to front B is between A and C, E is between F and D. F is sitting straight opposite to A and right to E.

38. D is between which of the following pairs?
    1. EF   2. AE   3. AB   4. CF

39. If the position of B and E are interchanged and also that of C and D, A will be in between which of the following pairs?
    1. CB   2. ED   3. FD   4. CE

40. Who is at the immediate left of D?
    1. E   2. F   3. B   4. A

41. Six friends A, B, C, D, E and F are sitting in a closed circle facing the center. E is to the left of D. C is between A and B. F is between E and A. Who is to the left of B?
    1. D   2. C   3. A   4. F

42. In a row of children, Shibu is fifth from the left and Lakhya is sixth from the right. When they exchange position, Shibu will be thirteenth from the left. What will be Lakhya's position from the right?
    1. 14th   2. 7th   3. 11th   4. 18th

43. In a march past seven persons are standing in a row. Q is standing in a row. Q is standing left to R but right to P. O is standing right to N and left to P. Similarly, S is standing right to R and left to T. Find out who is standing in the middle?
    1. P   2. R   3. Q   4. O

44. Five boys took part in a race. Ram finished before Mohan but behind Gopal. Abbas finished before sailesh but behind Mohan. Who won the race?
    1. Ram   2. Gopal   3. Mohan   4. Abbas

45. Six persons playing a game sitting in a circle facing the center. Vijay was to the left to Sudhir. Amar was between Rakesh and Saurav. Neerav was second to the left of Amar. Who is second to the right of Vijay?
    1. Neerav   2. Rakesh   3. Saurav   4. Data Insufficient

46. In a row of girls, if Seeta who is 10ᵗʰ from the left and Lalitha who is 7ᵗʰ from the right, interchange their seats, Seeta becomes 15ᵗʰ from the left. How many girls are there in the row?
   1. 17   2. 20   3. 22   4. 21

47. In a row of boys, Anand is eleventh from the left and Deepak is fifteenth from the right. When Anand and Deepak interchange their positions, Anand will be fifth from the left. Which of the following will be Deepak's position from the right?
   1. 7ᵗʰ   2. 17ᵗʰ   3. 11ᵗʰ   4. 9ᵗʰ

48. In a photograph Shyam is to the left of Madan. Mary is to the right of George, Karim is in between Shyam and Mary. Who is at the corner?
   1. Shyam   2. Mary   3. George   4. Karim

49. Six students A, B, C, D, E and F are standing in a row. B is between F and D, E is between A and C. A does not stand next to either F or D. C does not stand next to D. F is between which of the following pairs of students?
   1. B and D   2. B and A   3. B and E   4. B and C

50. Madhav ranks seventeenth in a class of thirty one. What is his rank from the last?
   1. 13   2. 14   3. 15   4. 16

51. In a row of children, shibu is fifth from the left and Lakhya is sixth from the right. When they exchange positions, shibu will be thirteenth from the left. What will be Lakhya's position from the right?
   1. 4ᵗʰ   2. 5ᵗʰ   3. 13ᵗʰ   4. 14ᵗʰ

52. Four girls A, B, C and D are sitting in a circle. B and C are facing each other. Which of the following is definitely true?
   1. A is to the left of C   2. D is to the left of C
   3. A & D are facing each other   4. A is not between B & C

53. Raju and Manoj are ranked 14 and 15 respectively from the top in a class of 30 students. What will be their respective ranks from the bottom.
   1. 15ᵗʰ & 16ᵗʰ   2. 16ᵗʰ & 15ᵗʰ   3. 17ᵗʰ & 16ᵗʰ   4. 18ᵗʰ & 17ᵗʰ

54. Mahesh ranked 13ᵗʰ from the top and 26ᵗʰ from the bottom among those who have passed the annual examination in a class. If six students have failed in the annual examination, what was the total number of students in that class?
   1. 44   2. 20   3. 21   4. 38

55. There are five books A, B, C, D, E. C lies above D, E is below A. D is above A, B is below E. Which is the bottom most book?
   1. A   2. B   3. E   4. C

56. If (A) Suresh is taller than Ashutosh (B) Raju is taller than Charu but shorter than Bala (C) Ashutosh is shorter than Charu (D) Charu is taller than Suresh, then who is the tallest?
   1. Suresh   2. Ashutosh   3. Raju   4. Bala

57. If (A) Mahesh is taller than suresh (B) Anil is taller than Mahesh (C) Ramesh is taller than Anil (D) Puneet is tallest of all. If they stand according to their height, who will be exactly in the middle?
   1. Mahesh   2. Suresh   3. Ramesh   4. Anil

58. Sunita is standing on a stairs below Sulekha, Rani is below Sulekha and Madhu is between Rani and Sulekha who is second from bottom?
   1. Rani   2. Sulekha   3. Madhu   4. Sunita

59. Five boys are up on the ladder. A) A is further up the ladder than B B) B is between A and C C) D is further up than A.
   Who is the third from the bottom.
   1. B   2. C   3. A   4. D

60. Five books are lying in a pile. E is lying on A and D is under B. A is lying above B and C is lying under D. Which book is lying at the bottom?
   1. A   2. B   3. C   4. D

61. Four boys are sitting in a row. Bipin is sitting just on one side to Gopal, but not just on any side to Raju. If raju is not just on any side of Farukh then who are sitting just both side of Farukh?
   1. Only gopal   2. Only bipin   3. nobody   4. Bipin and Gopal

62. Five students are sitting in a row. Tapesh is on the right of Zahir. Manoj is on the left of Zahir but is on the right of Love. Tapesh is on the left of Qeer. Who is sitting 1st from the left?
   1. Zahir   2. Tapesh   3. Qeer   4. Love

63. Five bags are lying in a pile one above the other. If A is above B, C is above D but below E and D is above A, which bag is in the middle?
   1. A   2. D   3. C   4. B

64. Prakash is taller than Geetha. Amar is taller than Prabhat but not as tall as Geetha. Prabodh is taller than Prakash. Who among them is the shortest?
   1. Prabhat   2. Geetha   3. Amar   4. Prabodh

65. Of the six towns, Dhulia is bigger than Amalner, Shrirampur is bigger than Nasik, Jalgaon is not as big as Shrirampur but bigger than Amalner, Amalner is smaller than Nasik but bigger than Manmad. Which is the smallest?
   1. Amalner   2. Nasik   3. Jalgaon   4. Manmad

66. Ashok is taller than Kavitha but not as tall as Jayesh. Jayesh is shorter than Subodh who is not as tall as Prabodh. Who is tallest in the group?
   1. Prabodh   2. Subodh   3. Kavitha   4. Ashok

67. Ravi is taller than Jyoti who is shorter than Raju. Mohan is taller than Ravi but shorter than Suresh. Raju is shorter than Ravi. Who is the tallest?
   1. Ravi   2. Raju   3. Suresh   4. Data Insufficient

68. Amar is taller than Samir, Pravath is taller than Umesh but not as tall as Samir; Ashok is shorter than Umesh. Who is shortest?
   1. Amar   2. Samir   3. Pravath   4. Ashok

69. Shyam is older than Pradeep. Praveen is as old as Anjan. Amrut is younger than Suresh who is as old as Anjan. Pradeep is older than Praveen. Which boy is oldest of all?
   1. Pradeep   2. Praveen   3. Suresh   4. Shyam

70. Roshan is taller than Hardik who is shorter than Susheel, Mirza is taller than Harry but shorter than Hardik, Susheel is shorter than Roshan. Who is the tallest?
   1. Roshan   2. Susheel   3. Hardik   4. Harry

Directions Read the following statements and answer the questions given below.

a) Six friends A, B, C, D, E and F are sitting in a closed circle facing the center, b) E is to the left of D, c) C is between A and B, d) F is between E and A.

71. Who is to the left of E?
   1. A   2. C   3. D   4. F

72. Who is to the right of C?
   1. A   2. B   3. D   4. E

Directions Read the following information to answer questions below.

Six persons were playing game sitting in a circle facing the center. Vijay was to the left of Sudhir, Amar was between Rakesh and Saurav. Neeru was second to the left of Amar.

73. Who is second to the right of Vijay?
   1. Neeru   2. Rakesh   3. Saurav   4. Can't be determined

74. Who is/are between Amar and Vijay?
   1. Saurav and Sudhir   2. Rakesh & Saurav   3. Sudhir & Rakesh   4. Data Insufficient

75. Which of the following is the position of Vijay from Neeru?
   1. 2nd from the left   2. 3rd from left   3. 3rd from right   4. Can't be determined

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

i. Seven members of World Forest Conservation Committee – A, B, C, D, E, F and G planted seven saplings on seven days of the week which was celebrated as "Plantation Week".
ii. A planted the sapling on Monday, the first day of the Plantation Week
iii. B planted the sapling a day before when C planted the sapling and the very next day of E.
iv. D planted the sapling on some day after that of B but that day was not the middle day of the week.
v. F planted the sapling on the last day of the plantation week and it was the third day after C planted the sapling.

76. Which of the following pairs of members planted the saplings on Wednesday and Thursday respectively?
1. D and G   2. B and G   3. B and C   4. Can't be determined

77. On which day did B plant the sapling?
1. Tuesday   2. Wednesday   3. Thursday   4. Can't be determined

78. Who among the following planted sapling on Saturday?
1. Either B or C   2. Either D or G   3. Only C   4. Only E

79. Who planted the sapling on the middle day of the plantation week?
1. B   2. D   3. E   4. C

80. On which day did D plant the sapling?
1. Monday   2. Wednesday   3. Tuesday   4. Can't be determined

PROBLEM SOLVING

EXERCISE – 12

Directions (1 to 6)

Read the following questions and answer the following.

Some friends are sitting on a bench. Sunil is sitting next to Sunita and Sanjay is sitting next to Bindu. Bindu is not sitting with Sumith. Sumith on the left end of the bench and Sanjay are on second position from right hand side. Sunil is on the right side of Sunita and to the right of Sunil. Sunil and Sanjay are sitting together. Based on these arrangements, answer the following questions.

1) Sunil is sitting between
     a) Sunita and Bindu   b) Sumit and Bindu
     c) Sumit and Sanjay   d) Bindu and Sanjay

2) Who is sitting in the center?
     a) Sunita   b) Sunil
     b) Bindu   d) Sanjay

3) Sanjay is sitting between?
     a) Bindu and Sunita   b) Sunita and Bindu
     c) Sumit and Bindu   d) Sunil and Bindu

4) Sumith is sitting on the?
      a)   Second from right   b) Second place from left
      c) Extreme left   d) Extreme right

5) Bindu is sitting on the?
      a)   Extreme left   b) Extreme right
      c) Second from left side   d) none

6) Sunita is sitting how many places from Bindu?
      a)   1   b) 2
      c) 3   d) 4

Directions: (7 to 11)

Read the following questions and answer the following.

In a Mega city, streets and roads run East -West and alternate with other at ¼ kilometer intervals.
 1)   Duncan street is 1 km is north of Marlo street
 2)   Marlo Street is ¾ km south of Ansari Road.
 3)   Thakur Road is ¾ km south of Marlo Street.
 4)   Masjid Street is ½ km south of Marlo Street.

7)   Which of these roads or streets is farthest from Marlo Street?
      a)   Duncan street   b) Thakur Road
      c) Thakur and Ansari Roads are equally far
       d)   Thakur and Duncan Street are equally far

8)   An, additional road, Royal, could be in any of the following location expect?
a) ¼ km north of Duncan Street   b) ¼ km north of Marlo Street
 c) ½ km south of Ansari Road   d) 1 km north of Masjid

9)   What is the distance between Ansari Road and Masjid Street?
      a)   ¾ km   b) 1 km
      c) 1 ¼ km   d) 2 km

10) Shivalik Road runs directly North-South across Moga's Street and roads. If a car starts going down Shivalik Road at Ansari Road, then makes a U- turn at Thakur Road and goes back to Masjid street, about how far does it travel?
      a)   3 ¼ km   b) 3 km
      c) 1 ¾ km   d) 2 ¼ km

11)   What is the greatest distance between any two of the street named?
      a.   1 km   b) 1 ½ k
      c) 1 ¾ km   d) 2 km

Directions: (12 to 16)

Read the following questions and answer the following.

J, K, L, M, N, O and P are 7 kids playing in the garden. They are wearing clothes of black, blue, white, green, pink, yellow and brown colors. Out of seven, three are girls. No girl is wearing black, yellow or brown. M's sister O wearing pink, while he is wearing brown, J is wearing blue, while his sister k is not wearing green. N is wearing yellow, while his best friend P is a boy.

12) What color is K wearing?
      a.   Green   b) Pink
      c) Brown   d) None

13) What color is P wearing?
      a.   Black   b) Blue
      c) White   d) Black or Green

14) What color is L wearing?
      a.   Black   b) Green
      c) White   d) Black or Green

15) What colors are the sisters are J and M are wearing?
      a) Pink and Green   b) Pink and Yellow

c) White and Green   d) White and Pink
16) Which of the following group represents only girls?
      a) KLN   b) KNO
      c) KLO   d) None

Directions: (17 to 21)

Read the following questions and answer the following.

PQRSTV and W are seven employees in an organization. There are three MBAs two graduates and two matriculates among them. They work in three different groups I, II, III . In each group there is one MBA and at least one graduate or one matriculate. S is an MBA and is in-group III with P, a matriculate. The other matriculate is in-group I with only T.V an MBA works with Q who does not work with W, a graduate P does not work with R.

17) Which of the following groups represents three MBAs
        a) TVS   b) TQS
        c) WQS   d) None

18) If R is transferred in a group III and P is transferred is group I then which of the following statements will be true?
      a.   There will be only two employees in group II
      b.   There will be only two employees in group I
      c.   There will be only one employee in group II
      d.   All or correct

19) Which of the following pair expresses tow graduates?
      a) PW   b) PQ
      c) PR   d) None

20) If both graduates are transferred in-group I then in which group does W work?
      a) Only II   b) Only III
      c) II or III   d) none

21) In which group do three of them work?
    a) only I   b) Only II
      c) Only III   d) Only II or III

Directions: (22 to 25)
Read the following questions and answer the following.

The following questions are based on the given sequence of alphabets.
    a b c d e g h i j k l m n o p q r t s u v w x y z

22) Which of the following is missing in the above set of series?
      a) J   b) y
      c) f   d) v
23) Which letter is out of the normal position?
     a) t   b) j
      c) d   d) s

24) How many vowels are there?
      a) 6   b) 5
      c) 7   d) 8

25) Which letters are sandwiched between two vowels?
      a) vw   b) hj
      c) gh   d) pq

Directions: (26 to 30)

Read the following questions and answer the following.

A goldsmith has five gold rings, each having a different weight.
    1) Ring D weight is twice as much as ring E.
    2) Ring E Weighs four and one-half times as much as ring F.
    3) Ring F weighs half as much as ring G.

4) Ring G weighs half as much as ring H.

5) Ring H weighs less than rings D but not more than ring F.

26) Which of the following represents the descending order of weights of the rings?
   a) D, E, G, H and F
   b) E, G, H, D and F
   c) H, F, G, D, E and E
   d) D, E, H, G and F

27) Which of the numbered statement above is not necessary to determine the correct order of the rings according to their weights?
   a) Statement 1
   b) Statement 2
   c) Statement 4
   d) Statement 3

28) Which of the following is the lightest in weight?
   a) Ring D
   b) Ring E
   c) Ring F
   d) G

29) If these rings are sold according to their weights as it is, which ring will fetch highest value in rupees?
   a) G
   b) H
   c) F
   d) D

30) Ring H is heavier than which of the following two rings?
   a) GE
   b) GH
   c) DF
   d) DE

CUBES

Cube: A three dimensional figure, in which length, breadth and height are equal is said to be a cube.
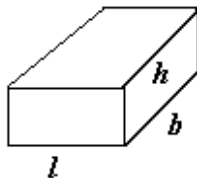
Properties:

∑ Lateral Surface Area = $4a^2$

∑ Total Surface Area = $6a^2$

∑ Longest diagonal = $\sqrt{3}.a$, where a is the side of the cube.

∑ Volume = a^3

∑ No. of faces in a cube = 6.

∑ No. of corners in a cube = 8.

∑ No. of edges in a cube = 12.

If each cube is painted with single paint and is cut into pieces such that each edge has 'x' pieces in it, then …

No. of cubes having THREE surfaces painted	8
No. of cubes having TWO surfaces painted	12(x – 2)
No. of cubes having ONE surface painted	$6(x-2)^2$
No. of cubes having ZERO surface painted	$(x-2)^3$

Note: The above table is used for regular cutting.

Exercise:-13

1) What is maximum number of identical pieces a cube can be cut in to by 5 cuts?

2) What is maximum number of identical pieces a cube can be cut in to by 6 cuts?

3) What is maximum number of identical pieces a cube can be cut in to by 7 cuts?

4) What is maximum number of identical pieces a cube can be cut in to by 12 cuts?

5) What is least number of cuts required to divided a cube in to 24 identical pieces?

6) What is least number of cuts required to divided a cube in to 120 identical pieces?

Answers:
1. 18   **2. 27**   **3. 36**   **4. 125 5. 6**   **6. 12**
Directions: (7 to 11) Study the following information and answer the following questions

   a)   A rectangular wooden block is having length 6 cm, breadth 4 cm and height 1 cm
   b)   Both the sides having dimensions (4 cm * 1) cm are painted in black color
   c)   Both sides having dimensions (6 cm * 1 cm) are painted in red color
   d)   Both sides with dimensions (6cm * 4 cm) are painted in green color
   e)   The block is cut in 4 equal parts of 1 cm, each (from 6 cm side) and into 4 equal parts 1 cm each (4 cm side)

7) How many cubes will have all three colors black, green and red at least on one side?
   a) 16   b) 12
   c) 10   d) none

8) How many cubes will be formed?
   a) 6   b) 12
   c) 24   d) none

9) If cubes having only "black as well as green" color are removed, then how many cubes will remain?
   a) 4   b) 4
   c) 16   d) 12

10) How many cubes will have two sides with green color and remaining 4 sides without any color?
   a) 12   b) 10
   c) 4   d) 8

11) How many cubes will have 4 colored sides and 2 sides without colors?
   a) 8   b) 4
   c) 16   d) 10

Key:
        7. d   **8. c**   **9. c**   **10. d**   **11. b**

Directions: (12 to 14) A solid cube of each side 12 cm has been painted yellow, Pink, and white on pair of opposite sides. It is then cut into cubical blocks of each side of 3 cm.

12) How many cubes will have only two face painted?
        a) 21   b) 16
        c) 24   4) 28

13) How many cubes no face painted?
        a) 16   b) 8
        c) 6   d) 24
14) How many cubes have three face painted with different colors?
        a) 16   b) 8
        c) 6   d) 12

Key:
        12. c   **13. b**   **14. b**

Directions: (15 to 18)

A large cube painted on all six faces and then cut into a certain number of smaller but identical cubes. It was found that among the smaller cubes there were eight cubes, which had no face, painted at all.

15) How many smaller cubes was the original large cube cut into?
16) How many small cubes have exactly one face painted?
17) How many small cubes have exactly two face painted?
18) How many small cubes have three face painted?

Answers:

    15. 64   **16. 24**   **17. 24 18. 8**

Directions: (19 to 28):

A cube is painted with Red, Green, and Blue such that the adjacent faces painted with same colors and it cut in to 343 small but identical pieces.

19) How many cubes will have three face painted with three different colors?

20) How many cubes will have three face painted with any two colors?

21) How many cubes will have three face painted with specific two colors?

22) How many cubes will have two face painted with any two colors?

23) How many cubes will have two face painted with specific two colors?

24) How many cubes will have two face painted with any one colors?

25) How many cubes will have two face painted with specific one colors?

26) How many cubes will have one face painted with any one colors?

27) How many cubes will have one face painted with specific one colors?

28) How many cubes will have no face painted?

Directions: (29 to 38)

A cube is painted with Red, Green, and Blue such that the 0pposite faces painted with same colors and it cut in to 343 small but identical pieces.

29) How many cubes will have three face painted with three different colors?

30) How many cubes will have three face painted with any two colors?

31) How many cubes will have three face painted with specific two colors?

32) How many cubes will have two face painted with any two colors?

33) How many cubes will have two face painted with specific two colors?

34) How many cubes will have two face painted with any one colors?

35) How many cubes will have two face painted with specific one colors?

36) How many cubes will have one face painted with any one colors?

37) How many cubes will have one face painted with specific one colors?

38) How many cubes will have no face painted?

LOGICAL DEDUCTIONS

EXERCISE-14

1. All books are hooks.
   All hooks are crooks.

   a) All hooks are books.
   b) All crooks are hooks.
   c) All crooks are books.
   d) All books are crooks.

2. Some crooks are hooks.
   No hook is a book.

   a) Some hooks are not books.
   b) Some hooks are crooks.
   c) Some crooks are books.
   d) Some crooks are not books.

3. Some goods are expensive.
   Some expensive things are qualitative.

   a) Some goods are qualitative.
   b) Some goods are not qualitative.
   c) Some qualitative are goods.
   d) No conclusion

4. All posters are good looking.
   Some posters are expensive.

   a) Some good looking are not expensive.
   b) Some good looking are expensive.
   c) Some expensive are not good looking.
   d) Some expensive are good looking.

5. All expensive are posters.

Some good looking are posters.

a) Some posters are good looking.
b) Some good looking are expensive.
c) Some expensive are good looking.
d) None of these

6. All boxes are dolls.
   No baskets are boxes.

   a) Some dolls are baskets.
   b) Some dolls are not baskets.
   c) Some baskets are not dolls.
   d) None of these

7. All dolls are boxes.
   No baskets are boxes.

   a) Some dolls are not baskets.
   b) Some dolls are baskets.
   c) No dolls are baskets.
   d) None of these

8. No tables are watches.
   Some watches are lamps.

   a) Some lamps are tables.
   b) No lamp is a table.
   c) Some lamps are not tables.
   d) None of these

9. All my girl friends are beautiful.
    Sudha is very beautiful.

    a) Sudha is my friend.
    b) Sudha is not my friend.
    c) (a) or (b)
    d) None of these

10. No cow is a cat.
    All cats are rats.

    a) Some rats are cats.
    b) Some rats are not cats.
    c) Some rats are not cows.
    d) None of these

11. All women are men.
    All men are crazy.

    a) All men are women.
    b) No men is crazy.
    c) All women are crazy.
    d) All crazy are women.

12. Some shirts are benches.
    No bench is a table.

    a) Some shirts are tables.
    b) Some shirts are not tables.
    c) No table is a shirt.
    d) None of these

13. All roads are poles.
    No pole is a house.

    a) Some roads are houses.
    b) Some roads are not houses.
    c) No road is house.
    d) None of these

14. No man is monkey.
    John is a man.

    a) John is not a monkey.
    b) John may or may not be a monkey.
    c) (a) or (b)
    d) None of these

15. All businessmen except Ramji are dishonest.
    All dishonest people smoke.

    a) All businessmen except Ramji smoke.
    b) Ramji does not smoke.
    c) (a) or (b)
    d) None of these

16. Few takers are givers.
    No givers are almighty.

    a) Some givers are not takers.
    b) Some takers are not almighty.
    c) Some almighty are takers.
    d) None of these

17. Some crows are jackals.
    No fox is a crow.

    a) Some jackals are not foxes.
    b) Some jackals are foxes.
    c) No jackal is a fox.
    d) No fox is a jackal.

18. Only cats are animals.
    No historian is an animal.

    a) Some cats are historians.
    b) Some historians are cats.
    c) Some cats are not historians.
    d) Some historians are not cats.

19. Some girls are cute.
    Some Americans are cute.

    a) Some Americans are not cute.
    b) Some girls are Americans.
    c) Some girls are not Americans.
    d) None of these

20. No kindhearted is bandit.
    All bandits are blackmailers.

    a) Some blackmailers are kindhearted.
    b) Some kindhearted are blackmailers.
    c) Some kindhearted are not blackmailers.
    d) Some blackmailers are not kindhearted.

21. No fruit is a flower.
    No flower is a stem.

    a) No fruit is a stem.
    b) Some fruits are not stems.
    c) No stem is a fruit.
    d) None of these

22. Some bowls are dishes.
    No dish is a glass.

    a) Some bowls are not glasses.
    b) Some glasses are not bowls.
    c) No bowl is a glass.
    d) No glass is a bowl.

23. Some bowls are plates.
    All plates are glasses.

    a) Some bowls are not glasses.
    b) Some glasses are bowls.
    c) Some bowls are glasses.
    d) None of these

24. Some huts are not buildings.
    No building is a hotel.

    a) Some huts are not hotels.
    b) No hotel is a hut.
    c) Some hotels are not huts.
    d) None of these

25. All cups are pens.
    Some pens are tables.

    a) Some cups are tables.
    b) Some tables are cups.
   c) Some cups are not tables.
    d) None of these

26. All colleges are schools.
    No theatre is a school.

    a) No school is a theatre.
    b) Some colleges are not schools.
    c) Some colleges are not theatres.
    d) No college is a theatre.

27. Some computers are CPUs.
    All CPUs are mouses.

    a) Some computers are not mouses.
    b) Some mouses are computers.
    c) Some computers are mouses.
    d) None of these

28. Some horses are dogs.
    No rabbit is a dog.

    a) Some horses are not rabbits.
    b) Some horses are rabbits.
    c) No horse is a rabbit.
    d) None of these

29. Some pearls are beads.
    All rings are beads.

    a) Some pearls are rings.
    b) All rings are pearls.
    c) Some rings are pearls.
    d) None of these

30. Some biscuits are chocolates.
    No brinks are biscuits.

    a) No biscuits are fruits.
    b) Some chocolates are drinks.
    c) Some drinks are not chocolates.
    d) None of these

Logical Venn Diagrams

EXERCISE – 15

In the following diagram, 'Δ' represents 'Cute, '□' represents 'Young' and 'O' represents 'Girls'.

1. Find the girl who is cute but not young.
    a) C   b) A   c) D   d) F

2. Find the person who is not a girl and also not cute?
    a) A   b) B   c) D   d) F

3. Who is old and not a cute girl?
    a) G   b) F   c) B   d) D
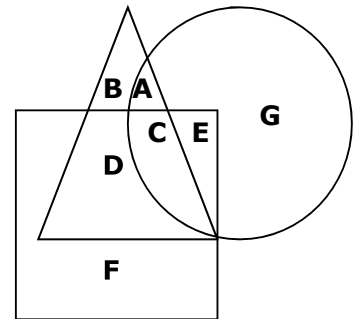
In the below figure, 'Triangle' represents all the models of the bikes which are manufactured in the year 2004, 'Square' represents all the models of the bikes manufactured in the year 2005, 'Rectangle' represents all the models of those bikes which were manufactured in the year 2006 whereas 'Circle' represents all the models of the bikes manufactured in the year 2007.

4. Which of the following represents the models of bikes, which are manufactured only in the years 2005 and 2006?
    a) S   b) V   c) B   d) T

5. Which of the following represents the bikes, which are manufactured in all the given four years?
    a) U   b) W   c) A   d) X

6. Which of the following represents the bikes, which are manufactured only in the year 2006?
    a) Q   b) P   c) R   d) S

7. Which of the following represents the bikes, which are manufactured only in the years 2004 and 2007?
    a) U, A & W   b) W   c) W, A & Y   d) Y

8. Which of the following represents the bikes, which are manufactured in 2004, 2005 and 2006 but not in 2007?

2

a) Z   b) A   c) U   d) T

In the following diagram '□' represents the 'Teachers', 'O' represents the 'Artists' and 'Δ' represents the 'Sportsmen'.

9. Which number/numbers represent the people who are Artists only?
   a) 5 & 8   b) 2, 5 & 8   c) 8 & 3 d) 8 & 1

10. Which number/numbers represent the people who are Sportsmen only?
    a) 10   b) 9   c) 3   d) 2

11. Which number/numbers represent those who are Teachers only?
    a) 3 & 2 b) 4 & 9 c) 4 & 7 d) 3 & 1

12. Which number/numbers represent those who are Sportsmen and Teachers but not Artists?
    a) 9   b) 10   c) 3   d) 2

13. Which number/numbers represent those who are Artists and Teachers but not Sportsmen?
    a) 5 & 8 b) 2 & 1 c) 8 & 2 d) 4 & 1
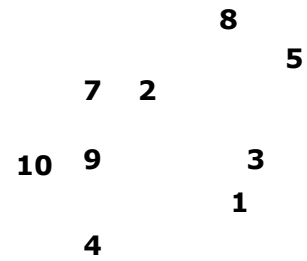
Study carefully the different regions in the given diagram and answer the questions given below.

14. Find the sum of the numbers in the triangle only.
    a) 13   b) 7   c) 18   d) 17
15. Find the sum of the numbers in the circle only.
    a) 9   b) 11   c) 5   d) 8
16. Find the sum of the numbers in the square only.
    a) 11   b) 21   c) 18   d) 17
17. Find the sum of the numbers in circle and the triangle only.
    a) 2   b) 9   c) 13   d) 11
18. Find the sum of the numbers in the square and triangle only and not in the circle.
    a) 10   b) 7   c) 17   d) 9
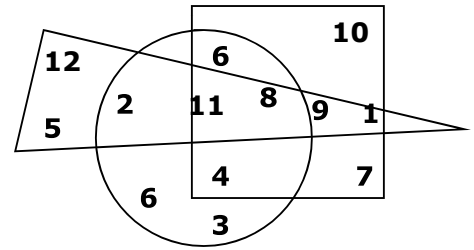
In the diagram given below, the 'rectangle' represents Hockey Players, the 'triangle' represents Cricket Players, the 'square' represents Tennis Players and the 'circle' represents Football players.

19. Which of the following statements is true?
    a) All the Hockey Players are Tennis Players.
    b) Some Hockey Players are Football Players as well as Tennis Players.
    c) All the Hockey Players are Football Players.
    d) All Tennis Players are Hockey Players but not Football Players.

20. Which of the following statements is true?
    a) All Cricket Players are Football Players.
    b) Some Tennis Players are Hockey Players but not Cricket Players.
    c) All Hockey Players are Tennis Players.
    d) Some Cricket Players are not Football Players.

21. Choose the correct statement.
    a) Some Tennis Players are Hockey Players.
    b) No Tennis Player is a Cricket Player.
    c) All Football Players are Cricket Players.
    d) All Football Players are Hockey Players.
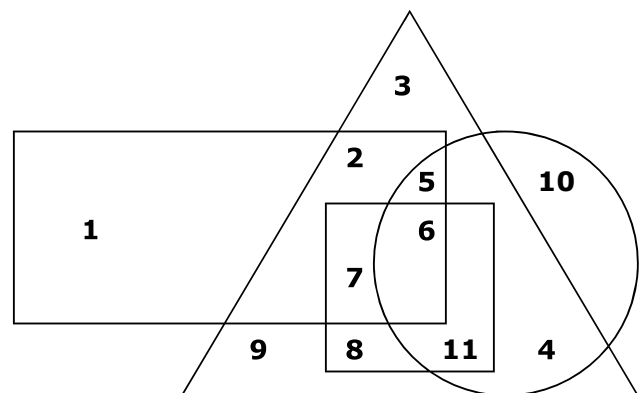
In the following diagram, the square represents girls, the triangle represents the musicians and the circle represents the singers while the rectangle stands for painters.
22. Which letter represents singers who are girls but neither musicians nor painters?
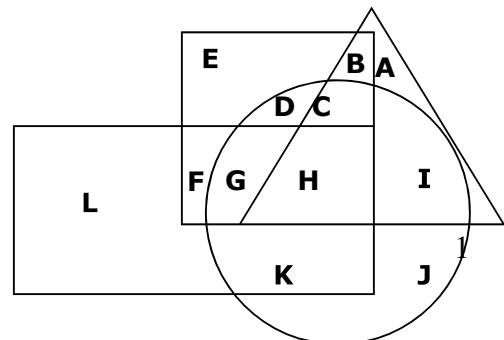
a) C   b) D   c) G   d) H

23. Which letter represents girls who are painters as wells as musicians but not singers.

     a) B   b) E   c) F   d) None

24. Which letter represents girls who are singers but not musicians also not painters?

     a) C   b) D   c) E   d) G

25. Which letter represents singers who are male painters but are not musicians?

     a) I   b) J   c) K   d) L

DATA SUFFICIENCY

- ∑ As the name suggests, Data Sufficiency problems are to test the ability of you to judge whether the given date in the form of statements is sufficient to answer the question.
- ∑ There is no need to solve the problem.
- ∑ Just you need to determine whether it would be possible to answer the question.
- ∑ If you can tell that an answer would be obtainable, you can stop working.

Structure of a Data Sufficiency Problem:

- ∑ A question is asked followed by two or three statements.
- ∑ You need to study the question and all the statements given and decide whether any information provided in the statement(s) is/are redundant and can be dispensed with while answering the questions.
- ∑ You have to decide whether the question can be answered with any one or two of the statements or all the statements are required to answer the question.
- ∑ The answer number bearing the combination of statements or single statement which is necessary to answer the question is your answer.

General Structure:

Question: ……………………………………………..

Statement I: ………………………………………..
Statement II: ……………………………………….

Directions:
1 …………………………….
2 …………………………….
3 …………………………….
4 …………………………….

Important Note:

1. To solve Data Sufficiency Problems, you should be familiar with the concepts of Arithmetic.
2. Directions may not be same for all the Data Sufficiency Problems.

Examples:

Model – 1:

1. What is the HCF of two numbers P and Q?

I. P and Q are consecutive natural numbers.
II. P x Q is divisible by 2.

Directions:

- ∑ Give answer (1) if statement I alone is sufficient to answer the question.
- ∑ Give answer (2) if statement II alone is sufficient to answer the question.
- ∑ Give answer (3) if both the statements I and II are sufficient to answer the questions, but neither of the statement alone is not sufficient.

∑   Give answer (4) if both the statements I and II together are not sufficient to answer the question and additional data is required.

Sol: By using statement I, we can find the HCF of P and Q.
By using statement II, we cannot find the HCF of P and Q.
So, statement I alone is sufficient to answer the question.
Hence, the answer is 1.

Model – 2:

1. What is the perimeter of the rectangular metallic strip?

I: The area of the strip is 50 m.
II: The diagonal of the strip is 20 m.
III: The ratio between the length and breadth of the strip is 3 : 2.

Directions:

∑   Give answer (1) if all the statements I, II and III are required.
∑   Give answer (2) if only two of I, II and III are sufficient
∑   Give answer (3) if only I and II are required.
∑   Give answer (4) if only II and III are required.
∑   Give answer (5) if none of these are required.

Sol: Let the length be l and breadth be b for the rectangular metallic strip.
Statement I: $l \times b = 50$
Statement II: $l^2 + b^2 = 20$
Statement III: $l = \dfrac{3}{2} b$
Solving any two of the above equations, we get the values of l and b.
Hence, the answer is 2.

EXERCISE – 16

Directions: (1 – 10):

∑   Give answer (1) if statement I alone is sufficient to answer the question.
∑   Give answer (2) if statement II alone is sufficient to answer the question.
∑   Give answer (3) if both the statements I and II are sufficient to answer the questions, but neither of the statement alone is not sufficient.
∑   Give answer (4) if both the statements I and II together are not sufficient to answer the question and additional data is required.

1. Is x > y?
    II.   x > z and z is positive.
    III. Z < y

2. Is the number 5a2b7 divisible by 11?
    I. a + b = 14
    II. ab = 14

3. What is the greatest number which divides a, b, and c exactly?
    I. a = 24
    II. The greatest number which dives b and c exactly is 18.

4. What is the value of $a_1 + a_2 + a_3 + a_4 + a_5$?

    I. a_1 is the smallest composite number.

    II. a_1, a_2, a_3, a_4, a_5 are successive composite numbers.

5. What is the value of 3 * 4?
   I. $x + y = 10$
   II. $x * y = x^2 + y^2 - xy$

6. Is x a positive integer?
   I. $xy > 0$
   II. $y > 0$

7. The remainder obtained when $28a - 28$ is divided by a is zero. Then what is the value of a?
   I. The sum of LCM and HCF = 65
   II. One of the numbers is 20.

8. Is z a prime number?
   I. $a + b = 2z$
   II. a and b are successive and composite.

9. What is the numerical value of the expression $(a^x + b^y)a^y.b^x$, eliminating the variables a, b, x, y?
   I. $x + y = 0$
   II. $a = b$

10. The LCM of two numbers is 12 times their HCF. What are the two numbers?
    I. The sum of LCM and HCF = 65
    II. One of the numbers is 20.

Directions: (11 – 25):

∑ Give answer (1) if statement I alone is sufficient to answer the question, while statement II alone is not sufficient to answer the question.
∑ Give answer (2) if statement II alone is sufficient to answer the question, while the statement I alone is not sufficient to answer the question.
∑ Give answer (3) if statement I alone or statement II alone is sufficient to answer the question.
∑ Give answer (4) if both the statements I and II together are not sufficient to answer the question and additional data is required.
∑ Give answer (5) if both the statements I and II together are sufficient to answer the question.

11. How many items did the distributor purchase?
    I. The distributor purchased all the items for Rs.4500
    II. If the distributor had given Rs.5 more for each item he would have purchased 10 items less.

12. How long will it take to fill a tank?
    I. One pipe can fill the tank completely in 3 hours.
    II. Second pipe can empty that tank in 2 hours.

13. What will be the area of a plot in sq. m.?
    I. The length of the plot is $1\frac{2}{3}$ times the breadth of the plot.
    II. The diagonal of the plot is 30 m.

14. What is the ratio of the number of boys and girls in a school?
    I. Number of boys is 40 more than the girls.
    II. 50% of the sum of first and second numbers = 24.

15. What is the difference between the two numbers?
    I. First number is 60% of the other.
    II. Number of girls is 90% of the number of boys.

16. What is the speed of the running train?
    I. Length of train is 120 m.
    II. The train crossed the other train of length 150 m in 5 sec.
17. What is the C.I. after 3 years?
    I. Rate of interest is 4%.
    II. The difference between the total S.I. and the total C.I. after 2 years is Rs.20.

18. What is the average monthly income per family member?
    I. Each male earns Rs.1250 a month and each female earns Rs.1050 a month.
    II. Ratio of males to females in the family is 2 : 1.

19. What S.P. should be marked on the article?
    I. Discount of 5% is to be given and gain % should be double the discount. Purchase cost is in the range of Rs.300 – Rs.400
    II. 10% discount is to be allowed and 15% profit is to be obtained on the purchase cost of Rs.200 of the article.

20. What is the height of a right-angled triangle?
    I. The area of the right-angled triangle is equal to the area of a rectangle whose breadth is 18 cm.
    II. The breadth of the rectangle is 12 cm.

21. What is the sum which earned interest?
    I. The total S.I. was Rs.7000 after 7 years.
    II. The difference between the sum and the S.I. earned after 10 years is Rs.1000.

22. A train crosses a signal post in A sec. What is the length of the train?
    I. The train crosses a platform of 100 m in B sec.
    II. The train is running at a speed of 80 kmph.

23. What is the area of a circle?
    I. The circumference of the circle is 308 m.
    II. The radius of the circle is 28 m.

24. What is the capacity of a cylindrical tank?
    I. Radius of the base is half of its height, which is 28 m.
    II. Area of the base is 616 sq. m. and height is 28 m.

25. What is the cost of laying carpet in a rectangular hall?
    I. Cost of the carpet = Rs.450 per sq. m.
    II. Perimeter of the hall = 100 m.

Directions: (26 – 30):

∑ The problems consists of a question and three statements I, II and III given below it.
∑ You have to study the questions and decide the data in which of the statements are sufficient to answer the questions.

26. What is the area of the isosceles triangle?

    I. Perimeter of the triangle is 10 m.
    II. Base of the triangle is 10 m.
    III. Height of the triangle is 4 m.

    1) I and II only   2) II and III only
    3) I and II only or II and III only   4) I and III only
    5) All I, II and III

27. What is Sunny's present salary?

    I. The salary increases every year by 10%.
    II. His salary at the time of joining was Rs.10000.
    III. He had joined exactly 5 years ago.

    1) II and III only   2) I and II only
    3) All I, II and III   4) I and III only
    5) None of these

28. What is amount of gain earned?

    I. 10% discount is offered on the labeled price.

II. If there is no discount, profit would have been 30%.
III. S.P. was more than the C.P by 20%

1) I and either II or III   2) Any two of the three
3) All I, II and III   4) Either I or II and III
5) Data Insufficien

DATA INTERPRETATION

∑ It deals with careful reading, understanding, organizing and interpreting the data provided so as to derive meaningful conclusions.
∑ Mostly used tools for interpretation of a data are
   o Ratio
   o Percentage
   o Rate
   o Average

Types of Data Interpretation: The numerical data pertaining to any event can be presented by any one or more of the following methods.
   1. Tables
   2. Line Graphs
   3. Bar Graphs or Bar Charts
   4. Pie Charts or Circle Graphs

1. Tables: It is the systematic presentation of data in tabular form to understand the given information and to make clear the problem in a certain field of study. It has six elements namely:

   o **Title:** It is the heading of the table.
   o **Stule:** It is the section of the table containing row headings
   o **Column Captions:** It is the heading of each column
   o **Body:** It consists the numerical figures
   o **Footnotes:** It is for further explanation of the table
   o **Source:** It is the authority of the data

Eg: Study the following table and answer the questions given below it.

Annual Income of Five Schools

Figures in '00 rupees

Sources of Income	School A	School B	School C	School D	School E
Tuition Fee	120	60	210	90	120
Term Fee	24	12	45	24	30
Donations	54	21	60	51	60
Funds	60	54	120	42	55
Miscellaneous	12	3	15	3	15
Total	270	150	450	210	280

1. The income by way of donation to school D is what per-cent of its miscellaneous?

Sol: Required percentage = $\dfrac{5100}{300} = 27\%$

2. Line Graph: A line graph indicates the variation of a quantity w.r.t two parameters calibrated on X and Y-axis respectively.
Note:

   1. Any part of the line graph parallel to X-axis represents no change in the value of Y parameter w.r.t the value of X parameter.
   2. The steepest or maximum part of the line graph indicates maximum percentage change of the value during the two consecutive period in which the related part lies.
   3. If the steepest part is a rise slope, then it is the highest percentage growth.
   4. If the steepest part is a decline slope, it will represent a maximum percentage fall of the value calibrated in the other axis.

3. Bar Graph: Bar graphs are diagrammatic representation of a discrete data.

Types of Bar Graphs:

- ○ **Simple Bar Graphs:** A simple bar graph relates to only one variable. The values of the variables may relate to different years or different terms.

- ○ **Sub-divided Bar Graph:** It is used to represent various parts of sub-classes of total magnitude of the given variable.

- ○ **Multiple Bar Graphs:** In this type, two or more bars are constructed adjoining each other, to represent either different components of a total or to show multiple variables.

4. **Pie Chart:** In this method of representation, the total quantity is distributed over a total angle of 360° which is one complete circle or pie.

Note: Here, the data can be plotted w.r.t only one parameter.

EXERECISE - 17

Directions (Questions 1 to 5): In the graph given below, the sales in Rs. Thousand are shown. Answer the questions based on it.

1. By how much the amount of sales in 1991 was less than those in 1993?
a) Rs.100   b) Rs.1 lakh
c) Rs. One thousand   d) None of these

2. What were the approximate average sales (in thousands) for period 1990 to 1995?
a) 300   b) 400
c) 450   d) None of these

3. The sales in 1991 are what percent of those in 1992?
a) 80   b) 70
c) 15   d) 45

4. In which year the sales showed the least percentage increase to those in preceding year?
a) 1990
b) 1992
c) 1993
d) 1994

5. The sales in 1994 are how many times to those in 1992?
a) 1.4
b) 1.1
c) 0.60
d) 0.75

Directions (Questions 6 to 10): Study the table carefully and answer the questions given below it.

Production of Cars in different factories during the period

Factories	1990	1991	1992	1993	1994
A	15	18	25	15	18
B	12	23	40	20	15
C	20	20	50	25	20
D	25	18	38	14	18
E	30	32	32	30	30

6. In which year, the production of cars of all factories was the closest to the average no. of cars produced during 1990-1994?
a) 1990
b) 1991
c) 1994
d) None of these

7. Which factory showed a decrease of 20% in the production of cars in 1994 as compared to 1993?
a) A & C
b) B
c) C
d) D & E

8. In which of the given years was there maximum production of cars?
a) 1994
b) 1993
c) 1990
d) None of these

9. What is the ratio of production of cars of factory A to that of factory E in 1994?
a) 5 : 3
b) 3 : 5
c) 2 : 7
d) None of these

10. In which year was the total production of cars of factories about 30% of the total production of cars during 1990-1994?
a) 1991
b) 1993
c) 1994
d) 199

Directions (Questions 11 to 15): India's total trade with foreign countries for a year is given in the pie charts as shown below. Analyze the charts carefully and answer the questions based on them.

India's Total Trade with Foriegn Countries

Exports : 113,959 Million Rupees

U.S.A. 15%
U.S.S.R. 14%
JAPAN 9%
U.K. 6%
WEST GERMANY 4%
FRANCE 2%
OTHERS 50%

Imports : 165,918 Million Rupees

U.S.S.R. 10%
U.S.A. 9%
WEST GERMANY 8%
JAPAN 7%
U.K. 6%
FRANCE 2%
OTHERS 58%

11. India's exports to which of the following countries are more than the imports from that country?
a) U.S.A.
b) U.S.S.R.
c) JAPAN
d) Both U.S.A. & U.S.S.R.

12. The ratio of the angle subtended by the arcs corresponding to U.S.A. for the exports to imports is nearly?
a) $\dfrac{15 \times 113}{9 \times 165}$
b) $\dfrac{15 \times 165}{9 \times 113}$
c) 1.67
d) 1.33

8

13. The ratio of the total imports from France and U.K. to the total exports to these countries is nearly?
    a) 1.25   b) 1.33
    c) 1.22   d) 1.46

14. Which of the following statement is not true?
a) The exports to Japan are less than the imports from Japan.
b) The imports from U.K. are more than the exports to U.K. by 6% of Rs.51,959 million.
c) The total exports of U.S.A., U.S.S.R., Japan, U.K., West Germany and France are more than the total imports from these countries.
d) Two of the above statements are true.

15. If the area of the sector corresponding to U.S.S.R. in exports pie chart is A, the area of the sector corresponding to Japan in the imports pie chart is? (the radii of both the circles being same)

    a) $\dfrac{A}{2}$ b) $\dfrac{3A}{8}$

    c) $\dfrac{5A}{8}$ d) $\dfrac{7A}{8}$

Directions (Questions 16 to 20): Study the following table carefully & answer the questions given below.
Sugar cane production in million tons by six major states during 1986 to 1990.

Year/States	P	Q	R	S	T	X	TOTAL
1986	140	65	48	38	39	22	352
1987	132	63	62	56	40	23	376
1988	150	55	72	49	36	27	389
1989	168	60	45	65	43	25	406
1990	170	45	70	62	42	23	412

16. In the year 1990, how many of the given states have a share of 15% or more in the total sugarcane production?
                a) 3   b) 4
                c) 5   d) All

17. Which of the following states shows constant fall in sugarcane production every year?
                a) P   b) Q
                c) R   d) None

18. What was the approximate % increase in sugarcane production in S from 1987 to 1990?
                a) 5   b) 7
                c) 20   d) 11

19. In which year does P has a share about 35% in the total sugarcane production?
                a)1986   b) 1987
                c) 1988   d) 1989

20. In which year during the given period was the % of Q's share the highest in the total production?
                a) 1986   b) 1987
                c)1988   d) 1989

Directions (Questions 21 to 25): The questions given below are based on the following table.

Railway Time Table Geetanjali Express

City	Arrival Time (hrs)	Departure Time (hrs)	Cumulative Mileage
BOMBAY	---	0900	0
IGATPURI	1100	1102	80
NASIK	1450	1455	281
BHUSAWAL	1710	1712	391
AKOLA	2240	2245	730
NAGPUR	0005	0015	800
DURG	0100	0102	845
JAMSHEDPUR	0415	0428	995
CALCUTTA	0625	---	1100

21. The largest run for the train between two successive halts is?
a) Jamshedpur-Calcutta
b) Bombay-Calcutta
c) Bhusawal-Akola
d) Akola-Nagpur

22. The average speed the train maintained between two successive stations was the highest between?
a) Bhusawal-Akola
b) Jamshedpur-Calcutta
c) Nagpur-Durg
d) Bombay-Igatpuri

23. The average speed that the train maintained between Bombay and Calcutta was nearly equal to?
a) 42 miles/hr
b) 52 miles/hr
c) 61 miles/hr
d) 74 miles/hr

24. If we consider the journey that begins at Bombay and ends at Calcutta, the train has the longest halt at?
a) Bombay
b) Calcutta
c) Jamshedpur
d) Nagpur

25. The train begins its journey from Calcutta to Bombay eight hours after it has arrived Calcutta. If the train left Bombay on Monday, on what day will it have returned to Bombay? (Assume that on the return journey the train maintains the same average speed as on onward journey)
a) Monday
b) Tuesday
c) Wednesday
d) None of these

Directions (Questions 26 to 30): Study the following graph and answer the questions given below it.

Requirement and production of Rubber over the years

26. In which of the following year was it likely that the quantity of rubber imported to bridge the gap between demand and supply was maximum?
a) 1991
b) 1993
c) 1995
d) None

27. In 1991, the production of rubber

10

was what percent of the requirement?
- a) 150
- b) 67
- c) 45
- d) 300

28. During which year was the percentage drop in the requirement of rubber over the previous year, the maximum?
- a) 1994
- b) 1993
- c) 1991
- d) None of these

29. For which of the two years was the average yearly production of rubber equal to the average yearly requirement?
- a) 1992 & 1995
- b) 1992 & 1993
- c) 1994 & 1995
- d) 1993 & 1995

30. In 1992, the quantity of requirement of rubber was what percent of the quantity of production?
- a) 25
- b) 72
- c) 65
- d) 70