

### Reasoning

The Reasoning Part has the following major topics:

1. General Mental Ability
2. Logical Reasoning
3. Non Verbal Reasoning

Here we need to emphasize mainly on the following topics for Civil Services, Bank PO, SSC .etc. Examination.

Under General Mental Ability the topics are:

1. Analogy
2. Classification
3. Blood Relation
4. Puzzle Test

5. Logical Venn Diagram
6. Numbers, Ranking and Time Sequence
7. Mathematical Operation
8. Logical Sequence of words
9. Arithmetic Reasoning

Under Logical Reasoning

None is necessary to be emphasised.

Under Non Verbal Reasoning

1. Non Verbal Intelligence Test
2. Series

### 1. Analogy

Analogy means 'similarity in meaning or sense'. The basic aim of analogy questions is to test a candidate's ability, knowledge etc. A candidate should have ability to compare and contrast, and he must remember that everyone does not have logical ability in equal meaning.

#### Type 1—Analogy means 'Correspondence'

**Illustrative Example:1**

Zoology : Animals :: Mycology : ?

- a. Skull
- b. Virus
- c. Fungi
- d. Algae

**Solution:** Zoology is the study about animals where as Mycology is the study about fungi. So, the answer is (c).

**Illustrative Example 2:**

Cattle : Herd :: Sheep : ?

- a. Swarm
- b. Flock
- c. Crowd
- d. Mob

**Solution:** Herd is a group of cattle. Similarly, flock is a collection of sheep. So, the answer is (b)

**Illustrative Example 3:**

MALE : LAME :: ? : SMILE

1. IMSE
2. MSEI
3. IMSE
3. IESM

1 2 3 4    3 2 1 4

**Solution:** 1. MALE  $\Rightarrow$  LAME

The first and third letters have been interchanged.

Therefore,

3 2 1 4    1 2 3 4

SMIE  $\Rightarrow$  IMSE

**Illustrative Example 4:**

Light : Dark :: Knowledge : ?

1. Study
2. Uneducated
3. Learn
4. Read

**Solution:** 2. Uneducated

Antonym (The words in the pair are antonyms)

Light  $\times$  Dark

Knowledge  $\times$  Uneducated

**Illustrative Example 5:**

Wimbledon Cup : Tennis :: Ranji Trophy : ?

1. Football
2. Hand Ball
3. Cricket
4. Chess

**Solution:** 3. These type of question are based on the General Knowledge. Wimbledon Cup is given for Tennis. Similarly, Ranji Trophy is given for cricket.

#### Practice Questions

**Directions:** In the following number/ letter series identify the missing term in each question.

1. Repec : Violin :: Tiger : ?
  - a. Camel
  - b. Cat
  - c. Tree
  - d. Wood
2. Pituitary : Brain :: Thyroid : ?
  - a. Stomach
  - b. Liver
  - c. Neck
  - d. Mouth
3. Square : Perimeter :: Circle : ?
  - a. Area
  - b. Perimeter
  - c. Circumference
  - d. Ellipse
4. Physiology : mind :: Cardiology : ?
  - a. Lungs
  - b. Heart
  - c. Brain
  - d. Liver
5. Warrior : Sword :: Gardener : ?
  - a. Harrow
  - b. Rod
  - c. Blade
  - d. Flowers
6. Birds : Ornithology :: Eggs : ?
  - a. Occultism
  - b. Zoology
  - c. Entomology
  - d. Oology

### Answers

- (b) Repec is an instrument that resembles violin. Similarly, cat is an animal that resembles tiger.
- (c) Pituitary is a gland located in the brain. Similarly, thyroid is also a gland located in the neck.
- (c) Perimeter is the length along a square, i.e. length of all of its four sides. Circumference is also a length along a circle.
- (b) Phycology is a study about algae. Similarly, Cardiology is the study about heart.
- (a) Sword is a weapon used for war to fight with the enemies. In the same way, harrow is an instrument used for gardener to maintain garden.
- (d) Ornithology is the study about birds. Similarly, Oology is the study about eggs.

### Type 2 – Choosing A Similar Word

In this type, you are given three words followed by four other words as alternatives. The candidate is required to choose the word which is similar to the given three words.

#### Illustrative Example 1:

Pen : Pencil : Fountain Pen

- |                 |                     |
|-----------------|---------------------|
| a. Reading      | b. Writing Material |
| c. School items | d. Plastic Items    |

#### Solution:

Pen, Pencil and Fountain Pen are all writing materials.

Hence the answer is (b).

### Practice Questions

**Direction:** In each of the following questions a group of three inter related words are given. Choose a word from the given alternatives which is similar to the given three words.

- Stem : Leaf : Branch
 

a. Wood	b. Tree
c. Teak	d. Fertiliser
- Cytology : Botany : Taxonomy
 

a. Biology	b. Physics
c. Seismology	d. Morphology
- Dbase : Lotus : C+
 

a. Cyclotron	b. Software Packages
c. Electronics	d. Computer
- Everest : K<sub>2</sub> : Nandadevi
 

a. Zaskar	b. Blue Mountain
c. Elagiri	d. Anaimudi
- Coal : Night Sky : Soot
 

a. Raven	b. Brink
c. Colours	d. White
- Liver : Heart : Brain
 

a. Hand	b. Kidney
c. Leg	d. Skin

### Answers

- (b) All are parts of a tree

- (a) All are branches of biology
- (b) All are software packages
- (d) All are mountain peaks, while other alternatives contain names of mountain ranges
- (a) All are black in colour
- (b) All are organs of human body

### Type 3 – Choosing the Analogous Pair

In this type, a pair of words is given followed by four pairs of words as alternatives. The candidate is required to choose the pair in which the words bear the same relationship to each other as the words of the given pair bear.

- Numismatist : Coins
 

a. Cartographer	: Maps
b. Jeweller	: Jewels
c. Geneticist	: Chromosomes
d. Botanist	: Plants
- CEN : FHQ
 

a. S U V	: F I L
b. T K R	: W M U
c. T K R	: W N U
d. M O P	: P R T
- HSFP : T B W D
 

a. L R U I	: M Q V H
b. L Q U J	: W Q W N
c. J F S I	: L I V M
d. D B M I	: T K R S
- RCNV : TFRA
 

a. J F S I	: L I W N
b. M O S V	: S M O P
c. L I W N	: M Q V P
d. E G P N	: W M U S
- Create : Destroy
 

a. Alight	: Descend
b. Mend	: Repair
c. Kindle	: Deny
d. Chaos	: Peace
- Brain : Edge
 

a. Sink	: Float
b. Robust	: Weak
c. Alight	: Descend
d. Crime	: Sin

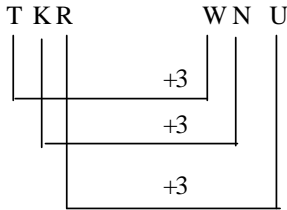
### Answers

- (d) Numismatist is the research person about coins. Similarly, research person about plants is Botanist

- (c) CEN : F R Q
 

		+3		
		+3		
		+3		

Similarly,



Now  $7^3 + 7 = 343 + 7 = 350$

So, if the first number is  $x$ , the second number is  $x^3 + x$ .

Thus, the relationship is  $x : x^3 + x$ . Hence, the answer is (b)

**Example-2**

336 : 168

a. 27 : 9

b. 36 : 24

c. 48 : 24

d. 96 : 38

**Solution:** Clearly, the relationship is  $2x = x$ . This relation exists in (c). So, the answer is (c)

**Example-3**

Which number is like the given set of numbers?

Given Set (63:108:27)

a. 236

b. 148

c. 45

d. 70

**Solution:**

Clearly, the numbers in the given set are all divisible by 9.

Hence, the answer is 45 and so belongs to the same group.

**Example-4**

Which set of numbers is like the given set? Given Set : (39,30,3)

a. (26,20,2)

b. (48,36,4)

c. (87,75,5)

d. (36,40,3)

**Solution:** Clearly, in the given set the first number is 13 times the third and the second number is 10 times the third. A similar relationship exists between the numbers in the group (26,20,2)

### Practice Questions

**Directions:** In each of the following questions, there is a certain relation between two given numbers on one side of : and one numbers is given on another side of : while another is to be found from the given alternatives having the same relation with this number as the numbers of the given pair bear. Choose the best alternative.

1. 36:216 :: 81 : ?

a. 826

b. 729

c. 629

d. 319

2. 11: 132 :: 23: ?

a. 312

b. 426

c. 552

d. 712

3. 11:110 :: 13: ?

a. 169

b. 182

c. 248

d. 156

4. 25 : 81 : 36 : ?

a. 36

b. 256

c. 86

d. 126

5. 10 : 7 :: 14 : ?

a. 9

b. 28

c. 10

d. 11

6. 12: 132 :: 13: ?

a. 148

b. 156

c. 166

d. 11

7. 216:49:: 125 : ?

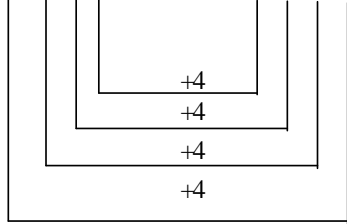
a. 36

b. 81

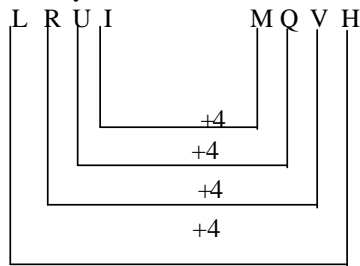
c. 100

d. 186

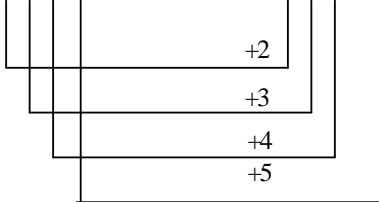
3. (a) H S P F T B W D



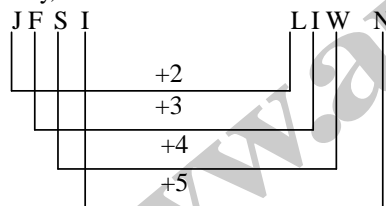
Similarly,



4. (a) R C N V T F R A



Similarly,



5. (d) The words in each pair are antonyms of each other.

6. (c) The words in each pair are synonyms of each other.

### TYPE 4 - NUMBER ANALOGY

**Example-1**

9:738 :: 7 : ?

a. 650

b. 350

c. 750

d. 550

**Solution:**

Clearly  $9^3 + 9 = 729 + 9 = 738$

8.  $10:60::20:?$   
 a. 120                      b. 140  
 c. 80                        d. 100
9.  $36:126::81:?$   
 a. 200                      b. 201  
 c. 196                      d. 240
10.  $8452:7341::6457:?$   
 a. 5346                     b. 5436  
 c. 6346                     d. 6146
- Answers**
1. (b). Here the relationship is  $x^2=x^3$   
 (i.e) Given set, we have  $6^2=6^3$   
 Similarly,  $9^2=9^3$  (i.e) 81:729
2. (c). Here the relationship is  $x^2:(x^2+x)$   
 (i.e)  $11^2:(11^2+11)$   
 Similarly,  $(23^2+23)=552$
3. (d). Here the relationship is  $x:(x^2-x)$   
 (i.e)  $11:(121-11)$   
 Similarly,  $13:(13^2-13)$   
 (i.e) 13:156
4. (b). Here the relationship is  $x^y=(x-2)^{y+2}$   
 (i.e)  $5^2:(5-2)^{2+2}$
5. (a) Here the relationship is  $2x:(x+2)$   
 (i.e)  $2 \times 7:(7+2)$   
 $14:9$
6. (a) Here the relationship is  $x:(x^2-x)$   
 Similarly,  $13:(169-13)$   
 $13:156$
7. (a) Here the relationship is  $x^3=(x+1)^2$   
 Here  $x=5$  then  $5^3=(5+1)^2$   
 $125:36$
8. (a) Here the relationship is  $(2x-x):6x$   
 (i.e)  $x=20$ ,  
 then  $(40-20):120$   
 $20:120$
9. (b) Here the relationship is  $x^2:(x+5)^2+5$   
 (i.e),  $x=9$   
 $9^2:(9+5)^2+5$   
 $81:201$
10. (b) Here the relationship is  $x:(x-1111)$   
 Hence,  $(6457-1111)=5436$

## 2. Classification

Classification means putting together elements in a group or class together, on the basis of their common characteristic and separating the elements not sharing the common characteristic. In such questions, a group of 4 or 5 elements are given in which 3 or 4 are have the same characters and the remaining one is not related with the rest objects. The candidate is required to choose this one item which should not fit into the given group.

### Example-1

Find the odd one out.

- a. Potato                    b. Ginger  
 c. Beetroot                d. Brinjal

**Solution:** Here the odd one is Brinjal since all the others except Brinjal grow inside the soil.

### Example-2

Find the odd one out.

- a. BDSR                     b. FHNM  
 c. SUZA                    d. MOGF

**Solution:** (c)

B	$\xrightarrow{+2}$	D	S	$\xrightarrow{-1}$	R
F	$\xrightarrow{+2}$	H	N	$\xrightarrow{-1}$	M
S	$\xrightarrow{+2}$	U	Z	$\xrightarrow{-1}$	A
M	$\xrightarrow{+2}$	O	G	$\xrightarrow{-1}$	F

So, the odd one is SUZA

### Example-3

Find the Odd one out.

- a. Light                                      b. Heat  
 c. Sound                                    d. Physics

**Solution:** Here, the odd one is Physics. All except Physics are branches of Physics. Hence, the answer is (d)

### Example-4

Find the odd one out.

- 2, 10, 30, 68, 128  
 a. 10                                         b. 30  
 c. 68                                         d. 128

**Solution:** Here the odd one is 128

Since

$2 = 1^3$	+	1
$10 = 2^2$	+	2
$30 = 3^3$	+	3
$68 = 4^3$	+	4
$128 \neq 5^3$	+	$5=30$

It must be  $125 + 5 = 130$

Hence, the answer is (d)

### Example-5

Find out the odd one out.

- a. 24, 64                                      b. 36, 96  
 c. 27, 72                                      d. 6, 24

**Solution:**

Hence, the answer is (d).

In all others, the smaller number is three times of some number and the bigger number is eight times the same number.

For Example:

$$8 \times 3 = 24 \text{ and } 8 \times 8 = 64$$

$$12 \times 3 = 36 \text{ and } 12 \times 8 = 96$$

$$9 \times 3 = 27 \text{ and } 9 \times 8 = 72$$

While in the answer option

$$2 \times 3 = 6 \text{ and } 2 \times 12 = 24$$

Hence, the odd one is (d)

### Practice Questions

**Directions:** In each of the following questions, four words have been given, out of which three are alike in some manner and the fourth one is different. Choose out the odd one.

- a. Skull                                b. Heart  
c. Liver                                d. Lung
- a. Bitch                                b. Bee  
c. Niece                                d. Stag
- a. Heart                                b. Brain  
c. Lung                                d. Tongue
- a. Wheat                                b. Rice  
c. Peanut                                d. Mustard
- a. Mango                                b. Grape

- c. Watermelon                                d. Orange  
a. Lady                                        b. Bee  
c. Cub                                        d. Daughter

### Answers

- (a) All except skull are muscles while skull is made up of bone. Except skull, all are organs
- (d) Except stag, all are the female. Bitch is a female and the corresponding male is dog.

Some more examples

Male	Female
Dog	Bitch
Drone	Bee
Nephew	Niece
Stag	Doe
Lion	Lioness

- (c) All except lung are present in human body in single. But lung occurs in a human body in pair.
- (b) All except rice are rabi crops, while rice is a kharif crop
- (c) All except watermelon grow on trees, while watermelon grows on the ground.
- (c) All except cub are the female. So the odd one is cub. Since cub is the infant of lion.

## 3. Blood Relations

### Blood Relations

The following hints will help to solve the problems in blood relations problem.

- Mother's / Father's Brother : Uncle
- Mother's / Father's Sister : Aunt
- Mother's / Father's Father : Grandfather
- Mother's / Father's Mother : Grandmother
- Son's Wife : Daughter-in-law
- Daughter's Husband : Son-in-law
- Husband's / Wife's Brother : Brother-in-law
- Husband's / Wife's Sister : Sister-in-law
- Brother's Son : Nephew
- Brother's Daughter : Niece
- Brother's Wife : Sister-in-law
- Sister's Husband : Brother-in-law
- Grandson's / Granddaughter's / Daughter : Great grand daughter
- Uncle / Aunts' Son / Daughter : Cousin

### Type 1: Exercise

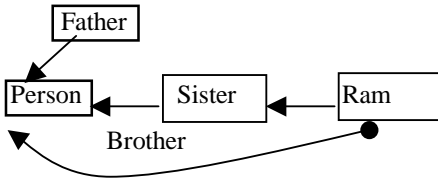
- Joshi told Shilpa, "the girl I met in the school was the youngest daughter of the brother-in-law of my friend's mother". How is the girl related to Joshi's friend?  
a. Aunt                                b. Niece  
c. Nephew                                d. Cousin
- Arun introduces Ramu as the son of the only sister of his father's wife. How is Ramu related to Arun?  
a. Son                                b. Brother  
c. Niece                                d. Cousin
- X introduces Y saying, "She is the wife of the grandson of the father of my father." How is Y related to X?  
a. Brother-in-law                                b. Sister-in-law  
c. Nephew                                d. Niece
- Pointing out to a photograph, a man tells his friend, "He is the son of the only son of my father's wife." How is the boy in the photograph related to the man?  
a. Son-in-law                                b. Son  
c. Nephew                                d. Brother-in-law
- If Arjun says, "Raju's mother is the only daughter of my mother". How is Arjun related to Raju.  
a. Father                                b. Brother-in-law  
c. Uncle                                d. Nephew
- A woman said to a man, "Your mother's husband's sister is my aunt." How is the man related to the woman?  
a. Nephew                                b. Uncle  
c. Brother                                d. Brother-in-law
- X introduced Y as the son of the daughter of the father of her uncle. Then Y is X's:  
a. Brother                                b. Daughter  
c. Cousin                                d. Grandson
- Pointing to a man, Suresh said, "His son is my son's uncle." How is the man related to Suresh?  
a. Brother                                b. Uncle  
c. Father                                d. Grandfather

9. Introducing Suji, Ajay said, "She is the wife of my father's only son." How is Suji related to his mother?  
a. Sister                      b. Niece  
c. Sister-in-law              d. Wife
10. Prem is son of Pankaj. Neha is the daughter of Arun. Roja is the mother of Neha. Arun is the brother of Neha. How is Arun related to Roja?  
a. Brother                      b. Father  
c. Son                          d. Cannot be determined
11. A man said, "This lady is the wife of the grandson of my father." Who is the lady to the man?  
a. Niece                      b. Sister – in – law  
c. Daughter – in – law      d. Daughter
12. Pointing to a man, a woman said, "His mother is the only daughter of my mother. How is the woman related to the man?"  
a. Mother                      b. Grandmother  
c. Sister                        d. Daughter
13. Pointing to a man in a photograph, a woman said, "His brother's father is the only son of my grandfather." How is the woman related to the man in the photograph?  
a. Sister                        b. Mother  
c. Aunt                         d. Grandmother
14. Pointing towards a person in a photograph, Ram said, "he is the only son of the father of my sister's brother." How is Ram related to the man in photograph?  
a. Father                      b. Uncle  
c. Himself                      d. Uncle
15. Pointing to a girl in the photograph, Prem said, "Her mother's brother is the only son of my mother's father." How is the girl's mother related to Prem?  
a. Mother                      b. Sister  
c. Aunt                         d. Grandfather
16. Introducing a man, a woman said, "His wife is the only daughter of my mother." How is that man related to the woman?  
a. Maternal Uncle          b. Brother  
c. Husband                    d. Father-in-law
17. Introducing a man to her husband, a woman said, "His brother's father is the only son of my grandfather." How is the woman related to this man?  
a. Mother                      b. Aunt  
c. Sister                        d. Daughter
18. Introducing a man, a woman said, "he is the only son of my mother's mother." How is the woman related to the man?  
a. Mother                      b. Aunt  
c. Sister                        d. Niece
19. A man introduces a woman as the daughter of the brother of his mother. How is the woman related to the woman?  
a. Niece                        b. Sister-in-law  
c. Cousine                    d. Aunt
20. Pointing to a woman, a man said "Her mother is the only daughter of my mother." How is the man related to the woman?  
a. Father                        b. Uncle  
c. Brother                      d. Nephew

### Answers

1. (d) Daughter of brother-in-law means niece. Niece of mother of Joshi's friend. The girl in question is the cousin of Joshi's friend
2. (d)  
Father's Wife                  - Mother  
Mother's sister                - Aunt  
Aunt's Son                     - Cousin  
So, Ramu is Arun's cousin. Hence the answer is d.
3. (b)  
Father's father                - Grandfather  
Grand father's  
Grand son                      - Brother  
Brother's wife                 - Sister-in-law  
Hence the answer is b
4. (b)  
Father's Wife                  - Mother  
Mother's only son              - Himself  
So, the boy is man's son. Hence the answer is b
5. (c)  
Only daughter of Arjun's mother- Arjun's Sister  
So, Raju's mother is Arjun's sister. Arjun is the brother of Raju's mother. Raju is maternal Uncle
6. (c)  
Your mother's husband      - Your father  
Your father's sister          - Your aunt  
So, man's aunt is woman's aunt and therefore the man is lady's brother
7. (a)  
Daughter of Uncle's father   - Uncle's sister  
Uncle's Sister                  - Mother  
Mother's son                    - Brother
8. (c)  
Suresh's son's uncle          - Suresh's Brother  
So, the man is Suresh's brother i.e. the man is Suresh's father
9. (c)  
My father's only son – Himself  
Wife of my father's only son – Wife of Ajay  
She is the sister-in-law of Ajay's mother
10. (c)  
Neha is the daughter of Arun and Roja is the mother of Neha. Arun is the brother of Neha i.e. Arun is the son of Roja
11. (c)  
Father's grandson             - son  
Son's wife                      - Daughter-in-law  
Therefore, the lady is the daughter-in-law of the man

12. (a)  
Only daughter of my mother - Herself  
Therefore, the woman is the mother of the man.
13. (a)  
Only son of woman's grandfather means woman's father.  
Man's brother's father means father of man. Therefore, the woman is the sister of man.
14. (c)



15. (a)  
Girl's mother's brother is the only son of Prem's mother's father means girl's mother is also the mother of Prem.
16. (c)  
Only daughter of my mother- Myself  
So, the man is woman's husband.
17. (c)  
Only son of her grandfather - Her father  
Man's brother's father - Man's father  
So, man's father is her father i.e. she is the man's sister
18. (d)  
My mother's mother - My grandmother  
My grandmother's only son - My maternal uncle  
So the woman is man's niece
19. (c)  
Brother of mother - Uncle  
Uncle's daughter - Cousin
20. (b)  
Only son of my mother - Himself  
So, the man is woman's uncle

**Type 2: Relation Puzzle**

1. P and Q are brothers. R and S are sisters. P's son is S's brother. How is Q related to R?  
a. Uncle                      b. Brother  
c. Father                      d. Grandfather
2. Given that:  
1. A is the father of B  
2. C is the son of A  
3. E is the daughter of B  
4. D is the brother of E  
The grand father of D is  
a. A   b. B   c. C   d. E

- Directions (3-7):** Read the following information carefully and answer the questions below:
- a. There are eight persons A, B, C, D, E, F, G and H  
b. E is G's son  
c. A is B's son and the only grandson

- d. C is married to F who is A's grandfather  
e. E is H's cousin who is also G's niece  
f. Three couples, all have children
3. How many son do C and F have?  
a. 1                              b. 2  
c. 3                              d. Can't be determined
4. H is the mother of  
a. A                      b. B                      c. C                      d. D
5. E is the nephew of  
a. G                      b. B                      c. D                      d. F
6. The unmarried in the following is  
a. G                      b. B                      c. B                      d. E
7. The husband of D is  
a. A                      b. H                      c. G                      d. C

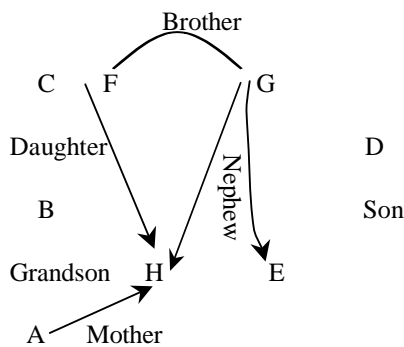
**Directions (8-14):** Read the following and answer the questions given below:

- a. a family consists of six members A, B, C, D, E and F  
b. A and C are married couple  
c. B is the son of C  
d. C is not the mother of B  
e. E is the brother of C  
f. D is the daughter A  
g. F is the brother of A
8. Which is a pair of brothers?  
a. C and E    b. B and D    c. A and F    d. A and D
9. Who is the brother of E?  
a. A    b. C    c. F    d. B
10. Who is the father of B?  
a. A    b. C    c. E    d. F
11. Who is the sister of B?  
a. A    b. B    c. E    d. F
12. How many children does A have?  
a. 4    b. 3    c. 2    d. 1
13. How many female members are there in the family?  
a. 1    b. 2    c. 3    d. 4
14. F is the brother of  
a. A    b. B    c. C    d. E

**Answers**

1. (a)  
P and Q are brothers  
Thus, P and Q are males  
R and S are sisters  
Thus, R and S are females  
P's son is S's brother  
That is P is the father of R and S and Q is the uncle of R.
2. (a)  
D is the brother of E  
E is the daughter of B  
⇒ D is the son of B  
Also, A is the father of B. So A is the grandfather of D.  
Hence the answer is A.

For questions (3-7)



3. (d)
4. (a)
5. (d)
6. (d)
7. (c)

For questions (8-14)

Persons	Sex	Relations
A	Female	Wife of C, Mother of B, and sister of F
B	Male	Son of C, Brother of D
C	Male	Father of B and D, Husband of A, Brother of E
D	Female	Daughter of A, Sister of B
E	Male	Brother of C
F	Male	Brother of A

8. (a)
9. (b)
10. (b)
11. (a)
12. (c)
13. (b)
14. (a)

### Type 3: Coded Relations

In these type of questions, the relationships are represented by certain codes or symbols. These are to be analysed.

#### Practice Questions

**Directions (1-8):** Read the following information carefully and answer the questions that follow.

- a.  $A + B$  means A is the father of B
  - b.  $A - B$  means A is the wife of B
  - c.  $A \times B$  means A is the brother of B
  - d.  $A - B$  means A is the daughter of B
1. If  $M - N + O + P$ , which of the following is true?
    - a. M is the daughter of P

- b. N is the aunt of M
  - c. M is the aunt of P
  - d. M is the sister of N
2. If  $M + N + P$ , which of the following is true?
    - a. M is the mother of P
    - b. N is the daughter of M
    - c. M is the aunt of N
    - d. M is the sister of N
  3. If  $M \times O - P$ , which of the following is true?
    - a. M is the uncle of N
    - b. M is the father of P
    - c. M is the brother of P
    - d. M is the son of P
  4. If  $M \times O \div P$ , which of the following is true?
    - a. M is the brother - in - law of P
    - b. M is the brother of P
    - c. M is the uncle of P
    - d. M is the father of P
  5. If  $M + O - P$ , Which of the following is true?
    - a. M is the brother of P
    - b. M is the son of P
    - c. M is the husband of P
    - d. M is the father of Q
  6. If  $M - O + P$ , which of the following is true?
    - a. M is the father of O
    - b. M is the brother of P
    - c. M is the mother of P
    - d. M is the sister of P
  7. If  $M \times O + P$ , which of the following is true?
    - a. M is the uncle of P
    - b. M is the father of P
    - c. M is the brother - in - law of P
    - d. M is the grandfather of P
  8. If  $M + O \times P$ , which of the following is true?
    - a. M is the sister of P
    - b. P is the husband of M
    - c. M is the sister - in - law of P
    - d. P is the son of M

**Directions (9-12):** Read the following information carefully and answer the questions that follow.

- a.  $A + B$  means A is the wife of B
  - b.  $A - B$  means A is the son of B
  - c.  $A \times B$  means A is the brother of B
  - d.  $A + B$  means A is the mother of B
  - e.  $A \# B$  means A is the sister of B
9. What does  $M \# O \div N$  mean?
    - a. M is the aunt of N
    - b. M is the sister of N
    - c. N is the niece of M
    - d. N is the daughter of M



10. What does  $M \# O - N$  mean?  
a. M is the aunt of N  
b. M is the daughter of N  
c. M is the niece of N  
d. M is the sister of N
11. What does  $M \times O \div N$  mean?  
a. M is the brother of O  
b. M is the father of N  
c. M is the uncle of N  
d. M is the nephew of N
12. What does  $M - O + N$  mean?  
a. N is the father of M  
b. N is the Son of M  
c. N is the uncle of M  
d. N is the brother of M

**Directions (13-15):** Read the following information and answer the questions that follow.

- $A + B$  means A is the wife of B
  - $A - B$  means A is the daughter of B
  - $A \times B$  means A is the son of B
13. If  $M \times N + P$ , which of the following is true?  
a. P is the wife of N  
b. P is the father of M  
c. M is the daughter of N  
d. N is the daughter of M
14. If  $T + P \times B + F$ , which of the following is not true?  
a. B is the mother of P  
b. F is the husband of B  
c. T is the wife of P  
d. P is the daughter of B
15. If  $Z \times T + P \times U - M$ , what is U to Z?  
a. Mother  
b. Grandmother  
c. Father  
d. Can't be determined

### Answers

1. (c)  
 $M - N + O + P$  means M is the daughter of N who is the father of O who is the father of P i.e. M is the sister of the father of P i.e. M is the aunt of P
2. (a)  
 $M + N + P$  means M is the wife of N who is the father of P.  
 $\Rightarrow$  M is the mother of P
3. (d)  
 $M \times O - P$  means M is the brother of O who is the daughter of P.  
 $\Rightarrow$  M is the son of P
4. (a)  
 $M \times O \div P$  means M is the brother of O who is the wife of P  
 $\Rightarrow$  M is the brother - in- law of P
5. (c)  
 $M + O - P$  means M is the father of O who is the daughter of P.  
 $\Rightarrow$  M is the father of O and P is the mother of O  
 $\Rightarrow$  M is the husband of P
6. (d)  
 $M - O + P$  means M is the daughter of O who is the father of P.  
 $\Rightarrow$  M is the sister of P
7. (a)  
 $M \times O + P$  means M is the brother of O who is the father of P  
 $\Rightarrow$  M is the uncle of P
8. (c)  
 $M \div O \times P$  means M is the wife of O who is the brother of P.  
 $\Rightarrow$  M is the sister- in - law of P
9. (a)  
 $M \# O \div N$  means M is the sister of O who is the mother of N.  
 $\Rightarrow$  M is the aunt of N
10. (b)  
 $M \# O - N$  means M is the sister of O who is the son of N  
 $\Rightarrow$  M is the daughter of N
11. (c)  
 $M \times O \div N$  means M is the brother of O who is the mother of N.  
 $\Rightarrow$  M is the uncle of N
12. (a)  
 $M - O + N$  means M is the son of O who is the wife of N.  
 $\Rightarrow$  N is father of M
13. (b)  
 $M \times N + P$  means M is the son of N who is the wife of P  
 $\Rightarrow$  M is the son of P or P is the father of M.
14. (d)  
 $T + P \times B + F$  means T is the wife of P who is the son of B who is the wife of F.  
 $\Rightarrow$  T is the wife of the son of F  
 $\Rightarrow$  T is the daughter-in-law of F.  
But as this is not given in the choice, so the fact in (d) derived from  $P \times B$  is true.
15. (b)  
 $Z \times T + P \times U$  means Z is the son of T who is the wife of P who is the son of U.  
 $\Rightarrow$  Z is the son of P who is the Son of U  
 $\Rightarrow$  Z is the grandson of U or U is the grandmother/ grandfather of Z, So (b) is true.

### 4. Puzzle Test

#### Type 1

#### Practice Questions

**Directions:** Answer the following questions on the basis of statement given below.

In a university, there were five friends. A and B were studying Tamil and French. C and B were studying French and History. D and A were studying Physics and Tamil. E and B were studying Geography and Urdu.

- Who among the students was studying maximum number of subjects?  
a. A                      b. B                      c. C                      d. D
- Which of the following pairs was studying both History and Tamil?  
a. A and C    b. B  
c. C and D    d. None of these
- More than two friends were studying which subject?  
a. Tamil    b. History  
c. Urdu    d. Physics
- D, B and A were studying which of the following subjects?  
a. French only    b. Tamil and French  
c. Tamil only    d. Physics
- Who among the students was studying less than two subjects?  
a. A    b. B  
c. D    d. Data is inadequate

**Directions:** Read the following information carefully and answer the questions that follow.

There are 6 cities A, B, C, D, E and F.

A is a historical place and not a hill station.

B and E are not historical places.

D is not a twin city.

A and B are not alike.

D is not a historical city.

- Which two cities are twin cities?  
a. C and E    b. B and E  
c. E and A    d. B and F
- Which two cities are historical places?  
a. A and D    b. A and C  
c. E and D    d. D and F
- Which two cities are hill stations?  
a. A and D    b. A and F  
c. E and D    d. D and F
- Which city is a hill station and a twin city but not a historical place?  
a. A    b. B    c. D    d. E
- Which two cities are neither historical places nor twin cities?  
a. A and B    b. B and E  
c. B and D    d. A and F

**Directions:** Read the following information carefully and answer the questions that follow.

Mani and Sruthi are good in Sports and Culture. Prabhu and Sruthi are good in G.K. and Culture. Arjun Prabhu and Niti are good in Tamil and G.K. Niti and Arjun are good in Tamil and Maths.

- Who is good in Sports, G.K. and Culture?  
a. Arjun    b. Mani  
c. Sruthi    d. Niti
- Who is good in Tamil, G.K and Culture?  
a. Prabhu    b. Sruthi  
c. Mani    d. Arjun
- Who is good in G.K, Tamil, Sports and Maths?  
a. Prabhu    b. Niti  
c. Mani    d. Arjun
- Who is good in Tamil, G.K and Maths but not in Sports?  
a. Mani    b. Prabhu  
c. Niti    d. Arjun

#### Answer

**For questions (1–5)** The given information may be analyzed as under

	Tamil	French	History	Physics	Geography	Urdu
A	√	√		√		
B	√	√	√		√	√
C		√	√			
D	√			√		
E					√	√

- (b) B studying maximum number of subjects (i.e.) 5 viz. Tamil, History, Physics, French and Urdu.
- (b) Only B studies both History and Tamil.
- (a) Three students A, B and D were studying Tamil.
- (c) D, B and A were studying Tamil.
- (d) None of the students was studying less than two subjects.

**For questions (6–10)**

	A	B	C	D	E	F
Historical	√	×	√	×	×	√
Twin cities	×	×	√	×	√	√
Hill stations	×	√	√	√	√	√

Since A and B are not alike and because A is Historical, B cannot be historical but only a hill station. So, we put cross for B across Historical

- (a) Clearly C, E and F are twin cities. So, the answer is a.

7. (b) Clearly A, C and F are historical places. So A and C are historical places.
8. (c) Clearly B, C, D, E and F are hill stations. So the answer is c.
9. (d) Clearly E is a hill station and twin city but not a historical place.
10. (c) B and D are neither historical places nor twin cities. So the answer is c.

### For questions (11–15)

	Culture	Sports	Tamil	G.K.	Maths
Mani	√	√	√		
Sruthi	√	√		√	
Arjun		√	√	√	√
Prabhu	√		√	√	
Niti			√	√	√

11. (c) Sruthi is good in Sports, G.K. and Culture.
12. (a) Prabhu is good in Tamil, G.K and Culture.
13. (d) Arjun is good in Sports, Tamil, G.K and Maths.
14. (c) Niti is good in Tamil, G.K and Maths but not in Sports.

### Type 2: Seating Arrangements

#### Practice Questions

**Directions (1–5):** Study the given information carefully and answer the questions that follow.

- (i) A, B, C, D, E, F and G are sitting in a row and all of them are facing west.
  - (ii) D is sitting immediate right of C.
  - (iii) B is at extreme end and has E as his neighbour.
  - (iv) F is between E and G.
  - (v) C is sitting third from the south.
1. Who is sitting to the left of B?  
a. E    b. A    c. C    d. D
  2. Which of the following pairs of people are sitting at the extreme ends?  
a. AB    b. BC    c. DE    d. FD
  3. G is sitting between which of the following pairs of the people?  
a. FC    b. FA    c. EF    d. FA
  4. Which of the conditions (i) to (v) given above is not required to find out the place in which A is sitting?  
a. (i)    b. (ii)  
c. (iii)    d. All are required
  5. Who is sitting to the next of A?  
a. D    b. B    c. C    d. E

**Directions (6–10):** Read the following information carefully and answer the questions given below it:

- (i) 8 persons P, Q, R, S, T, U, V and W are seated around square table, two on each side.
- (ii) There are 3 lady members and they are not seated next to

each other.

- (iii) U is between Q and W.
  - (iv) R is between T and Q.
  - (v) S, a lady member, is second to the left of U.
  - (vi) Q, is a male member is seated opposite P, a lady member.
  - (vii) There is a lady member between Q and T.
6. Who among the following is seated between P and S?  
a. Q    b. T  
c. None of these    d. Cannot be determined
  7. How many persons are seated between V and Q?  
a. 1    b. 2  
c. 3    d. Cannot be determined
  8. Who among the following are the three lady members?  
a. P, S, R    b. P, T, U  
c. U, V, W    d. S, V, W
  9. Who among the following is to the immediate left of Q?  
a. R    b. T  
c. U    d. Can't be determined
  10. Which of the following are not female members?  
a. P    b. T    c. R    d. S

**Directions (11–15):** Read the following information and answer the questions that follow:

- (i) 6 friends A, B, C, D, E and F are sitting in a circle
  - (ii) C is to the left of D
  - (iii) F is between A and E
  - (iv) E is between F and D
11. Who is to the left of E?  
a. A    b. C    c. D    d. F
  12. Who is to the right of F?  
a. A    b. B    c. C    d. D
  13. Which of the above given statements is superfluous?  
a. 1    b. 2  
c. 3    d. None of these
  14. B is sitting between .....?  
a. AC    b. CB    c. EF    d. FB
  15. Who is the right of D?  
a. A    b. E    c. C    d. F

#### Answers

#### For Questions (1–5)

D is to the left of C and C is third from the south. So, B will be at the extreme end from north because it should have E as its neighbour. G is between F and C. So, the sequence is

1. (a) E is sitting to the left of B.
2. (a) A and B are sitting at the extreme ends.
3. (a) G is sitting between F and C.
4. (d) All statements are required to answer the position of A.
5. (a) D is sitting next of A.

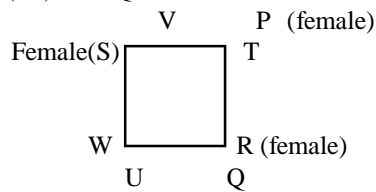
#### For Questions (6–10)

U is between W and Q (i.e.) WUQ  
R is between T and Q (i.e.) QRT

(i.e.) sequence becomes WUQRT

S is second to the left of U

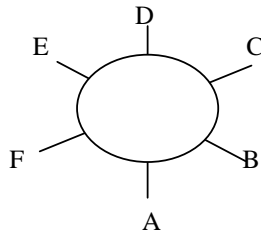
(i.e.) SWUQRT



P is seated opposite Q. Since R is between Q and T and so R is a female member

6. (c) V is seated between P and S.
7. (c) S, W and U are seated between V and Q.
8. (b) The 3 lady members are P, S and R.
9. (c) U is to immediate left of Q.
10. (a) Clearly T is a male member.

**For questions (11 – 15)**



Clearly, in the circle the arrangement is shown as

11. (c) D is the left of E
12. (a) A is to the right of F
13. (d) None of these. Since all the statements are necessary to determine the arrangements.
14. (a) AC
15. (b) E is in the right of D

### Type 3: Comparison Type Questions

#### Practice Questions

**Directions (1–5):** Read the following carefully and answer the questions following.

- (i) A, B, C, D and E each having different height – students of a college
  - (ii) A weighs thrice as much as B
  - (iii) B weighs 5 times as much as C
  - (iv) C weighs half as much as D
  - (v) D weighs half as much as E
  - (vi) E weighs less than A but more than B
1. Which of the following is the heaviest in weight?  
a. A    b. B    c. C    d. D
  2. Which of the following is the lightest in weight?  
a. A    b. B    c. C    d. D
  3. E is lighter in weight than which of the other two students?  
a. A, B    b. D, C    c. A, C    d. A, B
  4. E is heavier than which of the following two students?

a. D, B    b. D, C    c. A, C    d. A, B

5. Which of the following represents the descending order of weights of the students?  
a. A, B, E, D, C    b. A, E, B, C, D  
c. A, C, D, B, E    d. B, C, A, E, D
6. There are five friends A, B, C, D and E. A is shorter than B but taller than E. C is taller than B. D is a bit taller than A. Which of the following is the tallest person?  
a. C    b. E    c. D    d. A
7. Out of 5 friends, A is shorter than B but taller than E. C is the tallest and D is a little shorter than B and a little taller than A. Who is the shortest?  
a. A    b. E    c. C    d. D
8. P is elder to Q while R and S are elder to T who lies between P and R. If R is elder to Q, which one of the following statement is necessarily true?  
a. P is elder to R    b. R is elder to S  
c. S is elder to R    d. T is elder to Q

**Directions (9–13):** Study the information given below and answer the questions that follow:

- (i) P, Q, R, S, T and U are six persons in a room
  - (ii) U is taller than B and C
  - (iii) Q and R are heavier than P
  - (iv) Q is lighter than S; S is taller than R
  - (v) S is taller than T; T is taller than U
  - (vi) S is lighter than U
  - (vii) P is shorter than T but taller than U
9. Who among them is tallest?  
a. S    b. Q    c. P    d. T
  10. Who among them is shortest?  
a. Q or R    b. Q or T  
c. P or Q    d. Q or S
  11. Who is the third from top when they are arranged in descending order of height?  
a. P    b. Q    c. R    d. T
  12. Which of the following groups of friends is shorter than P?  
a. Q, R only    b. S, R, Q only  
c. T, Q, R only    d. U, Q, R only
  13. Who among them is lightest?  
a. P    b. Q  
c. R    d. Data inadequate
- Directions (14–18):** Read the information given below and answer the questions that follow:
- A + B means A is older than B  
A – B means B is older than A  
A # B means A and B are of the same age
14. Murali – Prabhu # Sunil means  
a. Murali is the youngest  
b. Murali is the oldest  
c. Prabhu alone is the oldest  
d. Sunil is the youngest
  15. Suri # Devi + Raju means

- a. Raju is the oldest
  - b. Raju is the youngest
  - c. Devi is older than Suri
  - d. None of these
16.  $Z - Y - X$  is same as
- a.  $X + Y + Z$
  - b.  $X \# Y + Z$
  - c.  $X + Y - Z$
  - d.  $X - Y + Z$
17. For an expression Uma – Shobha – Ravi, which of the following cannot be correct under any circumstances?
- a. Ravi is the son of Uma
  - b. Ravi is the oldest
  - c. Shobha is the daughter of Ravi
  - d. Uma is the daughter of Ravi
18. For an Expression, Raju + Mahesh + Devi, which of the following cannot be correct under any circumstances?
- a. Mahesh is the youngest
  - b. Raju is the oldest
  - c. Devi is the daughter of Raju
  - d. None of these

Answers

For questions (1-5)

Let C's weight be  $X$   
 Then D's weight is  $2x$   
 Then E's weight is  $4x$   
 B's weight is  $5x$   
 $\therefore$  A's weight is  $15x$   
 So the order of weights can be  
 $A > B > E > D > C$

- 1. (a) A is the heaviest in weight
- 2. (c) C is the lightest in weight
- 3. (a) E is lighter in weight than A and B
- 4. (b) E is heavier than D and C
- 5. (a) Clearly the descending order of weights A, B, E, D, C
- 6. (a) The order is  $C > B > D > A > E$   
So, the tallest person is C
- 7. (b) The order is  $C > B > D > A > E$   
So, the shortest person is E
- 8. (d) In terms of age we have  
 $Q < P, T < R, T < S, Q < R$

Since T lies between P and R, the sequence becomes  
 $Q < P < T < R < S$  (or)  $Q < P < T < S < R$

Clearly T is elder to Q. Hence (d) is necessarily true.

For questions (9–18): In terms of height, we have  $Q < U, R < U, R < S, T < S, U < T, P < T, U < P$

So,  $R < U < T < S, Q < U, U < P < T$

Thus the sequence becomes

$Q < R < U < P < T < S$  (or)

$R < Q < U < P < T < S$

In terms of weight, we have

$P < Q, P < R, Q < S, S < U, P < R$

- 9. (a) Clearly, tallest person is S
- 10. (a) Clearly shortest person is either Q or R
- 11. (a) The descending order of height is  
 $S > T > P > U > Q > R$  (or)  
 $S > T > P > U > R > Q$   
Clearly, P is third from the top.
- 12. (d) Clearly, U, Q and R are shorter than P
- 13. (d) Data is inadequate as no clue regarding T's weight is given
- 14. (a) Murali – Prabhu means Murali is younger to Prabhu .....(1)  
Prabhu # Sunil means Prabhu and Sunil are of the same age .....(2)  
From (1) & (2)  
 $\therefore$  Murali is the youngest
- 15. (b) Suri # Devi means, Suri and Devi are of the same age .....(1)  
Devi + Raju means Devi is older than Raju ..... (2)  
From (1) and (2)  
Raju is the youngest
- 16. (a)  $Z - Y - X$  means; Y is older than Z and X is older than Y  
This can also be written as  $X + Y + Z$ .
- 17. (a) Uma – Shobha – Ravi means Shobha is older than Uma and Ravi is older than Sobha.  
So Ravi the oldest of the three  
 $\therefore$  Ravi is the son of Uma is not possible
- 18. (a) Raju + Mahesh + Devi means Raju is older than Mahesh and Mahesh is older than Devi. So Mahesh is the youngest is wrong.

5. Logical Venn Diagrams

SYNOPSIS

In the logical diagram test, which are also popularly known as Venn diagrams, certain groups of items are illustrated with geometrical figures like circle, square and triangle etc. Venn diagram is a figure used to represent relationships

between sets. In this diagram, two separate figures show disjoint sets, while overlapping figure represents intersecting sets. This test aims to relate certain groups of the items with the given diagram and mark the correct answer from the alternative given.

### Solved Examples

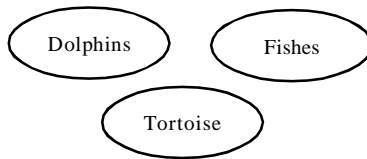
#### TYPE 1

In this type, a set of items or elements is given. You are asked to relate them through some common property and represent the relationship diagrammatically. The following categories of relationship can be illustrated.

**Category (A):** The different groups given in a set do not have any relationship with each other. Therefore, they are represented by disjointed figures.

*Ex.* Dolphins, fishes and tortoises

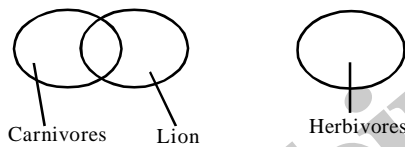
These are all separate animals and are entirely different from each other. Therefore, they should be represented by the disjointed circles.



**Category (B):** Two items in a set have some relationship, while third item does not have any relationship with others. Therefore, the two items which have some relationship are represented by intersection of figures, and the third item is represented separately.

*Ex.* Carnivores, Lions, herbivores.

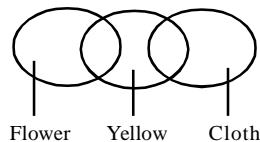
In the given set, lion is a carnivore, but some carnivores are also herbivores. Therefore, carnivores and lions are represented as intersection of figures, while herbivores represented separately.



**Category (C):** In the given set, when the two items are partially related to the third, and are independent of each other. Therefore, they are depicted by three intersecting circles in a line.

*Ex.* Flowers, Yellow, Cloth

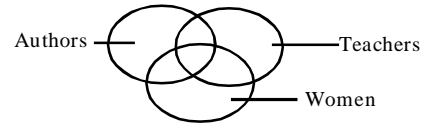
Some flowers and some cloths are yellow. But, not all the flowers and cloths are yellow. Therefore, given items in a set would be represented by three intersecting circles in a line.



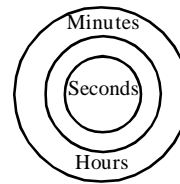
**Category (D):** In a given set, when all the three items are partially related to each other and is represented by three mutually intersecting circles.

*Ex.* Authors, teachers, women

Some authors can be teachers. Some teachers can be women. Some women can be authors. Therefore, the given items are partially related and represented by three mutually intersecting circles.



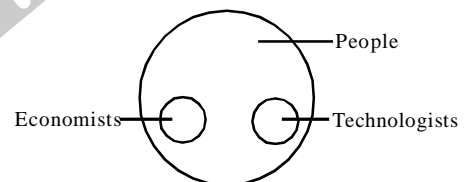
**Category (E):** In a given set, when all the three items represent the same class, and are fully interrelated to each other, they are represented in the form of three concentric circles.



**Category (F):** In a given set, when the two items belong to the class of third item, therefore they are represented by two disjointed circles within a larger circle.

*Ex.* People, Economists, Technologists.

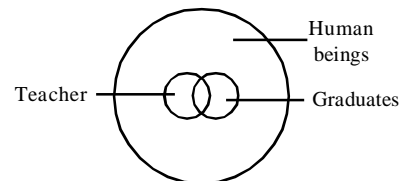
Economists and the technologists are separate specialists but both are people. Therefore, economists and technologists are different from each other, and represented by separate disjointed circles with in a larger figure.



**Category (G):** In a given set, when two items belong to the class of third, but the two items have some relationship. Therefore, two items having some relationship are represented by intersecting figures within a larger circle. The larger circle represents the third item.

*Ex.* Human beings, Teachers and Graduates

Some teachers may be graduates. Therefore, teachers and graduates are represented by two intersecting circles. Also, both teachers and graduate are human beings, therefore a larger circle encircles the two intersecting circles.

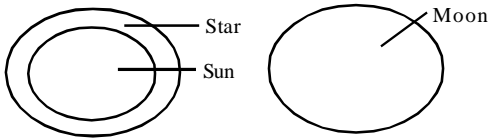


**Category (H):** In a given set of items, one item belongs to the

class of second while the third item is purely different from the two. Therefore, the two items having relationship are represented by two concentric circles, while the third item is represented by a third circle separately

**Ex.** Sun, Star, Moon

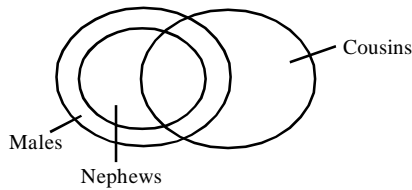
All stars are sun. Therefore, this would be represented by two circles. But the moon is entirely different from the two, hence, is represented by a separate circle.



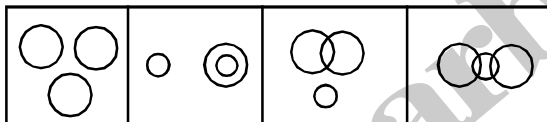
**Category (I):** In a given set of items, one item belongs to the class of second and the third is partly related to the two. Therefore, the two items having relationship are represented by two concentric circles and the third item represented as circle would intersect the two concentric circles.

**Ex.** Males, Nephews, Cousins

All nephews are males. Therefore, they are represented within two concentric circles. But cousins can be nephews or nieces. Hence, the circle representing cousins would intersect the two concentric circles.



**Ex.1.** Which one of the following diagrams represents smokers, lawyers, non-smokers?



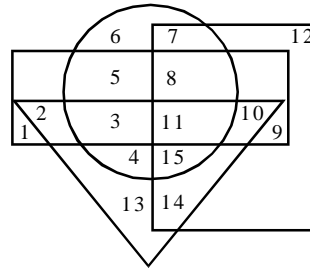
(a) (b) (c) (d)

**Sol:** Some lawyers can be smokers and some lawyers can be non-smokers. Hence, the answer is (d)

### Type II

In this type of Venn diagrams, a number of interlocking geometrical figures are given, and each geometrical figure in the diagram represents a certain class. You are required to study and analyse the figure carefully and answer the question from the given data.

**Ex. 2.** In the Venn – diagram below, Circle represents sportspersons, Square represents unmarried persons, Triangle represents woman and Rectangle represents educated persons. Each section is numbered. Study the diagram and answer the following questions.



Which sections are represented by No. 11?

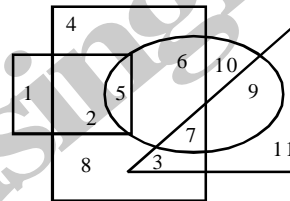
- |             |                 |
|-------------|-----------------|
| (a) Married | (b) Unmarried   |
| Educated    | Uneducated      |
| Woman       | Woman           |
| Sportsmen   | Sports- persons |
| (c) Married | (d) Unmarried   |
| Education   | Educated        |
| Sportsmen   | Sportswomen     |

**Sol:** Since (d) is common between the circle, square, triangle and rectangle, therefore, it represents unmarried educated sportswomen

Hence, the answer is (d)

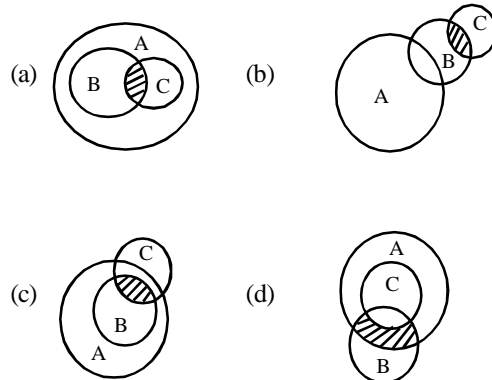
### Practice Questions

1. Which number is in the square, ellipse and triangle?

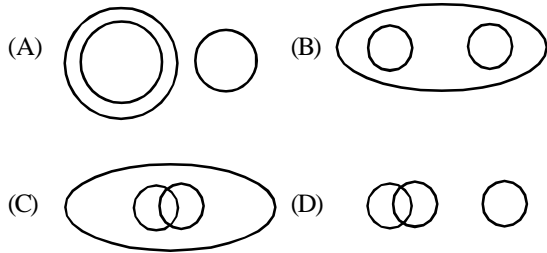


- (a) 1 (b) 5 (c) 6 (d) 7

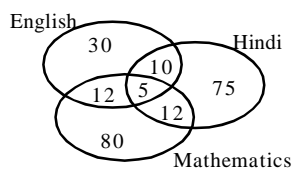
2. Most guitarists are bearded males. If A represents all males, B represents bearded males and C represents all male guitarists, then the correct diagram for their relation (shaded portion) is



**Directions . (3-7) :** In each of the following questions, three classes have been given. Out of the four alternative figures representing relationships, mark the one which is most appropriate to the classes in each of the questions.

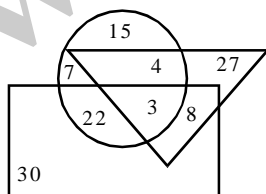


3. Males, Fathers, Engineers  
(a) A (b) B (c) C (d) D
4. Parrot, Animal, Pet  
(a) A (b) B (c) C (d) D
5. Artist, Painter, Scooter  
(a) A (b) B (c) C (d) D
6. Trees, Mango, Banana  
(a) A (b) B (c) C (d) D
7. Courier, Parcel, E-mail  
(a) A (b) B (c) C (d) D
8. The given diagrams show the number of students who failed in an examination comprising papers in English, Hindi and Mathematics. The total number of students who took the test is 500. What is the percentage of students who failed in at least two subjects?



- (a) 6.8 (b) 34 (c) 7.8 (d) 39

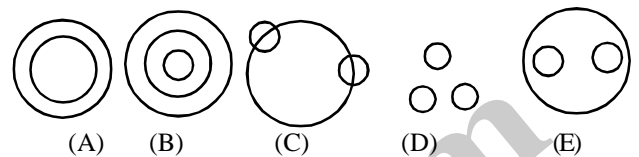
**Directions (9-13):** In the following diagram, results of a survey conducted on a group of Class XII students on their career choices have been given. The rectangle represents students interested in becoming engineers. The circle represents those who are interested in becoming artists and triangle represents students who will like to be managers. Assuming the career choices get realized, answer the questions based on this diagram



9. How many students would neither like to become engineers nor managers?  
(a) 15 (b) 22 (c) 7 (d) 44
10. How many will also be artists?  
(a) 11 (b) 25 (c) 22 (d) 30

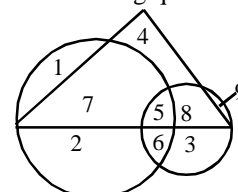
11. How many managers will neither be artists nor engineers?  
(a) 27 (b) 31 (c) 35 (d) 39
12. How many engineers will neither be artists nor managers?  
(a) 38 (b) 33 (c) 52 (d) 30
13. How many managers will also be engineers or artists?  
(a) 7 (b) 4 (c) 15 (d) 11

**Directions (14-18):** Each of the question below contains three elements. These elements may or may not have some inter linkage. Each group of the elements may fit into one of the diagrams at (A), (B), (C), (D) and (E). You have to indicate groups of elements in each of the questions correctly fit into which of the diagrams?



14. Pencil, Stationery, Jeep  
(a) A (b) B (c) C (d) D
15. Factory, Machinery, Product  
(a) A (b) B (c) C (d) E
16. Vegetable, Brinjal, Cauliflower  
(a) A (b) B (c) C (d) E
17. Honesty, Intelligence, Aptitude  
(a) A (b) B (c) C (d) D
18. Truck, Ship, Goods  
(a) A (b) B (c) C (d) E

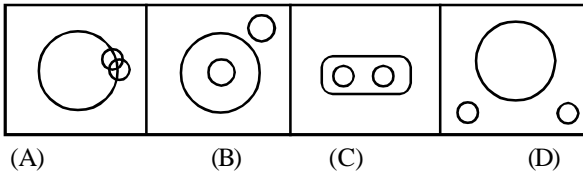
**Directions (19-23):** These questions are based on the following diagram in which the triangle represents female graduates, small circle represents self – employed females and the big circle represents self- employed females with bank loan facility. Numbers are shown in the different sections of the diagram. On the basis of these numbers, answer the following questions:



19. How many self – employed female graduates are with bank loan facility?  
(a) 5 (b) 12 (c) 20 (d) 7
20. How many non- graduate self – employed females are with bank loan facility?  
(a) 3 (b) 8 (c) 9 (d) 12
21. How many female graduates are not self – employed?  
(a) 4 (b) 10 (c) 12 (d) 15
22. How many female graduates are self – employed?  
(a) 12 (b) 13 (c) 20 (d) 15
23. How many non- graduate females are self - employed?  
(a) 11 (b) 9 (c) 12 (d) 21



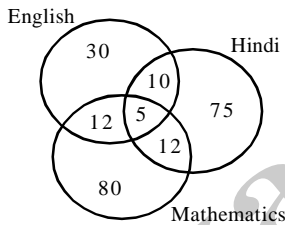
24. In a survey, 30% of the people surveyed owned a cellular telephone and 75% owned a personal computer. If 25% owned both a cellular telephone and a personal computer, the percentage people who owned a cellular telephone or a personal computer or both is  
 (a) 60% (b) 80% (c) 70% (d) 75%
25. Which of the following figures represents Furniture, Chairs and Tables?



- Answers**
1. (d) 2. (a) 3. (c) 4. (c) 5. (d) 6. (b)  
 7. (d) 8. (b) 9. (c) 10. (b) 11. (a) 12. (d)  
 13. (c) 14. (a) 15. (d) 16. (d) 17. (d) 18. (d)  
 19. (b) 20. (c) 21. (a) 22. (c) 23. (d) 24. (b)  
 25. (c)

### Explanatory Notes

2. As bearded males and male guitarists are also male, therefore they are best represented by the Fig. (A)  
 3. The given relationship is best explained by the Fig. (C)  
 4. The given relationship is best explained by the Fig. (C)  
 5. The given relationship is best explained by the Fig. (D)  
 6. The given relationship is best explained by the Fig. (B)  
 7. The given relationship is best explained by the Fig. (D)  
 8. Number of students who failed in at least two subjects =  $10 + 5 + 12 + 12 = 39$



Hence, required percentage =  $\frac{39}{500} \times 100 = 7.8$

9. No. of students who would neither like to become engineers nor managers – Students occupying the area

- outside rectangle and triangle =  $7 + 15 = 22$ .  
 10. Number of engineers who are also artists =  $22 + 3 = 25$ .  
 11. Number of managers who will neither be artists nor engineers = 27.  
 12. Number of engineers who are neither artists nor managers = 30  
 13. Number of managers who are engineers or artists =  $8 + 3 + 4 = 15$ .  
 14. Since pencil is a part of stationary and jeep is different from these two, therefore, given elements are represented by figure (A)  
 15. Since machinery and product are parts of factory, so it represented by figure (E)  
 16. Since brinjal, cauliflower are vegetables, so these elements are represented by figure (E)  
 17. Since, Honesty, Intelligence, Aptitude are three different traits, so they are represented by figure (D)  
 18. Since truck and ship carry goods, so they are represented by figure (E)  
 19. As numbers '7' and '5' are common between triangle and big circle, therefore, these represent self – employed female graduates. Their sum =  $7 + 5 = 12$ .  
 20. As numbers 1, 2 and 6 are within the big circle, but outside the triangle, these represent non- graduate self – employed females with loan facilities. Their sum =  $1 + 2 + 6 = 9$ .  
 21. As number '4' is within the triangle and outside the circles, therefore, it represents female Graduates.  
 22. As numbers 7, 5, 8 common within the circles and the triangles, therefore, they represent self – employed female graduates. Their sum =  $7 + 5 + 8 = 20$   
 23. As numbers 1, 2, 6, 3, 9 are within the circles but outside the triangle, these represent non- graduate females. Their sum =  $1 + 2 + 6 + 3 + 9 = 21$ .  
 24. The Venn- diagram is shown in the given figure. Number of persons who owned both CT or PC  $n(CT \cup PC) = 5 + 50 + 25 = 80\%$



25. As chair and tables both are types of furniture, therefore, it is represented by Fig. (C)

## 6. Number, Ranking & Time Sequence Test

### Practice Questions

1. How many 6's are there in the following sequence which are immediately followed by 3 but not immediately preceded by 4?  
 896326386658433446356336438  
 a. One b. Two  
 c. Three d. No such Number
2. How many 4's are there in the following sequence which are neither preceded 6 nor immediately followed by 9?  
 9466495947891649649  
 a. One b. Two  
 c. Three d. None
3. How many 4's are there in the following series which are not

immediately followed by 3 but immediately preceded by 8?

8 9 8 4 6 2 2 6 3 2 6 9 4 3 2 8 4 2 4 4 8 4 3 4 4 9 5

- a. One                                      b. Ten  
c. Three                                      d. Two

### Answers

1. (c)  
8 9 6 3 2 6 3 8 6 6 5 8 4 3 3 4 4 6 3 5 6 3 3 6 4 3 8
2. (b)  
9 4 6 6 4 9 5 9 4 7 8 9 1 6 4 9 6 4 9
3. (d)  
8 9 8 4 6 2 2 6 3 2 6 9 4 3 2 8 4 2 4 4 8 4 3 4 4 9 5

### Ranking Test

- In a row of boys, Gokul is 6<sup>th</sup> from either end of the row. How many boys are there in the row?  
a. 10                      b. 11                      c. 9                      d. 12
- Revathi ranks sixteenth from the top and forty eighth from the bottom in a class. How many students are there in the class?  
a. 64                      b. 63                      c. 66                      d. 76
- Ravi ranked 8<sup>th</sup> from the top and 28<sup>th</sup> from the bottom in a class. How many students are there in the class?  
a. 35                      b. 36                      c. 34                      d. 37

### Answers

- (b)  
clearly, number of boys in the row  
= (5 + 1 + 5) = 11
- (b)  
The number of students in the class  
= (15 + 1 + 47) = 63
- (a)

### Time Sequence Test

Note:

- A year has 365 days
- A leap year has 366 days

## 7. Mathematical Operations

### Type 1

**Directions:** In the following questions after changing the symbols as indicated below in each questions, find the correct answer after simplifying the given expression

- If + means  $\div$ , - means  $\times$ ,  $\div$  means -  
Then the value of  $45 + 9 - 3 \times 15 \div 2$  is  
a. 40                      b. 30                      c. 120                      d. 28
- If + means -, - means  $\times$ ,  $\div$  means +,  $\times$  means  $\div$   
Then the value of  $5400 \times 30 \div 18 + 30 - 2$  is  
a. 138                      b. 240                      c. 628                      d. 158

- Years, divisible by 4, are leap years e.g. 1984, 1988, etc
- the last day of a year is the same as first day except a leap year

### Practice Questions

- If the day before yesterday was Wednesday, when will Sunday be?  
a. Today                                      b. Tomorrow  
c. Day after tomorrow                      d. Two days after today
- If the day before yesterday was Friday. What day will fall on the day after tomorrow?  
a. Monday                                      b. Tuesday  
c. Wednesday                                      d. Thursday
- If the third day of a month is Tuesday, which of the following will be fourth day from 20<sup>th</sup> of the month?  
a. Monday                                      b. Tuesday  
c. Wednesday                                      d. Thursday
- 1.12.99 is the first Saturday, which is the fourth Monday of December 99?  
a. 24.12.99                                      b. 31.12.99  
c. 23.12.99                                      d. 24.12.99
- If the 25<sup>th</sup> June in a year is Wednesday, the number of Wednesdays in that month is?  
a. 3                                      b. 4                                      c. 5                                      d. 6

### Answers

- (c) If day before yesterday was Wednesday, so today is Friday. Therefore, tomorrow is Saturday and the next day is Sunday. Therefore, Sunday falls on the day after tomorrow.
- (b) If day before yesterday was Friday, so today is Sunday. Therefore, day after tomorrow is Tuesday.
- (b) The 3<sup>rd</sup> day is Tuesday. So, the 10<sup>th</sup>, 17<sup>th</sup> days are also Tuesdays. Thus 20<sup>th</sup> is Friday. Fourth day from 20<sup>th</sup> is 24<sup>th</sup> i.e. Tuesday.
- (a) 1. 12. 99 is first Saturday of Dec '99. So, 3.12.99 is first Monday of the month. So, 10.12.99, 17.12.99, 24.12.99, & 31.12.99 are also Mondays. So 24.12.99 is the fourth Monday.
- (b) 25<sup>th</sup> June is Wednesday. So, 18<sup>th</sup>, 11<sup>th</sup>, 4<sup>th</sup> are all Wednesdays of June. Only 4 Wednesdays of June.

### Answers

- (d) After the rearrangement, we have the following new expression  
 $45 \div 9 \times 3 + 15 - 2$   
 $= 5 \times 3 + 13$   
 $= 28$
- (a) After the rearrangement, we have  
 $5400 \div 30 + 18 - 30 \times 2$   
 $= 180 + 18 - 60$   
 $= 138$
- (b)  
 After the rearrangement, we have  
 $240 \div 3 \times 30 - 20 + 15$   
 $= 80 \times 30 - 5$   
 $= 2395$
- (b)  
 After the rearrangement, we have  
 $360 + 48 \div 3 \times 16 - 100$   
 $= 360 + 16 \times 16 - 100$   
 $= 360 + 256 - 100$   
 $= 516$
- (a)  
 After the rearrangement, we have  
 $630 - 9 + 36 - 60 \div 2$   
 $= 630 + 27 - 30$   
 $= 627$
- (c)  
 After the rearrangement, we have  
 $38 + 2 - 42 \div 7 \times 18$   
 $= 38 + 2 - 6 \times 18$   
 $= 40 - 108$   
 $= -68$
- d.  $38 \div 3 \times 2 + 42 - 23 \equiv 17$
- Change  $\times$  to  $-$  and  $-$  to  $\times$   
 a.  $32 \div 64 \times 3 + 43 - 3 \equiv 42$   
 b.  $32 - 8 + 14 \times 2 \div 1 \equiv 268$   
 c.  $16 \div 13 \times 2 + 3 - 2 \equiv 54$   
 d.  $13 \div 3 \times 3 + 7 - 18 \equiv 17$
- Change  $+$  to  $\times$  and  $\times$  to  $+$   
 a.  $35 + 7 \div 7 \times 14 - 1 \equiv 48$   
 b.  $45 \div 3 \times 15 + 17 - 3 \equiv 54$   
 c.  $64 \times 13 \div 3 + 7 - 3 \equiv 63$   
 d.  $72 + 6 \div 3 \times 14 \equiv 14$
- Change  $-$  to  $+$  and  $+$  to  $-$   
 a.  $46 - 6 + 12 \div 13 \times 2 \equiv 17$   
 b.  $63 - 3 + 6 \times 2 \div 3 \equiv 30$   
 c.  $14 \div 7 + 2 \times 12 - 13 \equiv 41$   
 d.  $36 \div 5 + 3 \times 6 - 12 \equiv 13$

### Answers

- (b)  
 After changing the signs, we have  
 $3 \times 16 \div 4 - 8 + 3$   
 $= 3 \times -8 + 3$   
 $= 12 - 8 + 3 = 7$
- (b)  
 After changing the signs, we have  
 $17 + 4 \div 4 - 11$   
 $= 17 +$   
 $= 18 - 11 = 7$
- (a)  
 After changing the signs, we have  
 $64 \div 8 - 2 + 16$   
 $= -2 + 16$   
 $= 8 - 2 + 16 = 22$
- (b)  
 After changing the signs, we have  
 $32 \times 8 + 14 - 2 \div 1$   
 $= 32 \times 8 + 14 - 2$   
 $= 256 + 12 = 268$
- (a)  
 After changing the signs, we have  
 $335 \times 7 \div 7 + 14 - 1$   
 $= 35 \times \div 14 - 1$   
 $= 48$
- (b)  
 After changing the signs, we have  
 $63 \div 3 + 6 \times 2 - 3$   
 $= 21 + 12 - 3 = 30$

### Type 2

**Directions:** In each of the following questions an equation becomes incorrect due to the interchange of two signs. One of the four alternatives under it specifies the interchange of signs in the equation which when made will make the equation correct. Find the correct alternative

- Change  $+$  to  $\times$  and  $\times$  to  $+$   
 a.  $5 + 6 \div 3 - 12 \times 2 \equiv 17$   
 b.  $3 + 16 \div 4 - 8 \times 3 \equiv 7$   
 c.  $17 - 10 \div 8 \times 13 \equiv 27$   
 d.  $26 + 8 \div 13 - 10 \equiv 17$
- Change  $+$  to  $\div$  and  $\div$  to  $+$   
 a.  $20 + 3 \div 4 \times 7 - 2 \equiv 13$   
 b.  $17 \div 4 + 4 - 11 \equiv 7$   
 c.  $4 \div 32 - 64 + 68 \times 15 \equiv 170$   
 d.  $34 \times 28 \div 61 + 14 - 2 \equiv 68$
- Change  $+$  to  $-$  and  $-$  to  $+$   
 a.  $64 \div 8 + 2 - 16 \equiv 22$   
 b.  $8 \div 71 \times 68 + 6 - 2 \equiv 11$   
 c.  $32 + 2 - 64 \div 8 \times 2 \equiv 23$

### Type 3

**Directions:** In each of the following questions an equation becomes incorrect due to the interchange of the signs and numbers. One of the four alternatives under it specifies the interchange of signs and numbers in the equation which

when made will make the equation correct. Find the correct alternative.

- Given interchanges: Signs  $\times$  and  $\div$  numbers 2 and 4
  - $4 \div 5 \times 7 = 17$
  - $2 \times 4 \div 8 = 16$
  - $4 \div 2 + 3 = 8$
  - $8 \times 4 \div 16 = 7$
- Given interchanges : Signs  $+$  and  $-$  numbers 5 and 3
  - $5 - 3 + 11 = 13$
  - $3 - 10 + 5 = 12$
  - $3 - 12 + 5 = 10$
  - $3 + 5 - 17 = 3$
- Given changes : Signs  $-$  and  $+$  numbers 7 and 18
  - $18 - 12 \div 7 = 13$
  - $12 - 18 \div 7 = 3$
  - $49 - 18 \div 7 = -11$
  - $18 - 17 \div 6 = 3$

### Answers

- (b)  
 $2 \times 4 \div 8 = 16$   
 Interchange 2 and 4  
 Interchange  $\times$  and  $\div$  we get  
 $4 \div 2 \times 8 = 16$   
 $2 \times 8 = 16$   
 $16 = 16$  which is correct
- (b)  
 $3 - 10 + 5 = 12$   
 Interchange 3 and 5  
 Interchange  $+$  and  $-$   
 $5 + 10 - 3 = 15 - 3$   
 $= 12$  which is R. H. S.
- (c)  
 $49 \div 7 - 18 = 7 - 18$   
 $= -11$

### Type 4

**Directions:** In each of the following questions the two expression on either side of the sign (=) will have the same value if 2 items on either side or on the same side are interchanged. The correct terms to be interchanged have been given as one of the four alternatives under the expressions. Find out the correct alternatives in each case.

- $15 + 3 \times 4 - 8 \div 2 = 8 \times 5 + 16 \div 2 - 1$ 
  - 3 and 5
  - 3 and 2
  - 8 and 5
  - 3 and 1
- $20 \div 4 \times 3 + 3 - 12 = 60 \div 5 \times 4 + 5 - 12$ 
  - 12 and 5
  - 20 and 12
  - 12 and 60
  - None of these
- $5 + 7 \times 4 - 6 \div 2 = 2 \times 3 - 20 \div 2 + 10$ 
  - 2 and 3
  - 7 and 3
  - 4 and 10
  - 5 and 3

### Answers

- (a)  
 After changing 3 and 5, we have  
 L.H. S.  $\Rightarrow 15 + 5 \times 4 - 8 \div 2$   
 $\Rightarrow 15 + 20 - 4 = 31$

$$\text{R.H.S.} \Rightarrow 8 \times 3 + 16 \div 2 - 1$$

$$\Rightarrow 24 + 8 - 1 = 31$$

$$\text{L.H.S} = \text{R.H.S}$$

- (a)  
 After changing 12 and 5, we have  
 L.H.S.  $\Rightarrow 20 \div 4 \times 3 + 3 - 5$   
 $\Rightarrow 5 \times 3 - 2 = 13$   
 R.H.S.  $\Rightarrow 60 \div 12 \times 4 + 5 - 12$   
 $\Rightarrow 5 \times 4 + 5 - 12 = 13$   
 L.H.S = R. H.S
- (b)  
 After changing 7 and 3, we have  
 L.H.S.  $\Rightarrow 5 + 3 \times 4 - 6/2 = 14$   
 R.H.S.  $\Rightarrow 2 \times 7 - 20/2 + 10 = 14$   
 L.H.S = R.H.S

### Type 5

**Directions:** In each of the following questions, choose the correct answer

- If P denotes  $+$ , Q denotes  $-$ , R denotes  $\div$  and S denotes  $\times$  find the value of  
 $25 \text{ R } 5 \text{ S } 5 \text{ P } 30 \text{ Q } 5$ 
  - 72
  - 62
  - 80
  - 50
- If P denotes  $\div$ , Q denotes  $-$  R denotes  $+$  and S denotes  $\times$  find the value of  
 $495 \text{ P } 11 \text{ S } 3 \text{ R } 136 \text{ Q } 3$ 
  - 246
  - 248
  - 268
  - 368
- If P denotes  $\times$ , Q denotes  $\div$  R denotes  $+$  and S denotes  $-$  find the value of  
 $15 \text{ S } 25 \text{ R } 1095 \text{ Q } 5 \text{ P } 21$ 
  - 1589
  - 262
  - 268
  - 14
- If P denotes  $\times$ , Q denotes  $-$  R denotes  $\div$  and S denotes  $+$  find the value of  
 $17 \text{ P } 289 \text{ R } 17 \text{ Q } 80 \text{ S } 5$ 
  - 144
  - 214
  - 412
  - 801
- If P denotes  $\times$ , Q denotes  $\div$  R denotes  $+$  and S Denotes  $-$  find the value of  
 $275 \text{ Q } 5 \text{ R } 85 \text{ S } 5 \text{ P } 25$ 
  - 25
  - 20
  - 15
  - 275

### Answers

- (d)  
 $25 \div 5 \times 5 + 30 - 5$   
 $= 5 \times 5 + 25$   
 $= 50$
- (c)  
 $495 \div 11 \times 3 + 136 - 3$   
 $= 45 \times 3 + 133$

- $= 135 + 133$   
 $= 268$
3. (b)  
 $15 - 25 + 1095 \div 5 \times 21$   
 $= -10 + 219 \times 21$   
 $= -10 + 4599$   
 $= 4589$
4. (b)  
 $17 \times 289 \div 17 - 80 + 5$   
 $= 289 - 75$   
 $= 214$
5. (c)  
 $275 \div 5 + 85 - 5 \times 25$   
 $= 55 + 85 - 125$   
 $= 15$

### Type 6

**Directions:** In each of the following questions, which one of the four alternatives makes the given equation correct?

1. a.  $25 \div 5 \times 3 + 10 - 5 = 4 \times 5 + 40 \div 2 - 10$   
 b.  $25 \div 3 \times 5 + 5 - 10 + 4 \times 5 \div 2 \times 40 - 10$   
 c.  $25 \div 5 \times 5 + 20 - 15 = 4 \times 5 + 60 \div 3 - 10$   
 d.  $725 \div 5 - 20 \times 5 + 10 = 1225 \div 5 + 25 \times 5 - 100$
2. a.  $7 \times 8 + 8 \div 2 - 30 = 20 \times 2 + 15 \div 3 - 15$   
 b.  $8 \div 4 + 20 \times 2 - 12 = 16 \div 4 \times 12 + 2 - 12$   
 c.  $63 + 17 \times 5 - 20 \div 4 = 17 \times 17 - 40 \div 8 + 2$   
 d.  $10 \div 2 \times 5 + 10 - 5 = 25 \div 5 \times 16 + 10 - 20$
3. a.  $196 \div 14 \times 3 + 10 - 2 = 25 \times 5 + 16 \div 4 - 13$   
 b.  $361 \div 19 + 7 \times 7 - 8 = 15 \times 4 + 125 \div 5 - 25$   
 c.  $63 + 17 \times 5 - 20 \div 4 = 17 \times 17 - 40 \div 8 + 2$   
 d.  $225 + 18 - 17 \times 30 \div 3 = 12 \times 120 \div 8 + 5 - 20$
4. a.  $256 \div 16 \times 15 + 32 - 40 = 324 \div 18 \times 3 + 72 - 5$   
 b.  $32 \times 5 - 40 \div 8 + 5 = 25 \times 8 \div 2 + 65 - 5$   
 c.  $75 \times 5 - 10 \times 13 + 4 = 13 \times 17 - 10 \div 2 + 5$   
 d.  $125 \div 5 + 5 \times 15 - 5 = 256 \div 16 + 10 \times 13 - 7$
5. a.  $72 \div 9 \times 8 + 13 - 2 = 121 \div 11 \times 9 - 25 + 1$   
 b.  $68 \div 4 \times 12 + 14 - 30 = 128 \div 4 \times 13 + 20 - 5$   
 c.  $961 \div 31 \times 3 + 40 - 15 = 15 \times 28 + 15 \div 3 - 3$   
 d.  $725 + 3 - 16 \div 4 + 5 = 120 \div 5 \times 8 + 20 - 3$
6. a.  $100 \times 2 + 48 \div 6 - 8 = 50 \div 5 \times 25 + 100 - 150$   
 b.  $65 \times 5 + 42 \div 7 - 4 = 58 \times 72 \div 9 + 4 - 31$   
 c.  $195 + 45 \div 5 \times 17 - 3 = 221 + 15 \div 3 \times 31 - 5$   
 d.  $25 \times 35 \div 7 + 14 - 5 = 196 \times 3 - 14 \div 2 + 84$
7. a.  $12 \times 12 \div 12 + 48 - 6 = 196 \div 14 \times 6 + 6 - 36$   
 b.  $17 \times 15 \div 5 + 12 - 2 = 25 \times 34 \div 17 + 18 - 4$   
 c.  $286 \div 16 + 168 \times 3 - 40 = 289 \div 17 + 2 \times 17 - 2$   
 d.  $19 \times 21 \div 3 + 70 - 6 = 38 \times 41 \div 17 + 90 - 30$
8. a.  $441 \div 7 + 7 - 10 \times 2 = 800 \div 50 + 17 \times 3 - 17$   
 b.  $226 \div 2 \times 17 + 10 - 3 = 484 \div 4 \times 16 + 170 - 60$   
 c.  $26 \times 41 \div 17 + 17 - 10 = 86 \div 2 \times 18 + 48 - 13$   
 d.  $13 \times 14 \div 7 + 70 - 16 = 14 \times 13 + 23 - 170 \div 17$
9. a.  $17 \times 5 + 15 \div 3 - 5 = 225 \div 25 \times 3 + 5 - 3$   
 b.  $119 \div 7 \times 10 + 5 - 25 = 625 + 125 \div 25 \times 2 - 485$
- c.  $381 \div 19 + 10 \times 2 - 5 = 625 \div 2 \times 13 + 14 - 40$   
 d.  $686 \times 3 + 44 \div 2 - 5 = 1225 + 5 \times 2 - 51 \div 3$
10. a.  $26 \times 3 + 75 \div 5 - 10 = 35 \times 5 + 125 \div 5 - 50$   
 b.  $175 \div 25 \times 7 + 13 - 2 = 12 \times 10 \div 5 + 39 - 3$   
 c.  $188 \div 9 + 10 \times 2 - 5 = 321 \div 17 + 180 - 50 \times 2$   
 d.  $225 \div 25 + 10 \times 2 - 10 = 660 \div 3 + 10 \times 7 - 60$

### Answer

The left hand expression and the right hand expression can be simplified using the rule **BODMAS**

- B = Bracket  
 O = Of  
 D = Division  
 M = Multiplication  
 A = Addition  
 S = Subtraction

1. (c)  
 LHS  $\Rightarrow 25/5 \times 5 + 20 - 15$   
 $= 5 \times 5 + 20 - 15$   
 $= 25 + 20 - 15$   
 $= 30$   
 RHS  $\Rightarrow 4 \times 5 + 60/3 - 10$   
 $= 20 + 20 - 10$   
 $= 30$   
 LHS = RHS
2. (a)  
 LHS  $\Rightarrow 7 \times 8 + 8/2 - 30$   
 $= 7 \times 8 + 4 - 30$   
 $= 56 + 4 - 30$   
 $= 30$   
 RHS  $\Rightarrow 20 \times 2 + 15/3 - 15$   
 $= 20 \times 2 + 5 - 15$   
 $= 45 - 15$   
 $= 30$   
 LHS = RHS
3. (b)  
 LHS  $\Rightarrow 361/19 + 7 \times 7 - 8$   
 $= 19 + 49 - 8$   
 $= 60$   
 RHS  $\Rightarrow 15 \times 4 + 125/5 - 25$   
 $= 60 + 25 - 25$   
 $= 60$   
 LHS = RHS
4. (b)  
 LHS  $\Rightarrow 32 \times 5 - 40/8 + 5$   
 $= 160$   
 RHS  $\Rightarrow 25 \times 8/2 + 65 - 5$   
 $= 165 - 5$   
 $= 160$   
 LHS = RHS
5. (a)

- LHS  $\Rightarrow 72 \div 9 \times 8 + 13 - 2$   
 $= 8 \times 8 + 13 - 2$   
 $= 75$
- RHS  $\Rightarrow 121 \div 11 \times 9 - 25 + 1$   
 $= 11 \times 9 - 25 + 1$   
 $= 75$
- LHS = RHS
6. (a)  
 LHS  $\Rightarrow 100 \times 2 + 48/6 - 8$   
 $= 200$
- RHS  $\Rightarrow 50/5 \times 25 + 100 - 150$   
 $= 200$
- LHS = RHS
7. (a)  
 LHS  $\Rightarrow 12 \times 12/12 + 48 - 6$   
 $= 12 \times 1 + 48 - 6$   
 $= 54$
- RHS  $\Rightarrow 196/14 \times 6 + 6 - 36$   
 $= 14 \times 6 + 6 - 36 = 54$
- LHS = RHS
8. (a)

- LHS  $\Rightarrow 441/7 + 7 - 10 \times 2$   
 $= 63 + 7 - 20$   
 $= 50$
- RHS  $= 800/50 + 17 \times 3 - 17$   
 $= 16 + 17 \times 3 - 17$
- LHS = RHS
9. (b)  
 LHS  $\Rightarrow 119/7 \times 10 + 5 - 25$   
 $= 17 \times 10 + 5 - 25$   
 $= 150$
- RHS  $\Rightarrow 625 + 125/25 \times 2 - 485$   
 $= 625 + 10 - 485$   
 $= 150$
- LHS = RHS
10. (b)  
 LHS  $\Rightarrow 175/25 \times 7 + 13 - 2$   
 $= 7 \times 7 + 13 - 2$   
 $= 60$
- RHS  $\Rightarrow 12 \times 10/5 + 39 - 3$   
 $= 60$
- LHS = RHS

### 8. Logical Sequence of Words

The candidate is required to arrange the given words in a meaningful order. Such as the sequence of occurrence of events, sequence from a part to the whole, sequence of increasing/ decreasing size, value etc, and then choose the correct sequence accordingly.

**Directions:** In each of the following question, arrange the given words in a meaningful sequence and then choose the most appropriate sequence from amongst the alternatives provided below each question.

1. 1. Mother      2. Baby      3. Food  
 4. Cry          5. Smile  
 a. 2, 3, 1, 5, 4      b. 2, 4, 1, 3, 5  
 c. 1, 3, 5, 2, 4      d. 2, 4, 5, 3, 1
2. 1. Satellite      2. Sun      3. Earth  
 4. Moon          5. Stars  
 a. 1, 4, 3, 2, 5      b. 5, 2, 3, 1, 4  
 c. 1, 3, 4, 2, 5      d. 1, 4, 5, 2, 3
3. 1. Continent      2. Earth      3. Country  
 4. District      5. State  
 a. 1, 2, 3, 4, 5      b. 2, 1, 3, 4, 5  
 c. 2, 1, 3, 5, 4      d. 1, 2, 4, 5, 3
4. 1. Calf          2. Cow      3. Milk  
 4. Butter      5. Curd  
 a. 2, 1, 3, 5, 4      b. 2, 3, 4, 5, 1  
 c. 3, 5, 1, 4, 3, 2      d. 5, 4, 1, 2, 3

5. 1. Deer          2. Lion      3. Fly  
 4. Dog          5. Elephant  
 a. 3, 4, 1, 5, 2      b. 5, 2, 1, 4, 3  
 c. 5, 1, 4, 3, 2      d. 5, 4, 3, 2, 1

#### Answers

1. b      2. a      3. c      4. a      5. b

#### Verification of Truth of the Statement

1. A Bus always has  
 a. Driver      b. Bonnet  
 c. Dicky      d. Wheels
2. A Clock always has  
 a. Alarm      b. Hands  
 c. Frame      d. Battery
3. A mirror always  
 a. Refraction      b. Reflects  
 c. Images      d. Reveals the truth
4. An animal always has  
 a. Lungs      b. Heart  
 c. Life      d. Skin
5. A drama always has  
 a. Stage      b. Actors  
 c. Story      d. Sets

#### Answers

1. d      2. b      3. b      4. c      5. c

### 9. Arithmetic Reasoning

- In a group of dogs and hens, the number of legs are more than twice the number of heads. The number of dogs are  
a. 5      b. 8      c. 10      d. 12
- A shepherd had 19 sheep. All but nine died. How many was he left with?  
a. None      b. 8      c. 11      d. 9
- A group of 1200 persons consisting of captains and soldiers is travelling in a ship. For every 19 soldiers, there is one captain. The number of captains in the group is  
a. 60      b. 65      c. 50      d. 70
- At the end of conference, the 11 people present shook hands with each other once. How many hand shakes will there be altogether?  
a. 55      b. 45      c. 53      d. 54
- A boy got twice as many sums wrong as he got right. If he attempted 51 sums in all, how many did he solve correctly?  
a. 12      b. 17      c. 18      d. 15
- The number of chairs in a room is three times the number of tables. Which one of the following numbers cannot represent the total number of tables?  
a. 40      b. 60      c. 42      d. 52
- 'A' is three times as old as 'B'. 'C' was twice as old as 'A', 6 years ago. In a year's time, 'A' will be 31. What is the present age of 'C'?  
a. 52      b. 54      c. 56      d. 60
- If we add 24 to a number then it will become  $1\frac{1}{4}$  of that number. Then the number is  
a. 72      b. 96      c. 120      d. 88
- If 0.5 part of a number equals 0.07 of another number. Then the ratio of the numbers is  
a. 50:7      b. 5:7      c. 7:50      d. 1:14
- A whole number and its reciprocal give a sum  $401\frac{1}{20}$ . Then what is the number?  
a. 40      b. 401      c. 20      d. 21
- If we decrease the side of a square by half, then the area is decreased by what percentage?  
a. 50%      b. 75%      c. 30%      d. 45%

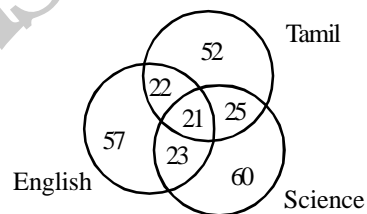
**Directions (12–16):** The following questions are based on the information given below.

Data on 550 candidates, who took an examination in Physics, Mathematics and Chemistry are given below:

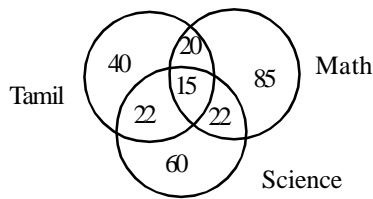
Passed in all the subjects	192
Failed in all subjects	70
Failed in Physics	200
Failed in Mathematics	219
Failed in Chemistry	201
Passed in Physics only	67
Passed in Mathematics only	53
Passed in Chemistry only	52

- How many failed in Physics only?  
a. 20      b. 30  
c. 25      d. 50
- How many failed in one subject only?  
a. 106      b. 116  
c. 140      d. 146
- How many passed in Mathematics and at least one more subject?  
a. 230      b. 248  
c. 228      d. 130
- How many failed in two subjects only?  
a. 152      b. 162  
c. 172      d. 201
- How many passed at least in one subject?  
a. 420      b. 460  
c. 360      d. 480
- In an examination 75% passed in English, 85% passed in Maths and 70% passed in both the subjects. Find out the percentage who failed in both the subjects?  
a. 12      b. 8  
c. 10      d. 15

**Directions (18–20):** The diagram given below shows the number of students who got distinction in 3 subjects out of 600 students. Study the diagram carefully and answer the questions that follow:



- What is the percentage of students who got distinction in 2 subjects?  
a. 10%      b. 11.88%      c. 12%      d. 11.66%
- What is the percentage of students who got distinction?  
a. 40%      b. 43.33%      c. 57%      d. 42%
- The percentage of students with distinction marks in science is  
a. 19.86%      b. 20%      c. 21.66%      d. 28%
- Ravi is twice as old as Suresh. Three years ago, he was three times as old as Suresh. How old is Ravi now?  
a. 10      b. 12      c. 14      d. 16
- Six hundred candidates appeared in an examination comprising of tests in Tamil, Maths and Science. The diagram shows the number of candidates who failed in different tests. What is the percentage of candidates who failed in at least two subjects?



- a. 13%      b. 13.16%      c. 14.2%      d. 16%
23. In a group of 16 people, 7 read Telugu, 8 read English while 3 of them read none of these two. How many of them read Telugu and English both?  
a. 4      b. 2      c. 5      d. 16%
24. In a group of cows of 24, all but ten die. How many were left?  
a. 14      b. 13      c. 10      d. 15
25. In a meeting of 12 members, each shakeshands with other. How many such hand shakes occur?  
a. 66      b. 64      c. 60      d. 70

### Answers

1. (b)  
Let the no. of dogs be  $x$ , and the no. of hens be  $y$ , then the no. of legs in the group =  $4x + 2y$ , number of heads in the group =  $x + y$   
So,  $4x + 2y = 2(x + y) + 16$   
 $4x + 2y = 2x + 2y + 16$   
 $2x = 16$   
 $\Rightarrow x = 8 = \text{no. of dogs}$
2. (d)  
All but nine died means  
All except nine died i.e. nine sheep remained alive
3. (a)  
Clearly, out of every 19 persons there is one Captain, so the number of captains  
 $\frac{1200}{20} = 60$
4. (a)  
Clearly, total number of handshakes  
=  $(10 + 9 + 8 + 7 + 6 + 5 + 4 + 3 + 2 + 1) = 55$
5. (b)  
Suppose the boy got  $x$  sums right and  $2x$  sums wrong.  
Then,  
 $x + 2x = 51$   
 $3x = 51$   
 $x = 17$
6. (c)  
Let the number of tables =  $x$   
The number of chairs =  $3x$   
Then,  $3x + x = 4x = \text{total furniture}$ . Thus, to find exact value of  $x$ , the total furniture must be divisible by 4
7. (b)

Clearly, we have  $A = 3B$  equation (1)  
 $C - 6 = 2(A - 6)$  equation (2)  
Also,  $A + 1 = 31 \Rightarrow A = 30$   
Putting  $A = 30$  in equation (1)  
 $B = 10$   
Putting  $A = 30$  in equation (2)  
 $c - 6 = 2(30 - 6) = 48$   
 $c = 48 + 6 = 54$

8. (b)  
Let  $x$  be that number  
 $X + 24 = \frac{5}{4}x$   
 $\frac{x}{4} = 24$   
 $x = 96$
9. (c)  
Let  $x$  be the first number and  $y$  be the second number  
 $0.5x = 0.07y$   
 $\frac{x}{y} = \frac{0.07}{0.5} = \frac{7}{50}$
10. (c)  
Let  $x$  be that number  $x + \frac{1}{x} = \frac{401}{20}$   
 $x^2 - \frac{401}{20}x + 1 = 0$   
 $20x^2 - 401x + 20 = 0$   
 $20x(x - 20) - 1(x - 20) = 0$   
 $20x^2 - 401x + 20 = 0$   
 $20x(x - 20) - 1(x - 20) = 0$   
 $(20x - 1)(x - 20) = 0$   
 $x = 20$  or  $\frac{1}{20} \Rightarrow x = 20$  whole number.
11. (b)  
Let 'a' be the side of the square  
Area =  $a^2$   
Reduced side =  $\frac{a}{2}$   
Therefore new area =  $\frac{a^2}{4}$   
Difference =  $a^2 - \frac{a^2}{4} = \frac{3a^2}{4}$   
Percentage =  $\frac{3a^2}{4} / a^2 \times 100 = 75\%$
12. (c)  
Candidates failed in Physics only



- $$= (\text{Candidates failed in Physics}) - (\text{Candidates failed in all subjects} + \text{candidates passed in Chemistry only} + \text{Candidates passed in Maths only})$$

$$= 200 - (70 + 52 + 53)$$

$$= 200 - 175 = 25$$
13. (b)  
 Candidates failed in one subject only = (Total no. of candidates) - (Candidates passed in all the subjects + candidates failed in all the subjects + candidates passed in one subject only)  

$$= 550 - (192 + 70 + 67 + 53 + 52) = 116$$
14. (c)  
 Candidates failed in Chemistry only = 201  

$$- (67 + 70 + 53) = 11$$
  
 Candidates failed in Physics only = 25. Therefore candidates passed in Maths and at least one more subject =  $(11 + 25 + 192) = 228$
15. (c)  
 Candidates failed in two subjects only = candidates passed in one subjects only.  

$$= 67 + 53 + 52$$

$$= 172$$
16. (d)  
 Candidates passed at least in one subject  

$$= (\text{Candidates passed in only 1 subject})$$

$$+ (\text{Candidates passed in only 2 subjects})$$

$$+ (\text{Candidates passed in all the subjects})$$

$$= (\text{Candidates passed in only 2 subjects})$$

$$+ (\text{Candidates failed in only 1 subjects})$$

$$+ (\text{Candidates passed in all the subjects})$$

$$= 172 + 116 + 192$$

$$= 480$$
17. (c)  
 Passed in English only =  $75 - 70 = 5\%$   
 Passed in Maths only =  $85 - 70 = 15\%$   
 Passed in all subjects =  $5 + 15 + 70 = 90\%$   
 Failed persons =  $100 - 90 = 10\%$
18. (d)  
 Number of students who got distinction in two Subjects =  $(25 + 23 + 22) = 70$   
 Therefore required percentage =  

$$\left(\frac{70}{600} \times 100\right) = 11.66\%$$
19. (b)  
 Number of students who got distinction  

$$= (60 + 57 + 52 + 22 + 21 + 23 + 25) = 260$$
  
 Required percentage =  $\left(\frac{260}{600} \times 100\right) = 43.33\%$
20. (c)  
 Number of students with distinction in science  

$$= (60 + 23 + 22 + 25) = 130$$

$$\text{Required percentage} = \left(\frac{130}{600} \times 100\right) \% = 21.66\%$$

21. (b)  
 Let Suresh's present age be  $x$  years, then  
 Ravi's present age =  $2x$  years  
 Three years ago, Suresh's age =  $(x-3)$   
 Ravi's age =  $(2x-3)$   
 Ravi's present age can be obtained as follows  

$$(2x-3) = 3(x-3)$$

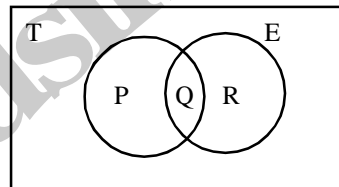
$$2x-3 = 3x-9$$

$$x=6$$
 Therefore, Ravi's present age =  $2x = 12$  years
22. (b)  
 Clearly, number of candidates who failed in at least two subjects = number of candidates who failed in two/ more subjects  

$$= (20 + 22 + 22 + 15) = 79$$
  
 Therefore required percentage  

$$= \left(\frac{79}{600} \times 100\right) \%$$

$$= 13.16\%$$
23. (b)



- Let circles T and E represent who read Telugu and English respectively  

$$(P + Q + R) + 3 = 16$$

$$P + Q + R = 13 \quad \dots(1)$$

$$P + Q = 7$$

$$Q + R = 8$$
 Adding  $P + 2Q + R = 15 \quad \dots(2)$   
 Subtracting with 1  

$$Q = 2$$
 Therefore, no. of people who read Telugu and English both = 2.
24. (c)  
 All but ten died means ten cows are alive
25. (a)  
 Clearly, total number of hand shakes  

$$= (11 + 10 + 9 + 8 + 7 + 6 + 5 + 4 + 3 + 2 + 1)$$

$$= 66$$

### Non-verbal Reasoning

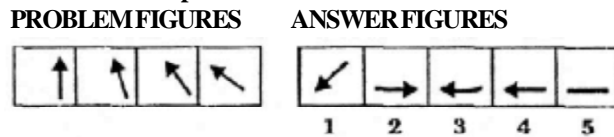
#### 1. Non-Verbal-Intelligence Tests

In this test, all questions are given in the form of diagrams / figures. The purpose of this test is to assess your analytical ability. Generally, a set of four diagrams are given as "Problem Figures". You have to find out the relationship between these figures and apply it to a new situation. The type of questions asked in this test can be classified into (1) Series and (2) Classification.

#### Type (1) Series

Each question of this type has two sets of figures. The set labelled "Problem Figures" is on the left hand side consisting of 4 or more figures. The set labelled as "Answer Figures" is on the right hand side and consists of five figures numbered from 1 to 5. In "Series" type questions, there is some systematic change occurring in the box from left to right in the "Problem Figures". You have to find the nature of this change and decide what will be the next figure, if the same change continues and pick out the one from the "Answer Figures" which can be next or fifth in the row of "Problem Figures".

Here is an example:



In the above example, you will notice that there are four figures in the "Problem Figures". The arrow in each square (from left to right) is tilting more and more to the left (anti-clockwise) and each time, it tilts by a certain amount. The question is "If the arrow continues to fall by the same amount what will be its next position i.e. "5th position"? From the extent to which it has tilted to the left in each of the first four squares, it is evident that it should be lying horizontal. From amongst the five Answer Figures given, the arrow in figure 4 is horizontal. Hence, the answer is (4). Note that the figures in the 2nd and the 5th square are also lying horizontal. They cannot be the answers because, in the Answer Figure 2, the arrow is pointing towards the reverse direction and in Answer Figure 5 it is a line and not an arrow.

The changes which occur in figures in different questions can be of various types. Some of these are :

1. Rotation - The elements are rotated clock - wise or anti - clockwise.
2. Substitution - A new element replaces an element already there in every successive figure.
3. Change in element - The elements in each successive figures are modified or changed.
4. Combination - Change involving two or more of the

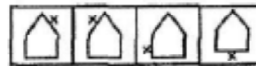
above.

5. Rearrangement - The elements are rearranged in each successive figure.
6. Addition - Some element is added in every successive figure.
7. Subtraction - Deletion of an element from every succeeding figure.

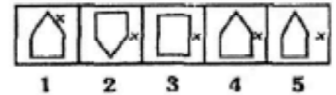
All elements refer to a line, a dot, a circle or a triangle or any other similar thing which appears in the Problem or Answer Figures.

#### Rotation

##### PROBLEMFIGURES



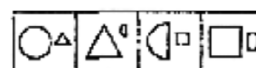
##### ANSWER FIGURES



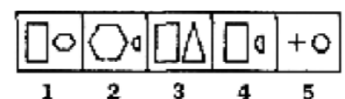
You will observe in the above question that there are two elements in all the Problem Figures - a pentagon and a "x" sign. While the pentagon is stationary, the "x" sign keeps moving around from side to side in anti - clockwise direction. You can observe that Answer Figure "4" is the correct position of "x". Hence, the answer is 4. Note that Answer Figures 1, 2 and 5 have an element with five sides and a "x" sign. However, they cannot be right answers. In Answer Figure "1", the "x" sign has moved one side more than it should have, though the movement is in the right direction, i.e., anti - clockwise. Answer Figure "2" is wrong because the pentagon is upside down. The shape of the pentagon in Answer Figure "5" is different from that in the Problem Figures.

#### Substitution

##### PROBLEMFIGURES



##### ANSWER FIGURES



In the above example, you will notice that each figure in the Problem Figures has two elements, a relatively large element on the left hand side and a smaller element on the right hand side. Also note that in each successive Problem Figure the smaller element of the immediately preceding figure, moves to the left and becomes in the larger one and an altogether new element (fresh) takes the place of the smaller element. In the last Problem Figure, there is a large square on the left and a rectangle on the right. If the same relationship as explained above is extended, the fifth figure should have a large rectangle on the left and a smaller new figure which so far has not appeared in any of the Problem Figures on the right. You will notice that only Answer Figures 1 and 4 have large rectangles on the left and smaller figures on the right side. Of

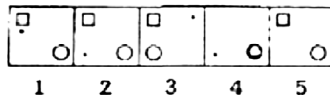
these, Answer Figure 1 is the correct answer because the other element in the figure is a small hexagon and has not appeared in any of the Problem Figures. Answer Figure 4 also cannot be the right answer because from the Problem Figures, it is clear that the element on the right should not have been a half circle which has appeared once. In Answer Figures 2 & 5, the larger element on the left hand side is not a rectangle as it should have been if the sequence had continued. Answer figure 3 cannot be correct, because both the figures are almost equal.

### Rearrangement

#### PROBLEM FIGURES



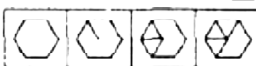
#### ANSWER FIGURES



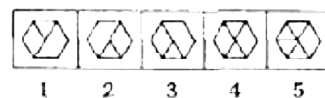
Each of the Problem Figures of the above question has three elements - a dot, a square and a circle. In each successive figure, these three elements change their positions. The circle's position is shifted diagonally from lower right hand corner to top left hand corner. The "dot" is moved from one corner to the next in an anti-clockwise direction and the "square" moves from one corner to the other in a clockwise direction. So, in the fifth figure the circle should be at the bottom right corner, the dot in the bottom left hand corner and the square in the top left hand corner. The elements are in the correct positions in Answer Figure. 2. So "2" is the answer. Note that in Answer Figure "1" the positions of "circle" and the "square" is correct but the position of the "dot" is wrong. It has not moved to the bottom left hand corner. In Answer Figure "4", the position of the "dot" and "circle" are correct but the "square" instead of moving in the clockwise direction, has moved in the anticlockwise direction. Answer Figure "5" has only two elements instead of three. The positions of the "circle" and "dot" in Answer Figure 3 are wrong.

### Combination

#### ANSWER FIGURES



#### PROBLEM FIGURES



In this type of items, the changes in the elements that occur can be of more than one of the types explained above. In the Problem Figure given above, there are three different elements - a semi-circle, a hexagon and a line. The following changes take place in the elements. The number of semi-circles goes down by "1" in each successive figure. A line gets added in the hexagon in each successive figure. Note that the side on which the line gets added is reversed in each figure. The

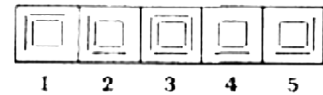
number of hexagons is one and remains the same. You can deduce that Answer Figure 2 is the correct answer. Answer Figure 2 gives the correct position of the line and the semi-circle is also not there. Note that Answer Figure "1" is wrong because the line is added in the wrong side. Answer Figure "5" and "3" are wrong because the semi-circle is there. Answer Figure "4" has one line more than the correct answer and hence is wrong.

### Addition

#### PROBLEM FIGURES



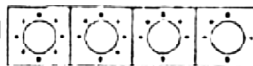
#### ANSWER FIGURES



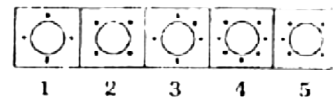
In the above question, you will notice that a line is added in each successive Problem Figure. Also notice that the addition is in the clockwise direction and that none of the lines are joined together. In the 4th Problem Figure, you see that a second line is added, drawn parallel to the line on the left hand side. So, following the logic of addition of a line in the clock-wise direction, the next line should be drawn parallel to the line on the top. From among the answer figures, it can be seen that "1" is the right answer. Addition takes place in the anti clockwise direction.

### Subtraction

#### PROBLEM FIGURES

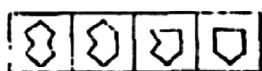


#### ANSWER FIGURES

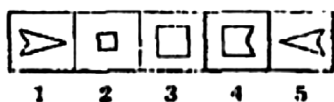


In this type of items, you will find that some element is removed in each successive Problem Figure. In the question given above, the first square has a circle and 8 dots around it. In the next, one dot is missing and in each successive square one additional dot is removed. Now look at the five "Answer Figures". In the correct Answer Figure, there should be four dots. Such figures are only Answer Figures No. 1 and 2. Answer Figures 3, 4 & 5 cannot be the correct answer because there are more than 4 dots. There are 8 dots in the first Problem Figure of which, one is in the North, one in the East, one in the South, one in the West and one each in between them. In the Problem Figures, you will notice that the dots at the North, East, South and West remain intact and only the dots in between are removed. In the fourth Problem Figure, only one of the dots in between i.e. the dot in between West and North, remains. It easily follows that this dot has to be removed. After this dot is removed, the resulting figure will be like the one in Answer Figure "1". So the answer is (1).

### Change in element PROBLEMFIGURES



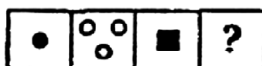
### ANSWER FIGURES



You will notice that in each successive Problem Figures in the question above, two lines straighten up to form a single long straight line. You will also notice that this happens to every two successive short lines in the anti-clockwise direction. When the two remaining short lines in Problem Figure 4 are straightened, the resulting figure will have an element with four sides. Also note that it should have sides of equal length. Note that Answer Figures 1 and 5 have an element with four sides, but the sides are of different lengths. Answer Figure 2 is not the right choice also, because the square is smaller than the element emerging in each successive Problem Figure. Answer Figure 4 is wrong because the element has five sides. Hence Answer Figure "3" is the right answer.

In these questions, figures will be presented in two units. The first unit contains two figures; one in each square and the second unit contains one figure in one square and a question mark in the other. You have to find out which one of the Answer Figure should be in place of the question mark. You can answer these questions only after you have found out the relation between the two figures in unit one of the Problem Figure. Now look at the example below.

### Combination PROBLEMFIGURES



### ANSWER FIGURES

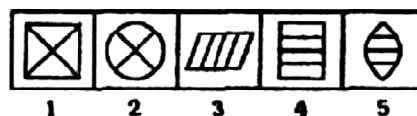


In the first unit, the first square has a darkened circle and the second square has three undarkened circles. The second unit should have a similar combination. So the darkened square should be followed by three undarkened squares, two at the top and one at the bottom. These conditions are satisfied only in Figure 2 of the Answer Figures. So the answer is 2. Note that Answer Figure "1" cannot be the answer because the bottom figure is a circle. Similarly, Figure 5 has no squares.

### Type (2) Classification

In this type of questions five numbered figures are given which are both "Problem Figures" and "Answer Figures". Four of these figures have something in common and so form a group. One of the five figures does not share this feature. You have to identify that one figure which is different and therefore does not belong to the group.

### PROBLEM - CUM - ANSWER FIGURES



Each figure in the above problem is divided into four segments or parts. All the segments or parts of four of the five figures, viz., figures 1, 2, 3 and 4 are of equal area. The common factor in these figures is the equal area of the segments of each figure. The area of the segments of Figure 5, the "oval" figure, is unequal. Hence, this is the figure that does not belong to the group, i.e. it is the "odd one out", and therefore the answer.

## 2. Series

### Type 1: Alphabetic Series

#### Example 1

What will be the next term in : CEH, DGJ, EIL?

- a. FKO      b. FLO      c. GKO      d. FOK

Clearly, the first, second and third letters of each term are respectively moved one, two and three steps forward to obtain the corresponding letters of the next term. So, the missing term is FKO

E	→ +1	F
I	→ +2	K
L	→ +3	O

Hence the answer is (a)

#### Example 2

Choose the term which will continue the following series. C4F, E6I, G9L, 1130 ?

- a. K 17 R      b. K 18 R  
c. L 18 R      d. K 18 S

**Solution:** Clearly, the first letter of the terms are alternate. The sequence followed by the numbers is +2, +3, +4, +5 ..... The last letter of each term is three steps forward of the last letter of the preceding term. Thus, the next term would be K 18 R

Hence the answer is (b)

**Directions (1-10)** In each of the following question, various terms of a letter series and given with one term missing as shown by (?) Choose the correct answer out of the given alternatives

- A, E, I, ?, U  
a. R      b. M      c. O      d. S
- B, C, E, H, ?  
a. L      b. M      c. K      d. N
- B, D, H, N, ?  
a. V      b. U      c. R      d. S
- Y, U, R, P, ?

5. a. M    b. N    c. O    d. P  
 B,D,G,I,L, ?
6. a. M    b. N    c. O    d. P  
 U,T,R,Q,O, ?
7. a. M    b. N    c. L    d. K  
 H,M,?,T, ?
8. a. Q,V    b. Q,U    c. R,U    d. R,V  
 Z,Y,X,T,S,R,N,M,L, ?
9. a. H,E,F    b. H,G,F    c. F,E,D    d. D,C,B  
 ceb,jli,o??
10. a. n,q    b. m,q    c. q,m    d. q,n  
 DGI,KNP,PSU,N??
11. a. Q,T    b. Q,S    c. R,T    d. M,N  
 DGI,KNP,PSU,???
12. a. MQS    b. NQT    c. NQS    d. NRS  
 JMK,VYW, ?S?MBEC
13. a. MN    b. PQ    c. PR    d. ST  
 GEC, MKI, TRP, ???
14. a. VTQ    b. MTR    c. VTR    d. MQS  
 FKN, JOR, DIL, O??
15. a. S,W    b. T,W    c. W,T    d. W,Y  
 WRT,OJL,S??
16. a. NP    b. MQ    c. NT    d. WY  
 alf, ene, i?d, mr?
17. a. p,c    b. c,p    c. a,c    d. q,c  
 er,gw,ka,oe,si,w?
18. a. n    b. m    c. q    d. p  
 acd, dca, mpq,qpm, fgh, ????
19. a. ghf    b. hfg    c. hgf    d. fjh  
 AB, DEF, IJKL, PQR?T, ??
20. a. S,X,Y    b. S,Y,Z    c. T,Y,Z    d. X,Y,Z  
 AC,EGHJ,??
21. a. M,N    b. K,L    c. J,L    d. J,I  
 BAT,DCV,FEX, ?
22. a. HGI    b. HGZ    c. HIJ    d. HGY  
 MN, LO, KP, ?
23. a. RS    b. JQ    c. IJ    d. QR  
 C,GLR,?
24. a. U    b. S    c. Y    d. Z  
 QR,PS,OT?MV
25. a. NT    b. NU    c. Y    d. Z  
 C,H,M,R ?
26. a. X    b. W    c. Y    d. V

### Answers

1. (c) The series consist of vowels A,E,I,O,U written in the order as above
2. (a) The series is of the form
- |   |                    |   |
|---|--------------------|---|
| B | $\xrightarrow{+1}$ | C |
| C | $\xrightarrow{+2}$ | E |
| E | $\xrightarrow{+3}$ | H |

3. (a) The letters are obtained as below

H	$\xrightarrow{+4}$	L
B	$\xrightarrow{+2}$	D
D	$\xrightarrow{+4}$	H
H	$\xrightarrow{+6}$	N
N	$\xrightarrow{+8}$	V

4. (c) The letters are obtained below

Y	$\xrightarrow{+4}$	U
U	$\xrightarrow{+3}$	R
R	$\xrightarrow{-2}$	P
P	$\xrightarrow{-1}$	O

5. (b) The series is obtained as below

B	$\xrightarrow{+2}$	D
D	$\xrightarrow{+3}$	G
G	$\xrightarrow{+2}$	I
I	$\xrightarrow{+3}$	L
L	$\xrightarrow{+2}$	N

6. (b) The letters are alternatively moved one and two steps backward to obtain the successive terms.

7. (a) Letters are in reverse order in which term the last 1, 2, 3 and 4 letters are missing between two consecutive letters.

8. (b) Beginning from Z in the alphabets 3 consecutive letters are written and then 3 consecutive letters are deleted and so on.

9. (d) The series may be divided into groups as shown. c e b / j l i / o q n

In each group, first letter is moved one step backward to obtain third letter while the third letter is moved. Three steps forward to obtain the second letter.

10. (b) Here the letters are obtained as follows

D	$\xrightarrow{+3}$	G	$\xrightarrow{+2}$	I
H	$\xrightarrow{+3}$	N	$\xrightarrow{+2}$	P
P	$\xrightarrow{+3}$	S	$\xrightarrow{+2}$	U
N	$\xrightarrow{+3}$	Q	$\xrightarrow{+2}$	S

11. (c) The arrangement of alphabets are as follows

D	$\xrightarrow{+3}$	G	$\xrightarrow{+2}$	I
K	$\xrightarrow{+3}$	N	$\xrightarrow{+2}$	P
P	$\xrightarrow{+3}$	S	$\xrightarrow{+2}$	U

12. (b) The letters are arranged as follows

J	$\xrightarrow{+3}$	M	$\xrightarrow{-2}$	K
---	--------------------	---	--------------------	---

V  $\xrightarrow{+3}$  Y  $\xrightarrow{-2}$  W  
 P  $\xrightarrow{+3}$  S  $\xrightarrow{-2}$  Q  
 B  $\xrightarrow{+3}$  E  $\xrightarrow{-2}$  C

13. (c) The arrangement of letters are as follows

G  $\xrightarrow{-2}$  E  $\xrightarrow{-2}$  C  
 M  $\xrightarrow{-2}$  K  $\xrightarrow{-2}$  I  
 T  $\xrightarrow{-2}$  R  $\xrightarrow{-2}$  P  
 V  $\xrightarrow{-2}$  T  $\xrightarrow{-2}$  R

14. (b) Here the first letter of the first series increased by 5 to obtain second letter is increase by 3 to obtain the third letter.

O  $\xrightarrow{+5}$  T  $\xrightarrow{+3}$  W

15. (a) The first letter of the first series decreased by 5 to obtain the second letter of the first series and the second letter increase by 2 to obtain the third letter

S  $\xrightarrow{-5}$  N  $\xrightarrow{+2}$  P

16. (a) The first letter of each series is increased by 4 and the second letter of all series is increased by 2 and the third letter of each series is decreased by one

l  $\xrightarrow{+2}$  n  $\xrightarrow{+2}$  p  $\xrightarrow{+2}$  r

f  $\xrightarrow{-1}$  e  $\xrightarrow{-1}$  d  $\xrightarrow{-1}$  c

17. (b) The letters in each term are moved four steps forward to obtain. The corresponding letter of the next term is m

18. (c) The series can be splitted as follows  
 acd, dca

The reciprocal of first series is the second

Similarly mpq qpm

Similarly fgh hgf

19. (b) The series consists of letters 2,3,4,5,etc, and one letter is between first two series, 2 letters between second and third and so on s,y,z, is the correct one.

20. (c) The series goes on increasing as follows

A  $\xrightarrow{+3}$  E  $\xrightarrow{+2}$

H  $\xrightarrow{+1}$  J

C  $\xrightarrow{+3}$  G  $\xrightarrow{+2}$

J  $\xrightarrow{+1}$  L

21. (b) The first two letters in each words are alphabets starting from A from the second position to first position only. Therefore the first two letters of the next word is HG The third letter in each word starting from first word exceeds by 2

T  $\xrightarrow{+2}$  V

V  $\xrightarrow{+2}$  X

X  $\xrightarrow{+2}$  Z

So the answer is HGZ

22. (b) The second letters in each sequence is a continuing series

N  $\xrightarrow{+1}$  O

O  $\xrightarrow{+1}$  P

P  $\xrightarrow{+1}$  Q

Similarly the first letters

In each sequence is a decreasing series

M-1  $\longrightarrow$  L

L-1  $\longrightarrow$  K

K-1  $\longrightarrow$  T

So, the answer is JQ

23. (c)

C+4  $\longrightarrow$  G

G+5  $\longrightarrow$  L

L+6  $\longrightarrow$  R

R+7  $\longrightarrow$  Y

So, the answer is Y

24. (b)

Q-1  $\longrightarrow$  P

P-1  $\longrightarrow$  O

O-1  $\longrightarrow$  N

N-1  $\longrightarrow$  M

25. (b)

C  $\xrightarrow{-5}$  H

H  $\xrightarrow{-5}$  M

M  $\xrightarrow{-5}$  R

R  $\xrightarrow{-5}$  W

### Type 2: Number Series

#### Example-1

Which is the number that comes next in the sequence 2,10,30,68,130,?

- a. 220                      b. 222  
 c. 322                      d. 120

*Solution:* Clearly the given series is  $1^3+1, 2^3+2, 4^3+4, 5^3+5$  and  $6^3+6$  and. So the next number is  $6^3+6=216+6=222$

Hence the answer is (b)

### Example-2

Find out the missing number in the following sequence  
4,9,25,?,121,169

- a. 45                      b. 49  
c. 51                      d. 40

**Solution:** (b) Clearly, the given sequence is as follows  
 $2^2, 3^2, 5^2, 7^2, 11^2, 13^2$   
(i.e.) Squares of Prime Numbers

**Directions:** In each of the following questions, a number series is given with one term missing. Choose the correct alternative that will continue the same pattern and fill in the blank spaces.

- 64, 67, 73, 81, ?  
a. 90                      b. 91                      c. 83                      d. 95
- 343, 345, 349, 357, ?  
a. 367                      b. 373                      c. 413                      d. 716
- 3, 3, 6, 13, 72, ?  
a. 630                      b. 360                      c. 180                      d. 420
- 8, 16, 64, 384, ?  
a. 3027                      b. 2072                      c. 3072                      d. 4017
- 5, 5, 7, 13, 28, ?  
a. 39                      b. 49                      c. 48                      d. 58
- 10, 12, 18, 30, 50, ?  
a. 80                      b. 78                      c. 87                      d. 90
- 37, 38, 46, 73, 137, ?  
a. 262                      b. 372                      c. 268                      d. 292
- 5, 5, 40, 1080, ?  
a. 68130                      b. 69120                      c. 78410                      d. 9120
- 63, 65, 68, 73, 80, ?  
a. 91                      b. 780                      c. 98                      d. 105
- 151, 153, 159, 171, ?  
a. 210                      b. 190                      c. 191                      d. 211

### Answers

1. (b) The series consists of letters as follows

$$\begin{array}{ccc} 64 & \xrightarrow{+3} & 67 \\ 67 & \xrightarrow{+6} & 73 \\ 73 & \xrightarrow{+8} & 81 \\ 81 & \xrightarrow{+1} & 91 \end{array}$$

2. (b) Here the numbers are obtained as follows

$$\begin{array}{ccc} 343 & \xrightarrow{+2} & 345 \\ 345 & \xrightarrow{+4} & 349 \\ 349 & \xrightarrow{+8} & 357 \\ 357 & \xrightarrow{+16} & 373 \end{array}$$

3. (b) The letters are arranged as follows

$$\begin{array}{ccc} 3 & \xrightarrow{\times 1} & 3 \\ 3 & \xrightarrow{\times 2} & 6 \\ 6 & \xrightarrow{\times 3} & 18 \\ 18 & \xrightarrow{\times 4} & 72 \\ 72 & \xrightarrow{\times 5} & 360 \end{array}$$

4. (c) The letters are arranged as follows

$$\begin{array}{ccc} 8 & \xrightarrow{\times 2} & 16 \\ 16 & \xrightarrow{\times 4} & 64 \\ 64 & \xrightarrow{\times 6} & 384 \\ 384 & \xrightarrow{\times 8} & 3072 \end{array}$$

5. (c) The letters are arranged as follows

$$\begin{array}{ccc} 5 & \xrightarrow{+(1^2-1)} & 5 \\ 5 & \xrightarrow{+(2^2-2)} & 7 & 7 \\ 7 & \xrightarrow{+(3^2-3)} & 13 & 13 \\ 13 & \xrightarrow{+(4^2-4)} & 28 & 28 \\ 28 & \xrightarrow{+(5^2-5)} & 48 & 48 \end{array}$$

6. (a) The series is obtained as follows

$$\begin{array}{ccc} 10 & \xrightarrow{+(1^2+1)} & 12 \\ 12 & \xrightarrow{+(2^2+2)} & 18 \\ 18 & \xrightarrow{+(3^2+3)} & 30 \\ 30 & \xrightarrow{+(4^2+4)} & 50 \\ 50 & \xrightarrow{+(5^2+5)} & 80 \end{array}$$

7. (a) The arrangement of letters are as follows

$$\begin{array}{ccc} 37 & \xrightarrow{+1^4} & 38 \\ 38 & \xrightarrow{+2^4} & 46 \\ 46 & \xrightarrow{+3^4} & 73 \\ 73 & \xrightarrow{+4^4} & 137 \\ 137 & \xrightarrow{+5^4} & 262 \end{array}$$

8. (d) The next letter in the given series is obtained as follows

$$\begin{array}{ccc} 5 & \xrightarrow{\times 1^2} & 5 \\ 5 & \xrightarrow{\times 2^2} & 40 \\ 40 & \xrightarrow{\times 3^2} & 1080 \\ 1080 & \xrightarrow{\times 4^2} & 69120 \end{array}$$

9. (a) The arrangement of letters are as follows

$$\begin{array}{ccc} 63 & \xrightarrow{+2} & 65 \\ 65 & \xrightarrow{+3} & 68 \\ 68 & \xrightarrow{+5} & 73 \\ 73 & \xrightarrow{+7} & 80 \\ 80 & \xrightarrow{+11} & 91 \end{array}$$

10. (c)

$$\begin{array}{ccc} 151 & \xrightarrow{+(1^2+1)} & 153 \\ 153 & \xrightarrow{+(2^2+2)} & 159 \\ 159 & \xrightarrow{+(3^2+3)} & 171 \\ 171 & \xrightarrow{+(4^2+4)} & 191 \end{array}$$

### 3. Rule Detection

#### Type 1

- Number of letters skipped in between adjacent letters in the series increase by one. Which of the following series observes the rule given above?
  - BDGJL
  - DFHJL
  - ACEHL
  - AEIMR
- Number of letters skipped in between adjacent letters in the series is two. Which of the following series observes this rule?
  - BFGHJ
  - EHKNQ
  - ORUXZ
  - DGJMO
- Number of letters skipped in between adjacent letters in the series are consecutive even numbers. Which of the following series observes this rule?
  - CEHJ
  - DFIN

- ACGL
  - BEJQ
- Number of letters skipped in between adjacent letters in the series are consecutive odd numbers. Which of the following series observes this rule?
    - BDHN
    - CEHM
    - GIMU
    - KMPT
  - Number of letters skipped in between adjacent letters in the series increases by two. Which of the following series observes this rule?
    - BEHK
    - BEJO
    - CFIM
    - FIMS

#### Answers

1. (b) We may analyse the given letter as follows of the four series

D E F G H I J K L M N ...  
 1 1 1 1

2. (b) E F G H I J K L M N O P Q R S ...

2 2 2 2 2

3. (d) B C D E F G H I J K L M N O P Q

2 4 6 8

4. (a) B C D E F G H I J K L M N

1 3 5

5. (a) B C D E F G H I J K L M

+2 +2 +2

#### Type 2: Alphabetical Quibble

**Directions:** Each of the following questions is based on the following alphabet series:

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

- Which letter is exactly mid way between G and T in the given alphabet?
  - M
  - L
  - W
  - No such letter
- In the English alphabet, which letter will be to the immediate left to N?
  - L
  - O
  - M
  - No such letter
- Which alphabet comes immediately before the seventh alphabet from the left extreme of the given alphabets?
  - F
  - G
  - H
  - K

#### Answer

- (d) There are 12 letters between G and T and as such, there is no letter which lies exactly in the middle
- (c) Clearly, M is the letter to the immediate left of N
- (a) Clearly, F is the letter which is before the Seventh alphabet from the left extreme (i.e.) A Seventh letter from A → G