

CODING - DECODING

CONCEPTS

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

Approach to solve the questions:

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

Tips to solve easily:

- 1) Remember English alphabets from A to Z with their position values i.e. A-1, B-2, C-3,, Z-26.
- 2) Remember reverse order of English alphabets. i.e. Z to A with their position values i.e. Z-1, Y-2, , A-26.
- 3) Remember the corresponding opposite letter of each alphabet with their position values. The following table will give the opposite letter of each alphabet.

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

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

Sum of the position numbers of a letter and its opposite letter is always 27.

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

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

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

Types of Coding-Decoding:

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

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

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

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

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

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

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

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

Similarly, t \rightarrow v, r \rightarrow t, u \rightarrow w, e \rightarrow g.

So, the answer is 'vtwg'.

4) 'Hyderabad' is coded as 'ixedszscze' then 'chennai' is coded as?

Explanation:

Here the letters are alternatively increasing and decreasing by 1.

h(+1) \rightarrow i, y(-1) \rightarrow x, d(+1) \rightarrow e, e(-1) \rightarrow d, r(+1) \rightarrow s,

a(-1) \rightarrow z, b(+1) \rightarrow c, a(-1) \rightarrow z, d(+1) \rightarrow e.

So, chennai will be coded as dgfmzsj.

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

Example:

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

Explanation: The alphabets are coded as follows.

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

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

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

Example:

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

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

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

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

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

Example: 1) In a certain code language 'pqost ygx mnlia' is coded as 'manager is there'; 'xyrs kixt ygx' is coded as 'clerk is here'; 'ygy srtv pqost' is coded as 'manager is genius'. Then what is the corresponding code for 'there'.

Explanation:

pqost ygx mnlia → manager is there ----- (1)

xyrs kixt ygx → clerk is here ----- (2)

ygy srtv pqost → manager is genius ----- (3)

From (1) and (2), common word is 'is' and common code is 'ygy'. i.e. 'is' → 'ygy'.

Similarly, from (1) and (3), manager is coded as pqost. Substitute the codes of 'manager' and 'is' in (1), we get, 'there' is coded as 'mnlia'. Hence, mnlia is the answer.

2) In a certain code language, '2 4 7' means 'spread red carpet'; '2 3 6' means 'dust one carpet' and '2 3 4' means 'one red carpet'. Then what is the code for the word 'spread'?

Explanation: 2 4 7 → spread red carpet ----- (1)

2 3 6 → dust one carpet ----- (2)

2 3 4 → one red carpet ----- (3)

Comparing (1) and (3), we get, 'red carpet' means 2 4.

Hence, 'spread' means 7.

CONCEPTUAL EXAMPLES

1) In a certain code, CONCEPT is written as TQFDOPC. Then how VICTORY is written in the same code?

a) YROTCIV b) RYOTCIV c) IVCTORY

d) YSPUDJV e) VSPUDJV

Explanation: In the given code, the letters of the word CONCEPT are reversed. After reversing except first and last letters, remaining all letters are moved one step forward to obtain the code. In the similar manner, VICTORY is coded as YSPUDJV.

Ask doubt with Question Id: 7950

2) If in a code language, JUMP is written as ITLO and COPIER is written as BNOHDQ, then how will CAMPUS be written in that code?

a) SUPMAC b) ACPMSU c) BZLOTR

d) DBNQVT e) BLORTZ

Explanation: Each letter in the word is moved one step backward to obtain the corresponding code. In the same way, CAMPUS is coded as BZLOTR.

Ask doubt with Question Id: 7951

3) In a certain code, DANGER is written as BCLICT. In the same code, ORACLE will be written as?

a) MTYEJG b) MPYEJG c) MTXCJG

d) GJEYTM e) none of these

Explanation: The letters at odd position are moved two steps backward and those at even position are moved two steps forward to obtain the corresponding letters of the code. Hence, option-a is correct choice.

Ask doubt with Question Id: 7952

4) In a certain code language, SUCCESS is written as 6344866 and NATIVE is written as 279508, then what will be the code for SENSITIVE?

a) 681659508 b) 632659503 c) 683659508

d) 648659504 e) 682659508

Explanation: The alphabets are coded as shown below.

S	U	C	C	E	S	S	N	A	T	I	V	E
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
6	3	4	4	8	6	6	2	7	9	5	0	8

From the above codes, we can write SENSITIVE as 682659508, which is option-e.

Ask doubt with Question Id: 7953

5) In a certain code language, 26891 is written as EGKPT, and 3457 is written as RUAL. Then how 58946 is written in that code?

a) AKPUG b) GUPKA c) AKUPG

d) AKPGU e) none of these

Explanation: Numbers are coded as shown below.

2	6	8	9	1	3	4	5	7
↓	↓	↓	↓	↓	↓	↓	↓	↓
E	G	K	P	T	R	U	A	L

∴ 58946 is coded as AKPUG; Option-a is correct choice.

Ask doubt with Question Id: 7954

6) In a certain code language blue is called green, green is called yellow, yellow is called white, white is called red, red is called purple, purple is called orange. Then what is the color of milk?

a) White b) Red c) Green d) Orange e) Purple

Explanation: Actually the color of milk is white. But in the given language, white is called red. So, answer is 'red'.

Ask doubt with Question Id: 7955

7) In a certain code language, all the two wheeler vehicles are called buses, all the buses are called books, all the books are called trees, all the trees are called pens. Then what we use to read?

a) Books b) Pens c) Trees d) Buses e) none of these

Explanation: We use books to read but in the given language books are called trees. So, the answer is trees.

Ask doubt with Question Id: 7956

DAY SEQUENCE/ CALENDAR

CONCEPTS

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

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

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

But a century year is not a leap year i.e. 100, 200, 300,....

But every 4th century year is a leap year.

i.e. 400, 800, 1200, 1600, 2000 etc.

A leap year has 366 days.

Examples:

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

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

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

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

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

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

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

• **Counting of odd days:**

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

Examples:

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

Explanation: 7) 10 (1

7

3 = Remainder → 3 odd days.

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

Explanation: 7) 100 (14

98

2 → odd days

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

Explanation: An ordinary year has 365 days. So,

7) 365 (52

364

1 → odd day

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

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

Explanation: As we know, a leap year has 366 days. So,

7) 366 (52

364

2 → odd days

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

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

• **Counting odd days for century years:**

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

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

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

124 odd days = 17 weeks + 5 days = 5 odd days.

∴ Number of odd days in **100 years** = 5.

2) Number of odd days in **200 years** = (5×2) = 3.

3) Number of odd days in **300 years** = (5×3) = 1.

4) Number of odd days in **400 years** = (5×4+1) = 0.

Similarly..., each one of 800, 1200, 1600, 2000 year etc has 0 (zero) odd days as they are multiples of 400.

• **Some Important points to remember:**

1) In every *normal / ordinary year* the first day (1st January) and the last day (31st December) are always same. For example, if January 1st is *Monday* then December 31st is also *Monday*.

2) In every leap year if the first day (January 1st) is *Sunday*, then last day (December 31st) will be it's next day i.e. *Monday*.

3) In every year, the calendar for the months *April* and *July* are always same.

4) For every 400 years, the day repeats.

For example, if 14-April-1604 is *Saturday*, then 14-April-2004 will also be *Saturday*.

5) The last day of a century cannot be either *Tuesday* or *Thursday* or *Saturday*.

Questions on day sequence/ calender are mainly 5 types.

1) Problems based on Total Day–Particular Day.

2) Problems based on Leap Year.

3) Problems based on Particular Date–Day.

4) Problems based on Same Calendar Year.

5) Problems based on Same Day–Date of the Month.

DIRECTION SENSE TEST

CONCEPTS

Direction sense test question will be asked to check the candidates ability in deciding the shortest way within time. In this type of questions, we will see persons or things moving in East, West, North and South directions from an initial point.

There are 4 directions viz., East, West, North, South.

And 4 cardinal directions viz., North-East, North-West, South-East, South-West.

There are 4 types of problems which are frequently been asked in Campus Recruitment Tests.

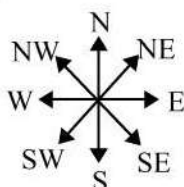
1) Problems on Distances

2) Problems on clocks

3) Problems on Angles

4) Problems on Shadows

The diagram below illustrates the relevant positions of all the 8 directions.



Problems on directions can be solved in 2 ways.

(1) Diagrammatic way (2) Shortcut way

While solving the problems on directions, it is very important for you to remember the left and right directions of each direction. i.e. Left of the East is North. Right of East is South and so on.

Type-(1): Problems on Distances:

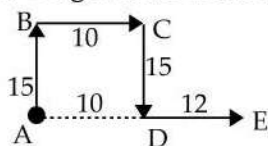
Steps for shortcut method:

- 1) If the directions are same, then add the distances.
- 2) If directions are opposite, then subtract the distances and write the direction which has maximum value.
- 3) If directions are North-East, North-West, South-East or South-West then take both directions as single direction and calculate the distance using the formula.

$$\sqrt{(\text{First Distance})^2 + (\text{Second Distance})^2}$$

Example: A man walk 15 km towards North. From there he walks 10 km towards East. Then 15 km towards South. Finally he walks towards East 12 km. How far and in which direction is he with reference to his starting point?

Explanation: Diagrammatic Method



The shortest distance is $AD + DE = 10 + 12 = 22$ km and the direction is East.

Shortcut Method:

First he walked 15 km North, so write N(15).

Next he walked 10 km East, so write E(10) i.e. N(15)E(10) and continue till the last statement.

Then we get, N(15) E(10) S(15) E(12)

Now apply the tips discussed above.

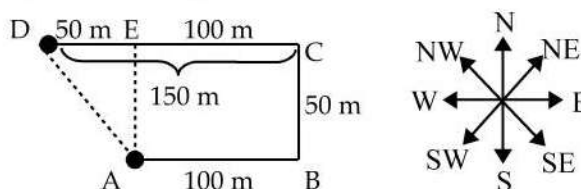
i.e. add E(10) and E(12) = E(22) (∵ same directions)

and subtract N(15) and S(15) = 0 (∵ opposite directions)

∴ Finally he is in East direction with distance 22 km.

Example: A Boy started to school from his home. He walks 100 m in East. Then he walks 50 m to his left. From there he walks 150 m to his left again, finally he reached his school. How far and in which direction his school is located from his home?

Explanation: Diagrammatic Method:



From $\triangle ADE$ the shortest distance is AD.

$BC \parallel EA$. So, $BC = EA = 50$.

$$AD = \sqrt{(AE)^2 + (DE)^2} = \sqrt{(50)^2 + (50)^2}$$

$$AD = \sqrt{2500 + 2500} = \sqrt{5000} = 10\sqrt{50}$$

The school is in North West direction and at a distance of $10\sqrt{50}$ meters from his home.

Shortcut Method:

Write from starting point to destination.

i.e. E(100) N(50) W(150)

East and West are opposite directions to each other, so subtract them and write the direction which has highest value. i.e. W(50).

$$N(50) W(50) = NW \left[\sqrt{(50)^2 + (50)^2} \right]$$

$$= NW \left[\sqrt{2500 + 2500} \right] = NW \left[\sqrt{5000} \right] = NW \left[10\sqrt{50} \right]$$

Required direction = North-West; Distance = $10\sqrt{50} m$

Type-(2): Problems on Clocks:

Steps to Solve:

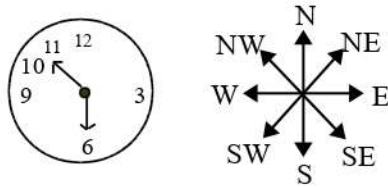
1) Representing the given time in a clock diagram.

Rotate the directions diagram according to the given clock timings. (Rotation of the direction arrows either clock wise or and clockwise but maximum 180° only).

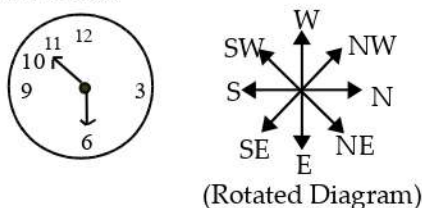
2) If two timings are given in the problem, then apply the same rotated directions to second timing also.

Example: A clock shows 10:30 (am/pm). If its minute hand points to East, then its hour hand points to?

Explanation: Represent the given time in a clock.



In the question it is given that, minute hand is pointing to East. But in the above diagram minute hand is pointing to South. So, rotate the directions diagram in such a way that the minute hand points to East. To do so, we have to rotate directions diagram 90° clock wise as shown below.



Now you see the hour hand in the clock and compare its direction with rotated directions diagram. Then we will come to know that the hour hand points SW direction.

Type-3: Problems on Angles:

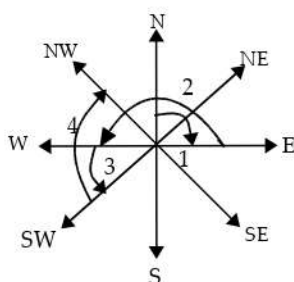
Steps to Solve:

- 1) If the given object moves in *clockwise* or it's *right hand side* then do *addition*. If it moves in *anti clockwise* or it's *left hand side* then do *subtraction*.
- 2) Now you will get a single degree value like 45°, 90° so on up to 180°. If the value is *positive* move the object in *clock wise* direction from its starting point or if the value is *negative* move the object in *anti clock wise* direction from its starting point.

Example: A man is facing North, he turns to his right 90°. Then he turns 180° in anti clock wise direction. Again he turns in the same direction 45°. Finally he turns 90° in the clock wise direction. In which direction is he facing now?

Explanation: Diagrammatic Method:

Indicate the movements of the person according to the given question.



Numbers in the above diagram indicates his movements from starting point to ending point. So, finally he is facing in *North-West* direction.

Shortcut Method: First the given object (man) moves in right hand side 90°, so write +90°. Next the man moves 180° in anti clock wise, so write -180°. Next he turns 45° in the same direction *i.e.* in his previous direction, so write -45°. Finally he turns 90° in clockwise direction, so write +90°. Now, by combining all the above four we get, Direction = 90° - 180° - 45° + 90° = -45°.

(minus indicates anti clock wise direction)

So move 45° in anti clock wise direction from his starting point.

i.e. 45° anti clockwise from North = North-West direction.

So, the man is facing NW direction finally.

Type-(4): Problems on shadows:

In this type of problems we will see two objects. These problems always depends on the sun. Here we are giving some tips to solve these problems easily.

- 1) Locate the person in the **North**, if the shadow is falling to his right (If Sun is in East only; morning time).
- 2) Locate the person in the **South**, if the shadow is falling to his left (If Sun is in East only; morning time).
- 3) If the sun is in **West** (*i.e.* in the evening time) then interchange North and South in (1) and (2).

Example: One morning after sunrise P went for a walk, he found that his friend Q is coming in opposite direction. P observed that, the shadow of Q is exactly falling to his right. Form which direction is P coming?

Explanation: Given that the shadow is falling to the right of P. So, locate P in the North. Then Q will be in South. So, we can say, P is coming from North direction.

CONCEPTUAL EXAMPLES

1) A girl is going to her friend's house. She went 45m West. Next she went 60m to her right, then she again took right and walked 75m. From there she went in her left direction and walked 30m to reach her friend's house. How far her friend's house is located with reference to her starting point.

- a) 205 m b) 305 m c) 300 m d) $40\sqrt{10}m$ e) $30\sqrt{10}m$

Explanation: Using shortcut method:

W(45)N(60)E(75) N(30).

East and West are opposite. So subtract = E(30).

N(60) and N(30) are same direction. So add = N(90).

$$N(90) E(30) = NE(\sqrt{(90)^2 + (30)^2}) = NE(30\sqrt{10})$$

Her friend's house is located at $30\sqrt{10}m$ distance with reference to her starting point.

Ask doubt with Question Id: 8011

SYLLOGISMS

CONCEPTS

Questions on syllogism contains statements followed by conclusions. You have to analyze the given statements carefully and find which of the conclusions logically follow.

Each statement of syllogism contains of three parts. They are, *subject*, *predicate* and *copula*.

Subject is that about which something is said.

Predicate is that part of the statement that which affirms is denied about the subject.

Copula is the word of the statement which denotes the relation between the subject and predicate.

Example: Consider the statement, '*woman is talented*'.

Here an information about *woman* is given. So, *woman* is the subject. '*talented*' is the quality affirmed for this subject. So it is the predicate. '*is*' denotes the relation between subject and predicate. So, it is *copula*.

Here we will discuss three types of methods to solve the questions on syllogism.

- 1) Diagrammatic method
- 2) Rules and Application method
- 3) Numbering and Apply method

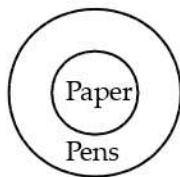
1) Diagrammatic Method:

To solve the syllogism questions in this method, you have to represent the given statements in the form of a diagram.

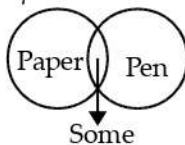
In syllogisms, frequently we come across the terms like *all*, *some* and *no*, *not* etc.

Example: 1) *All papers are pens.*

If the above statement are represented in a diagram, *papers* will be in inner circle and *pens* will be in outer circle. i.e.

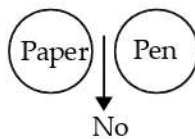


2) *Some papers are pens.*



3) *No paper is pen.*

'*no*' indicates there is no relations exists between subject and predicate of the given statement. Hence, the two circles will not meet each other.



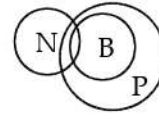
Example: Statements: Some Note books are books

All books are papers

Conclusions: I. Some Notebooks are papers

II. No papers is notebook

Explanation: The possible Venn diagram for the given statements is as follows:



From the given statements, statement-I follows from the above diagram but statement-II does not follow.

Ask doubt with Question Id: 8078

2) Rules and Application Method:

The following rules are very useful while solving problems using this method.

<i>all</i>	+	<i>all</i>	→	<i>all</i>
<i>all</i>	+	<i>no</i>	→	<i>no</i>
<i>some</i>	+	<i>all</i>	→	<i>some</i>
<i>all</i>	+	<i>some</i>	→	no conclusion
<i>no</i>	+	<i>no</i>	→	no conclusion
<i>some</i>	+	<i>some</i>	→	no conclusion
<i>some</i>	+	<i>no</i>	→	<i>some-not</i>
<i>no</i>	+	<i>all</i>	→	reverse of <i>some-not</i>
<i>no</i>	+	<i>some</i>	→	reverse of <i>some-not</i>

some-not/reverse of *some-not* + anything = no conclusion.

Implication Statements:

1) All → Some

If '*all A's are B's*' then '*some A's are B's*' is also true.

2) Some ↔ Some

If '*some cats are rats*' then '*some rats are cats*' is also true.

3) No ↔ No

If '*no car is bus*' then '*no bus is car*' is also true.

Note: For *either-or* option: If one conclusion is positive (i.e. starts with *all/ some*) and the other conclusion is negative (i.e. starts with *no*) and if they both have same objects as that of the given statements then the answer will be those two conclusions with *either-or* words.

Example: 1) Statements: Some keys are locks

All locks are doors

Conclusions: I. All keys are doors

II. Some keys are doors

III. Some keys are not doors

- a) only conclusion-(I) follows
- b) only conclusion-(II) follows
- c) only conclusion-(III) follows
- d) both conclusion-(I) and (III) follows
- e) None of the given conclusions follow

Explanation:

Step-1: Compare special words in both the statements.
i.e. *some* + *all*. Then, from the rule, *some* + *all* → *some*.

Step-2: Compare *predicate* of the first statement and *subject* of the second statement. If both are same then cancel them and deduce a new conclusion.

Some keys are ~~locks~~
+
All ~~locks~~ are doors
↓
Some keys are doors

'some keys are doors' is there in conclusion-(II). So, only conclusion-(II) follows. Hence, option-b is correct.

Note: From the given two statements if *subject* of the first statement and *predicate* of the second statement are not same, then it is not possible to deduce any conclusion from the two statements.

Ask doubt with Question Id: 8079

2) Statements: All bags are books

All pens are pencils

Conclusions: I. All bags are pencils

II. Some bags are pens

III. All pens are books

a) only conclusion-(I) follows

b) only conclusion-(II) follows

c) only conclusion-(III) follows

d) no conclusion follows

Explanation: Since the *subject* of the first statement and *predicate* of the second statement are not same, we cannot apply any rule. Hence, no conclusion follows.

Ask doubt with Question Id: 8080

3) Numbering and Apply Method:

The following rules are also very useful while solving the problems in this method.

s.no	1 st statement	2 nd statement	Final Conclusion
1	Positive	Positive	Positive
2	Positive	Negative	Negative
3	Negative	Positive	Negative
4	Negative	Negative	No Conclusion

Positive → *some*/ *all*; Negative → *no*/ *some-not*

Direct Relation: If any conclusion is/are directly derived from any of the given statement then it is called direct relation.

Indirect Relation: If the conclusion is not directly derived from any of the given statements then it is called indirect relation.

Consider the below *value table* which helps in solving the problems in this method.

Value Table:

Statement	Subject	Predicate
<i>all</i>	100	50
<i>some</i>	50	50
<i>no</i>	100	100

Note: Consider the values given for the words in the statements as *income*. And values given for the words in the conclusions as *expenditure*.

Example: Statements: Some notebooks are books

All books are papers

Conclusions: I. Some notebooks are papers

II. No papers is notebook

Using the above value table we can number *subject* and *predicate* parts of the given statements and conclusions as shown below.

Statements	Conclusions
50 50	50 50
Some notebooks are books	Some notebooks are papers
100 50	100 100
All books are papers	No papers is notebook
<i>Incomes</i>	<i>Expenditures</i>

Steps to Solve:

Step-1: Observe the statements and conclusions using *positive* and *negative* table. If it is applicable then only go to the next step, else conclude.

Step-2: Assign the values to statements and conclusions using value table.

Step-3: Check every conclusion whether it has direct relation with the given statements. If yes go to step-4 else go to step-5.

Step-4: If the conclusion has direct relation then, compare total *income* and *expenditure* of subject and predicate separately and check if $income \geq expenditure$.

If both subject's and predicate's $income \geq expenditure$ then that conclusion is said to be true.

Step-5: If no direct relation exists between subject and predicate of any conclusion, then check which two statements has to be combined to get that particular conclusion. Then find the common word in those statements. Common word must have at least one value as 100. If Income of every word \geq Expenditure of every word, then that conclusion is true.

Lets apply these method to an example.

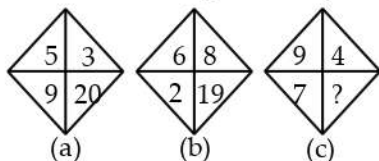
CHARACTER PUZZLE

CONCEPTS

In this type of questions, a figure or a matrix is given in which some numbers are filled according to a rule. A place is left blank. You have to analyze the given character or number and find out the missing number or letter from the given possible answers which may be filled in the blank space.

CONCEPTUAL EXAMPLES

1) Which number will replace the question mark?



- a) 236 b) 336 c) 286 d) 386 e) 436

Explanation:

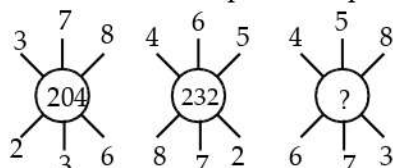
From figure (a), $9 + 5 + 3 = 17 \Rightarrow 17 + 3 = 20$

From figure (b), $2 + 6 + 8 = 16 \Rightarrow 16 + 3 = 19$

From figure (c), $7 + 9 + 4 = 20 \Rightarrow 20 + 3 = 23$

Ask doubt with Question Id: 8206

2) Which number will replace the question mark?



- a) 23 b) 18 c) 22 d) 21 e) None of these

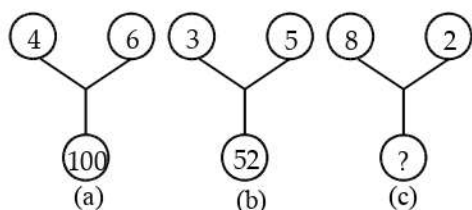
Explanation: $[3 \times 7 \times 8] + [2 \times 3 \times 6] = 204$

$$[4 \times 6 \times 5] + [8 \times 7 \times 2] = 232$$

Similarly, $[4 \times 5 \times 8] + [6 \times 7 \times 3] = 286$

Ask doubt with Question Id: 8207

3) Which number will replace the question mark?



- a) 81 b) 84 c) 516 d) 514 e) 86

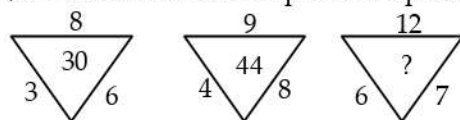
Explanation: From (a), $4^3 + 6^2 = 64 + 36 = 100$

$$\text{From (b), } 3^3 + 5^2 = 27 + 25 = 52$$

So, From (c), $8^3 + 2^2 = 512 + 4 = 516$

Ask doubt with Question Id: 8208

4) Which number will replace the question mark?



- a) 79 b) 89 c) 99 d) 69 e) 109

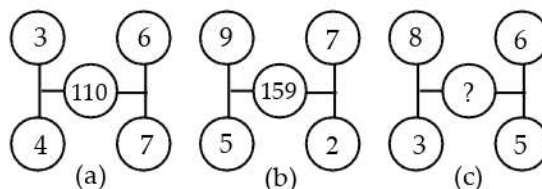
Explanation: From (a), $8 \times 3 + 6 = 30$

From (b), $9 \times 4 + 8 = 44$

So, from (c), $12 \times 6 + 7 = 79$

Ask doubt with Question Id: 8209

5) What number will replace the question mark?



- a) 229 b) 134 c) 329 d) 439 e) 339

Explanation: From (a), $3^2 + 6^2 + 4^2 + 7^2 = 110$

From (b), $9^2 + 7^2 + 5^2 + 2^2 = 159$

So, from (c), $8^2 + 6^2 + 3^2 + 5^2 = 134$

Ask doubt with Question Id: 8210

6) Which number will replace the question mark?

12	19	16
4	3	?
6	3	8
8	19	4

- a) 8 b) 16 c) 4 d) 2 e) None of these

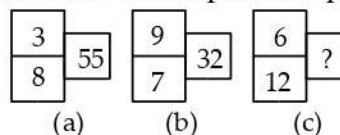
Explanation: From Column-I: $(12 \times 4) \div 6 = 8$

From column-II: $(19 \times 3) \div 3 = 19$

So, from column-III: $(16 \times ?) \div 8 = 4 \Rightarrow 16 \times ? = 32 \Rightarrow ? = 2$.

Ask doubt with Question Id: 8211

7) Which number will replace the question mark?



- a) 108 b) 46 c) 64 d) 104 e) can't be determined

Explanation: From (a), $8^2 - 3^2 = 55$

From (b), $9^2 - 7^2 = 32$

So, from (c), $12^2 - 6^2 = 108$

Ask doubt with Question Id: 8212

8) Which character will replace the question mark?

A ₅	F ₁₀	K ₁₅
B ₁₆	G ₂₁	L ₂₆
C ₂₇	H ₃₂	?

- a) M₃₇ b) N₃₆ c) O₃₇ d) M₃₆ e) M₃₈

Explanation:

From column-I, A \rightarrow B \rightarrow C ($5 + 11 + 11$)

From column-II, F \rightarrow G \rightarrow H ($10 + 11 + 11$)

From column-III, K \rightarrow L \rightarrow M ($15 + 11 + 11$)

The character M₃₇ will replace the question mark

Ask doubt with Question Id: 8213

ARITHMETIC REASONING

CONCEPTS

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

CONCEPTUAL EXAMPLES

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

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

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

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

Ask doubt with Question Id: 8282

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

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

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

Ask doubt with Question Id: 8283

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

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

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

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

$$10x = 200 \Rightarrow x = 20 \text{ km.}$$

He traveled 20 km by taxi.

Ask doubt with Question Id: 8284

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

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

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

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

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

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

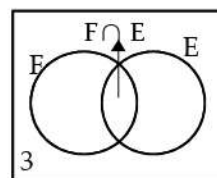
Number of peacocks in that group = 9.

Ask doubt with Question Id: 8285

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

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

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



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

$$\text{Also, } F + (F \cap E) = 7; \quad E + (F \cap E) = 8.$$

$$\text{By adding, } F + E + 2(F \cap E) = 15 \dots\dots\dots(2)$$

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

\therefore 3 of them read both French and English.

Ask doubt with Question Id: 8286

EXERCISE

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

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

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

- a) 84 b) 68 c) 74
d) 64 e) cannot be determined

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

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

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

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

STATEMENTS AND ARGUMENTS

CONCEPTS

In this type of questions, the statement deals with all general aspects of day to day life which may include socio economic, scientific, political issues etc. A statement is followed by two arguments. One supports the statement by pointing out the positive aspects and the other deny the statement by pointing out its negative impact. You have to analyze given statement, arguments and decide which of the arguments strongly supports the statement by giving an appropriate opinion on the subject. Read the given arguments in the question and discard them if they are *ambiguous, disproportionate, irrelevant, comparative, simplistic*.

1) Ambiguous: If the given arguments does not have a clear reason or if it is not contextual or not expressing its opinion whether supporting or not. Such an argument should be discarded.

2) Disproportionate: If the given arguments are too large or too small in comparison with given statements. This kind of arguments can be discarded.

3) Irrelevant: If the given arguments are irrelevant to the context of the given statements, they can be discarded.

4) Comparative: If the argument do not state the reasons for why the proposed action is implemented and its consequences. Such arguments can be discarded.

5) Simplistic: If the given arguments do not have sufficient information to support the given statements, they cannot be considered.

CONCEPTUAL EXAMPLES

Direction: Each of the following examples consists of a statement followed by two arguments (I) and (II). Give your answer as,

a: if only argument-(I) is strong.

b: if only argument-(II) is strong.

c: if either argument-(I) or (II) is strong.

d: if neither of the arguments is strong.

e: if both the arguments are strong.

1) Statement: Should number of holidays be increased to private employees?

Arguments:

I. Yes, because employee satisfaction will be better.

II. No, it will lead to decreased productivity of private organizations.

Explanation: Though employee satisfaction is important but this will adversely affect the productivity and revenue of the organization. So the

argument-(I) does not hold strong. Hence, only argument-(II) is strong.

Ask doubt with Question Id: 8322

2) Statement: Should taxes on air conditioners be further increased?

Arguments:

I. Yes, air conditioner is a luxury item and rich people can only buy them.

II. No, air conditioners are bought by financially backward sector also.

Explanation: Generally, taxes on any commodities or goods doesn't depend on the financial position of the individuals so, both the arguments does not hold strong. Hence, option-d is correct choice.

Ask doubt with Question Id: 8323

3) Statement: Should Indian software professionals who are working abroad be called back?

Arguments:

I. Yes, they must serve the mother land first and forget about high pay scales or facilities etc.

II. No, we have adequate talent here, let them stay according to their will and wish.

Explanation: The demands of an individual are as important as the demands of motherland. So, argument-(I) is not strong. Argument-(II) is weak because of its complacent attitude. Hence, option-d is correct choice.

Ask doubt with Question Id: 8324

4) Statement: Should education to women be made free in India?

Arguments:

I. No, this will weaken our present social structure.

II. Yes, this is the only way to bring back glory to Indian woman hood.

Explanation: Argument-(I) is strong. It is links, providing free education to women with weakening of social structure, which is not sensible. Argument-(II) also weak because of the term 'only'.

Hence, option-d is correct choice.

Ask doubt with Question Id: 8325

5) Statement: Are joint families better than small families.

Arguments:

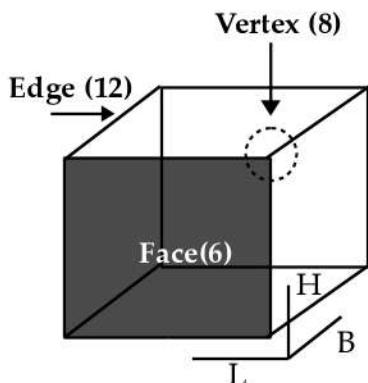
I) Yes, joint families provide more security and unity and also reduce the burden of work.

II) No, small families ensure more freedom.

CUBES AND DICES

CONCEPTS

- **Cubes:** A cube is a three dimensional figure, which have 6 surfaces, 8 corners and 12 edges.

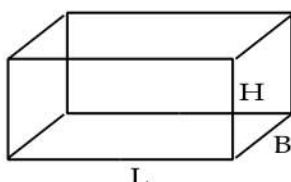


If a cube is painted with same colour and let 'n' be the number of separations made to the bigger cube then

1. Number of smaller cubes with 3 surfaces painted = 8.
2. Number of smaller cubes with 2 surfaces painted = $(n-2) \times 12$.
3. Number of smaller cubes with one surface painted = $(n-2)^2 \times 6$.
4. Number of smaller cubes with no surface painted = $(n-2)^3$.

• In general, a cube of edge length 'a' units can be divided into 'a³' unit cubes i.e. the number is equal to the volume of the cube.

- **Cuboid:** A Cuboid is a solid body with each face being a rectangle. Hence, Cuboid has length, breadth and height.



Let the length, breadth and thickness(height) be a, b and c respectively.

Volume of Cuboid = length \times breadth \times height

• A cuboid with length a, breadth b and height c is divided into unit cubes i.e. $a \times b \times c$ unit cubes = volume.

Number of unit cubes with 3 face visible = 8

Number of unit cubes with 2 faces visible = $4(a-2) + 4(b-2) + 4(c-2) = 4[a+b+c-6]$

Number of unit cubes with 1 face visible = $2[(a-2)(b-2) + (b-2)(c-2) + (a-2)(c-2)]$

Number of unit cubes with no face is visible = $(a-2)(b-2)(c-2)$

- **Dices:** Dices are three dimensional figures, which can be either cubes or cuboids. They have 6 faces and each face is numbered from 1 to 6. The labeling of the 6 faces of the dice can be done as follows:

Approach: 1) Study the figures given and the numbers labeled on the faces of the dice.

2) Find the adjacent numbers of each number.

3) Find the missing numbers of each figure.

4) With the help of the adjacent and the missing number of the figures, we can answer the given dice problem.

CONCEPTUAL EXAMPLES

- 1) A cube is painted blue on all of its surfaces. It is then cut in to 27 smaller cubes of equal size. Find how many smaller cubes have no color?

Explanation: If the cube is cut in to 27 smaller cubes, then number of separations made = $n = 3$ (since $3 \times 3 \times 3 = 27$).

Number of smaller cubes with no color = $(n-2)^3 = (3-2)^3 = 1^3 = 1$

Ask doubt with Question Id: 7742

- 2) A cube 125 mt is colored pink on two opposite surfaces and then cut in to 125 smaller cubes then find how many number of cubes have pink color?

Explanation: 125 m is cube got separated in to 125 smaller cubes.

\therefore Size of the big cube = 5 mt

(Since $5m \times 5m \times 5m = 125 m^3$)

Size of the smaller cube = 1 m.

Number of separations made = $\frac{5}{1} = 5$

The no. of small cubes get painted on one surface = 25.

Total no. of smaller cubes get pink color = $25 + 25 = 50$

Ask doubt with Question Id: 7743

- 3) A cube is painted such that one pair of surfaces is painted brown and the other pair of surfaces is painted orange. The cube is cut in to 64 small cubes of equal size. Find how many cubes have both the color brown and orange?

Explanation: There are 6 surfaces to the cube. In which opposite surfaces are painted brown and other 2 opposite surfaces are painted orange. Then 4 edges of the cube have both the colors. Since the big cube cut in to 64 smaller cubes, the 4 edges of the cube have both the colors. Since the big cube cut into 64 smaller cubes, the 4 edges of the big cube has $4 \times 4 = 16$ smaller cubes have both brown and orange colors. Answer = 16.

Ask doubt with Question Id: 7744

4) Adjacent surfaces of a cube are painted yellow color. The cube is cut in to 8 smaller cubes. Find how many cubes have yellow color?

Explanation: The cube is painted with 2 adjacent surfaces and remaining 4 surfaces are not painted. In which, edges of cube are not at all painted. In one edge, it has two smaller cubes. Remaining all are painted. Number of cubes painted in the cube = $8 - 2 = 6$

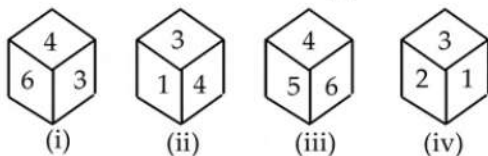
Ask doubt with Question Id: 7745

5) A cube of adjacent 3 surfaces are painted white and the other surfaces painted green. If the cube cut in to 216 equal cubes. Find how many cubes have both the colors white and green?

Explanation: From the adjacent diagram, The smaller cubes occurred in 4 edges (Out of 12) have both the colors white and green. \therefore No. of required cubes = $4 \times 6 = 24$

Ask doubt with Question Id: 7746

6. Find the number on the dice opposite to number 2?

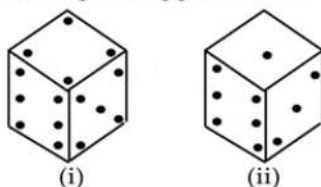


- a) 6 b) 5 c) 4 d) 3

Explanation: In figure-(ii), 4 is adjacent to 1 and 3. In figure-(iv), 2 is adjacent to 1 and 3. Hence, we can say, 4 is opposite to 2. Hence, option-c is correct choice.

Ask doubt with Question Id: 7747

7. Two positions of a dice are given below. Find the number at the place opposite to 4?

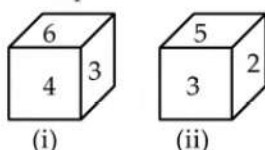


- a) 1 b) 2 c) 3 d) 5

Explanation: From figure-(i) and (ii), either 1 or 3 can be opposite to 4. If we observe the dice (i), if turns two steps upwards LHS, then it came 1 at top and 4 has gone to bottom. So, 1 is opposite to 4.

Ask doubt with Question Id: 8335

8. From the below figures, find the number at the bottom, when top is 5?



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

Explanation: Imagine, as if the figures are rotated in such a way that the common side i.e. 3 at the bottom in

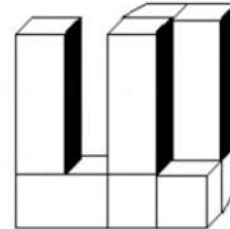
both the figures. Then compare the sides.

Then 6 is opposite to 2 and 4 is opposite to 5.

Ask doubt with Question Id: 8546

EXERCISE

1) Count the number of blocks in the given figure.



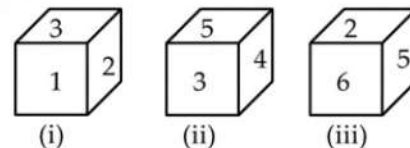
- a) 6 b) 7 c) 8 d) 9 e) 10

2) Count the number of cubes in the given figure?



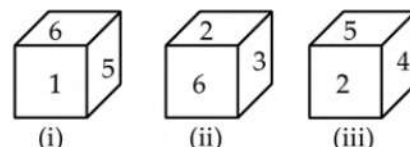
- a) 17 b) 13 c) 15 d) 16 e) 14

3) From the below diagrams, find what numbers are opposite to 3 and 1.



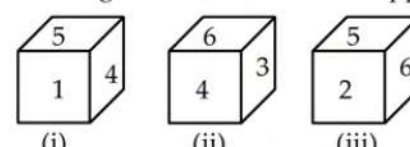
- a) 2, 5 b) 4, 2 c) 2, 4 d) 5, 6 e) 6, 5

4) From the below diagrams find what numbers are opposite to 5 and 6?



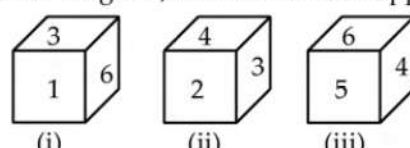
- a) 1, 2 b) 3, 4 c) 4, 5 d) 4, 6 e) 2, 3

5) From below diagram, find the number opposite to 2?



- a) 1 b) 3 c) 4 d) 5 e) 6

6) From below diagram, find the number opposite to 2?



- a) 1 b) 3 c) 4 d) 5 e) 6