Quick Revision Notes – Coding and Decoding

The term coding-decoding primarily related with massage sent in secret form which cannot be understood by other easily. Coding, therefore, means rule or method used to hide the actual meaning of a word or group of words and decoding means the method of making out the actual message that is disguised in a particular method of coding.

Coding is a process of conversion of original word or sentence or collection of character into some other form by following certain logic or rule. The resultant is known as code.

Quick Laws of the English Alphabet

| Alphabetical order position | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 |
|-----------------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Alphabets                   | 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 |
| Reverse order               | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |

Types of Coding:

a) **Letter Coding:** In this section, we are going to deal with types of questions, in which the letters of a word are replaced by certain other letters according to a specific pattern/rule to form a code. You are required to detect the coding pattern/rule and answer the question(s) that follow, based on that coding pattern/rule.

**Example:** In a certain code language, ‘PICTURE’ is written as ‘QHDSVQF’. How would ‘BROWSER’ be written in that same code language?

**Solution:** Clearly, the letters in the word ‘PICTURE’ are moved alternately one step forward and one step backward to obtain the letters of the code. Thus, we have

\[
\begin{align*}
P & \rightarrow Q \quad \text{Similarly,} \\
I & \rightarrow H \\
C & \rightarrow D \\
T & \rightarrow S \\
U & \rightarrow V \\
R & \rightarrow Q \\
E & \rightarrow F
\end{align*}
\]

b) **Direct Letter Coding:** In direct letter coding system, the code letters occur in the same sequence as the corresponding letters occur in the words. This is basically a substitution method.

**Example:** In a coding system, ‘SHEEP’ is written as ‘GAXXR’ and ‘BLEAT’ as ‘HPXTN’. How can ‘SLATE’ be written in that same coding system?

**Solution:** In both the words ‘SHEEP’ and ‘BLEAT’, the letter E is common and code for E is substituted X. Hence, using direct letter coding method, we have

\[
\begin{align*}
S & \rightarrow G \\
H & \rightarrow A \\
E & \rightarrow X \\
P & \rightarrow X \\
T & \rightarrow N
\end{align*}
\]

similarly, for ‘SLATE’

\[
\begin{align*}
S & \rightarrow G \\
L & \rightarrow P \\
A & \rightarrow T \\
T & \rightarrow E \\
E & \rightarrow N
\end{align*}
\]

b) **Number/Symbol Coding:** In these types of questions, either numerical code values are assigned to a word or alphabetical code letters are assigned to the numbers.

**Example:** If ‘RAJU’ is coded as 11-12-13-14 and ‘JUNK’ is coded as 13-14-10-9, then how will you code ‘RANK’?

**Solution:**
d) Deciphering Message Word Coding/Numeral Coding: To analyse such codes, any two messages bearing a common word/numeral are picked up. The common code word/numeral will represent that word/code. Proceeding similarly by picking up all possible combinations of two, the entire message can be decoded and the codes for individual word/numeral be found.

Example:
(i) ‘min fin bin gin’ means ‘trains are always late’.
(ii) ‘gin din cinhin’ means ‘drivers were always punished’.
(iii) ‘bin cin vin rin’ means ‘drivers stopped all trains’
(iv) ‘din kin fin vin’ means ‘all passengers were late’.
‘Drivers were late’ would be written as

Solution:

\[
\begin{align*}
\text{min fin bin gin} & \Rightarrow \text{trains are always late} \ldots (i) \\
\text{gin din cin hin} & \Rightarrow \text{drivers were always punished} \ldots (ii) \\
\text{bin cin vin rin} & \Rightarrow \text{drivers stopped all trains} \ldots (iii) \\
\text{din kin fin vin} & \Rightarrow \text{all passengers were late} \ldots (iv)
\end{align*}
\]

From Eqs. (i) and (iv), fin =>late
From Eqs. (ii) and (iii), cin =>drivers
From Eqs. (ii) and (iv), din =>were
Hence, drivers were late => cin din fin

e) Substitution Coding: In this section, some particular words are assigned certain substituted names. Now, questions are formed based on that principle.

Example: If ‘white’ is called ‘blue’, ‘blue’ is called ‘red’, ‘red’ is called ‘yellow’, ‘yellow’ is called ‘green’, ‘green’ is called ‘black’, ‘black’ is called ‘violet’ and ‘violet’ is called ‘orange’, then what would be the colour of human blood?

Solution:
We know the colour of the human blood is ‘red’ and given that ‘red’ is called ‘yellow’. So, the colour of human blood is ‘yellow’.

Solved Examples:
1. In a certain code, COMPUTER is written as RFUVQNPC. How is MEDICINE written in the same code?

Solution:
The letters of the word are written in a reverse order and each letter, except the first and the last one, is moved one step forward, to obtain the code.

2. If BOMBAY is written as MYMYMY, how will TAMIL NADU be written in that code?

Solution:
The letters at the third and sixth places are repeated thrice to code BOMBAY as MYMYMY. Similarly, the letters at the third, sixth and ninth places are repeated thrice to code TAMIL NADU as MNUMNUMNU.

3. If in a certain language, COUNSEL is coded as BITIRAK, how is GUIDANCE written in that code?
   **Solution:**
   The letters at odd positions are each moved one step backward, while the letters at even positions are respectively moved six, five, four, three, two,... steps backward to obtain the corresponding letters of the code.

4. If in a certain language CHARCOAL is coded as 45164913 and MORALE is coded as 296137, then how the word COACH is coded in that language?
   **Solution:**
   The alphabets are coded as follows:
   
<table>
<thead>
<tr>
<th>C</th>
<th>H</th>
<th>A</th>
<th>R</th>
<th>O</th>
<th>L</th>
<th>M</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>5</td>
<td>1</td>
<td>6</td>
<td>9</td>
<td>3</td>
<td>2</td>
<td>7</td>
</tr>
</tbody>
</table>
   
   C is coded as 4, O as 9, A as 1 and H as 5. So, the code for COACH is 49145.

5. If in a certain language CHARCOAL is coded as 45164913 and MORALE is coded as 296137, then how the word ROCHEL is coded in that language?
   **Solution:**
   The alphabets are coded as follows:
   
<table>
<thead>
<tr>
<th>C</th>
<th>H</th>
<th>A</th>
<th>R</th>
<th>O</th>
<th>L</th>
<th>M</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>5</td>
<td>1</td>
<td>6</td>
<td>9</td>
<td>3</td>
<td>2</td>
<td>7</td>
</tr>
</tbody>
</table>
   
   R is coded as 6, O as 9, C as 4, H as 5, E as 7 and L as 3. So, the code for ROCHEL is 694573.

6. If MISTAKE is coded as 9765412 and NAKED is coded as 84123, then how the word ROCHEL is coded in that language?
   **Solution:**
   The alphabets in the given words are coded as follows:
   
<table>
<thead>
<tr>
<th>M</th>
<th>I</th>
<th>S</th>
<th>T</th>
<th>A</th>
<th>K</th>
<th>E</th>
<th>N</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>8</td>
<td>3</td>
</tr>
</tbody>
</table>
   
   I is coded as 7, N as 8, T as 5, M as 9, A as 4 and E as 2. So, the code for INTIMATE is 78579452.

7. In a certain code, a number 13479 is written as AQFJL and 5268 is written as DMPN. How is 396824 written in that code?
   **Solution:**
   In the given codes, the numbers are coded as shown:
   
<table>
<thead>
<tr>
<th>1</th>
<th>3</th>
<th>4</th>
<th>7</th>
<th>9</th>
<th>5</th>
<th>2</th>
<th>6</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Q</td>
<td>F</td>
<td>J</td>
<td>L</td>
<td>D</td>
<td>M</td>
<td>P</td>
<td>N</td>
</tr>
</tbody>
</table>
   
   i.e., 3 as Q, 9 as L, 6 as P, 8 as N, 2 as M and 4 as F. So, 396824 is coded as QLPNMF.
8. The number in each question below is to be codified in the following code:

<table>
<thead>
<tr>
<th>Digit</th>
<th>7</th>
<th>2</th>
<th>1</th>
<th>5</th>
<th>3</th>
<th>9</th>
<th>8</th>
<th>6</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Letter</td>
<td>W</td>
<td>L</td>
<td>M</td>
<td>S</td>
<td>I</td>
<td>N</td>
<td>D</td>
<td>J</td>
<td>B</td>
</tr>
</tbody>
</table>

Then how the Number 64928 is coded in that language?

**Solution:**

As given, 6 is coded as J, 4 as B, 9 as N, 2 as L and 8 as D.

So, 64928 is coded as JBNLD.

9. If the animals which can walk are called swimmers, animals who crawl are called flying, those living in water are called snakes and those which fly in the sky are called hunters, then what will a lizard be called?

**Solution:**

Clearly, a lizard crawls and the animals that crawl are called 'flying'.

So, 'lizard' is called 'flying'.

10. If sky is called sea, sea is called water, water is called air, air is called cloud and cloud is called river, then what do we drink when thirsty?

**Solution:**

One drinks 'water' when thirsty and as given, 'water' is called 'air'.

11. If 'ishloinm' stands for 'neat and tidy' ; 'qprinmsen' stands for 'small but neat' and 'hsmsenrso' stands for 'good but erratic', what would 'but' stand for?

**Solution:**

In the second and third statements, the common code word is 'sen' and the common word is 'but'.

So, 'sen' means 'but'.

12. In a certain code language,

(A) 'pitdarna' means 'you are good'
(B) 'dartok pa' means 'good and bad'
(C) 'timnatok' means 'they are bad'

In that language, which word stands for 'they'?  

**Solution:**

In the first and third statements, the common word is 'na' and the common word is 'are'.

So, 'na' means 'are'.

In the second and third statements, the common code word is 'tok' and the common word is 'bad'.

So, 'tok' means 'bad'.

Thus, in the third statements, 'tim' stands for 'they'.

13. In a certain code language, '743' means 'mangoes are good' ; '657' means 'eat good food' and '934' means 'mangoes are ripe'. Which digit means 'ripe' in that language?

**Solution:**

In the first and third statements, the common code digits are '4' and '3' and the common words are 'mangoes' and 'are'.

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So, '4' and '3' are the codes for 'mangoes' and 'are'.
Thus, in the third statements, '9' means 'ripe'.

14. In a certain code, ‘467’ means 'leaves are green' ; '485' means 'green is good' and '639' means 'they are playing'. Which digit stands for 'leaves' in that code?

**Solution:**
In the first and second statements, the common code digit is '4' and the common word is 'green'.
So, '4' means 'green'.
In the first and third statements, the common digit is '6' and the common word is 'are'.
So, '6' means 'are'.
Thus, in the first statements, '7' means 'leaves'.

15. In a certain code language ‘level of environment pollution’ is written as ‘la naka ta’, ‘cause of the factories’ is written as ‘di re sa la’, ‘the pollution level in city’ is written as ‘kana di zo fi’ and ‘factories inside the city’ is written as ‘ha di fi re’. ‘na’ is the code for which of the following?

**Solution:**
Level of environment pollution → la na ka ta ........ (i)
Cause of the factories → di re sa la ........ (ii)
The pollution level in city → ka na di zo fi ........ (iii)
Factories inside the city → ha di fi re ........ (iv)
From (i) and (ii), of → la ........ (v)
From (i) and (iii), level/pollution → ka/na ........ (vi)
From (i), (v) and (vi), environment → ta ........ (vii)
From (i), (iii) and (iv), the → di ........ (viii)
From (ii), (iv) and (viii), factories → re ........ (ix)
From (ii), (v), (viii) and (ix), cause → sa ........ (x)
From (iii), (iv) and (viii), city → fi ........ (xi)
From (iii), (vi), (viii) and (x), in → zo ........ (xii)
From (iv), (viii), (ix) and (xi), inside → ha ........ (xiii)
By these conclusions we can say that the code for na is level/pollution

**Practice Problems:**
1. In a certain code 'best way to win' is written as 'ad mi ja no', 'the way to hell' is written as 'kujaig ad'. 'win of the day' is written as 'be kuzo mi' and 'to sell of night' is written as 'be li yaja'. What is the code for 'best'?

Directions (2 – 4):
2. KQAPJE
3. EMANRB
4. QDBGRM
5. In a certain code MODE is written as #8%6 and DEAF is written as %67$. How is FOAM written in that code?
6. In a certain code BRIGHT is written as JSCSGF. How is JOINED written in that code?
7. In a certain code MAJORITY is written as 'PKBNXSHQ', How is SANCTION written in that code?
8. If '+' means '−', '−' means '×', '×' means '¸' and '¸' means '+' then what is the value \(9 − 7 + 85 × 17 \div 15\)?
9. In a certain code ‘Sachin is good man’ is written as ‘pa le ta hi’, ‘man always rich’ is written as ‘ne hi ki’, ‘rich is good’ is written as ‘pa ne le’ and ‘be good always’ is written as ‘kisi pa’. Then how ‘pa ta ki le’ can be coded?
10. If ‘A’ is coded as 1, ‘B’ as 3, ‘C’ as 5 and so on, which of the following is the numerical value of the word ‘FAZED’?

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