

**G. VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS)**

(Re-Accredited with A grade by NAAC | DBT Star College Scheme)

**KOVILPATTI – 628 502**

**STUDY MATERIAL**

for

**OPEN ELECTIVE COURSE**

**(SELF STUDY COURSE)**

Subject : Quantitative Aptitude

Subject Code : U20MA6OE



DEPARTMENT OF MATHEMATICS - STUDY MATERIAL

COURSE CONTENT

UNIT-I : Percentage :- Oddman out Series - Percentage - Profit and Loss.

Section 1 : 10, 11, 35 in Text Book I

Unit-II : Central Tendency :- Mean - Median - Mode

Sections : 2.1 - 2.3 in Text Book II

Unit III : Logical Sequence :- Logical Venn diagram - Logical Sequence of words.

Sections I : 9 and 13 in text Book III

Unit IV : Coding :- Coding - decoding

Section 1 : 4 in Text Book III

Unit V : Puzzle Test

Puzzle test - classification type questions - Seating /

Placing arrangements - Comparison type questions

Sections 1 : 6 Type I, II & III in Text Book III

Text Books : I : Aggarwal. R.S, 2014, Quantitative Aptitude, S. Chand and Company Ltd, New Delhi

II : Arumugam, S & Thangapandi Issac. A, 2013, Statistics, New Gamma Publication House, Palayamkottai.

III : Aggarwal R.S. 2005, A modern Approach to Verbal and Non Verbal Reasoning, S. Chand Company Ltd, New Delhi

Reference Books : 1. Aggarwal. R.S, 2010, A modern Approach to Verbal & nonverbal Reasoning, S. Chand, Company Ltd

2. Aggarwal. R.S. 2019, A modern Approach to Verbal and Non Verbal Reasoning, S. Chand

Web References : 1. [https://www.youtube.com/watch?Company Ltd.](https://www.youtube.com/watch?Company%20Ltd.)  
2. <https://www.youtube.com/watch?v=ivE5qNFM0Nk>  
3. Reasoning - Logical Venn Diagrams (tutorialspoint.com)



UNIT- I.

I. we know  $x\% = \frac{x}{100}$

$20\% = \frac{20}{100}$  ,  $48\% = \frac{48}{100} = \frac{12}{25}$  etc

Thus  $\frac{1}{4} = (\frac{1}{4} \times 100)\% = 25\%$

$\& 0.6 = \frac{6}{10} = \frac{3}{5} = (\frac{3}{5} \times 100)\% = 60\%$

II. If certain Value p increases by x% , then increased Value =  $(100+x)\%$  of p  
If certain Value P decreases by x% , then decreased Value =  $(100-x)\%$  of P

Results on Population

III Let the population of a town be P and suppose it increases at the rate of R% per annum, then

1. Population after n years =  $P(1 + \frac{R}{100})^n$  & n years ago =  $\frac{P}{(1 + \frac{R}{100})^n}$

IV Results on Depreciation : Let the present Value of a machine be P. Suppose it depreciates at the rate of R% per annum. Then

1. Value of the machine after n years =  $P(1 - \frac{R}{100})^n$

2. Value of the machine n years ago =  $\frac{P}{(1 - \frac{R}{100})^n}$

V. If A is R% more than B, then B is less than A by

$[\frac{R}{(100+R)} \times 100]\%$

If A is R% less than B, then

B is more than A by  $[\frac{R}{(100-R)} \times 100]\%$

Problems :- (1) Express each of the following as a fraction

- (i) 56% (ii) 4% (iii) 0.6% (iv) 10%

Solutions :- (i)  $56\% = \frac{56}{100} = \frac{14}{25}$  (ii)  $4\% = \frac{4}{100} = \frac{1}{25}$

(iii)  $0.6\% = \frac{0.6}{100} = \frac{6}{1000} = \frac{3}{500}$  (iv)  $10\% = \frac{10}{100} = \frac{1}{10}$

(3)

Problem ②: Express each of the following as a decimal

(i) 6%      (ii) 28%      (iii) 0.2%      (iv) 0.04%      (v)  $\frac{1}{2}$ %

Soln.: (i)  $6\% = \frac{6}{100} = 0.06$       (ii)  $28\% = \frac{28}{100} = 0.28$

(iii)  $0.2\% = \frac{0.2}{100} = 0.002$       (iv)  $0.04\% = \frac{0.04}{100} = 0.0004$

Problem ③ Evaluate (i) 70% of 320 + 45% of 240

(ii)  $16\frac{2}{3}\%$  of 600 gm -  $33\frac{1}{3}\%$  of 180 gm

Soln.: (i) 70% of 320 + 45% of 240

$$= \left( \frac{70}{100} \times 320 + \frac{45}{100} \times 240 \right)$$

$$= 224 + 108 = 332$$

(ii)  $16\frac{2}{3}\%$  of 600 gm -  $33\frac{1}{3}\%$  of 180 gm

$$= \left( \frac{50}{3} \times \frac{1}{100} \times 600 \right) - \left( \frac{100}{3} \times \frac{1}{100} \times 180 \right)$$

$$= (100 - 60) \text{ gm} = 40 \text{ gm.}$$

Problem ④ (i) 2 is what percent of 50

(ii)  $\frac{1}{2}$  is what percent of  $\frac{1}{3}$

(iii) what percent of 7 is 84

(iv) what Percent of 2 metric tonnes is 40 quintals?

(v) what Percent of 6.5 litres is 130 ml?

(vi) what Percent is 1 minute 10 seconds of  $\frac{1}{2}$  an hour?

Soln.: (i) Required percentage =  $\left( \frac{2}{50} \times 100 \right)\% = 4\%$

$$\left[ \begin{array}{l} \text{∴ } x\% \text{ of } 50 = 2 \\ \frac{x}{100} \times 50 = 2 \\ x = \frac{2}{50} \times 100 \end{array} \right]$$

(ii) Required percentage =  $\left( \frac{1}{2} \times \frac{3}{1} \times 100 \right)\% = 150\%$

= 150% (ans)

$$\left[ \begin{array}{l} \text{∴ } x\% \text{ of } \frac{1}{3} = \frac{1}{2} \\ \frac{x}{100} \times \frac{1}{3} = \frac{1}{2} \\ x = \frac{1}{2} \times \frac{3}{1} \times 100 \end{array} \right]$$

(iii) Req. % =  $\left( \frac{84}{7} \times 100 \right)\% = 1200\%$

$$\left[ \begin{array}{l} \text{∴ } x\% \text{ of } 7 \text{ is } 84 \\ \text{i.e., } \frac{x}{100} \times 7 = 84 \Rightarrow \\ x = \frac{84}{7} \times 100 \end{array} \right]$$



(4)

$$(iv) \quad 1 \text{ metric tonne} = 10 \text{ quintals} \Rightarrow 2 \text{ metric} = 20 \text{ q} \rightarrow \begin{cases} \therefore x\% \text{ of } 2 \text{ metric} = 40 \text{ q} \\ \text{ie, } \frac{x}{100} \times 20 \text{ q} = 40 \text{ q} \\ \therefore x = \frac{40}{20} \times 100 \end{cases}$$

$$\therefore \text{Reqd. \%} = \left( \frac{40}{2 \times 10} \times 100 \right) \% = 200\%$$

$$(v) \quad \text{Required \%} = \left( \frac{130}{6.5 \times 1000} \times 100 \right) \% = 2\% \text{ (ans)}$$

$$= 2$$

$$\rightarrow \begin{cases} \therefore x\% \cdot 6.5 \text{ lit} = 130 \text{ ml} \\ 1 \text{ lit} = 1000 \text{ ml} \end{cases}$$

$$(vi) \quad 1 \text{ min } 10 \text{ Secs} = 1 \frac{10}{60} \text{ min} \quad \left( \begin{array}{l} 60 \text{ Sec} = 1 \text{ min} \\ 1 \text{ Sec} = \frac{1}{60} \text{ m} \\ 10 \text{ Sec} = \frac{10}{60} \end{array} \right) \rightarrow \begin{cases} \therefore \frac{x}{100} \times 6.5 \text{ lit} = 130 \text{ ml} \\ \therefore x\% = \left( \frac{130}{6.5 \times 1000} \times 100 \right) \% \\ x\% = \frac{13}{6.5} = \frac{130}{65} = 2 \end{cases}$$

$$= 1 \frac{1}{6} \text{ min}$$

$$= \frac{7}{6} \text{ min of}$$

$$\therefore \text{Reqd. \%} = \left( \frac{7}{6} \times \frac{1}{30} \times 100 \right) \% \quad \text{Half an hour} = 30 \text{ min}$$

$$= \frac{70}{18} \% = \frac{35}{9} \% = 3.89\%$$

Problem 5:

Find the missing figures

(i) ?% of 25 = 2.125

(ii) 9% of ? = 6.3

(iii) 0.25% of ? = 0.04

Soln: (i) let  $x\%$  of 25 = 2.125

$$\text{Then } \frac{x}{100} \times 25 = 2.125$$

$$\text{Then } x = \frac{2.125 \times 100}{25} = \frac{212.5}{25} = 8.5$$

(ii) let 9% of  $x$  = 6.3, Then

$$\frac{9}{100} x = 6.3$$

$$x = \left( \frac{6.3 \times 100}{9} \right) = 70$$

(iii) let 0.25% of  $x$  = 0.04,

$$\text{Then, } \frac{0.25}{100} x = 0.04$$

$$\text{ie, } x = \frac{0.04 \times 100}{0.25}$$

$$\boxed{x = 16} \text{ (ans)}$$

⑤

Problem ⑥ which is greatest? in  $16\frac{2}{3}\%$ ,  $\frac{2}{15}$  and  $0.17$ ?

Solution.  $16\frac{2}{3}\% = \left(\frac{50}{3} \times \frac{1}{100}\right) = \frac{1}{6} = 0.166$

$$\frac{2}{15} = 0.133$$

Clearly 0.17 is the greatest.

Problem ⑦ Saroj invests Rs. 72318, which is 17% of her annual income, in mutual funds. what is her monthly income?

Soln: Let the annual income be Rs.  $x$ .

$$\text{Then, } 17\% \text{ of } x = 72318$$

$$\text{i.e., } \frac{17x}{100} = 72318$$

$$\text{i.e., } x = \frac{72318 \times 100}{17} = 425400$$

Problem ⑧ The difference between 31% of a number and 13% of the same number is 576. what is 17% of that number?

Soln: Let the no. be  $x$ .

$$\text{Then, } 31\% \text{ of } x - 13\% \text{ of } x = 576$$

$$\Rightarrow (31 - 13)\% \text{ of } x = 576$$

$$\Rightarrow 18\% \text{ of } x = 576$$

$$\Rightarrow \frac{18}{100} \times x = 576$$

$$\Rightarrow x = \frac{576 \times 100}{18} = 3200$$

$$\therefore 17\% \text{ of the number} = 17\% \text{ of } 3200$$

$$= \frac{17}{100} \times 3200$$

$$= 544. (\text{ans})$$



(6)

Problem 9 65% of a number is 21 less than four-fifths of that no. what is the number?

Soln:- Let the number be  $x$

$$\text{Then, } \frac{4}{5}x - (65\% \text{ of } x) = 21$$

$$\text{i.e., } \frac{4}{5}x - \frac{65}{100}x = 21$$

$$\text{i.e., } \frac{(20 \times 4)x - 65x}{100} = 21$$

$$\text{i.e., } \frac{80x - 65x}{100} = 21$$

$$\text{i.e., } \frac{15x}{100} = 21$$

$$\text{i.e., } x = \frac{21 \times 100}{15} = 140$$

$$\text{i.e., } x = 140$$

Problem 10 :- Difference of two numbers is 1660. If 7.5% of one number is 12.5% of the other number, find the two no.s?

Soln:- let the numbers be  $x$  and  $y$ .

$$\text{Then, } 7.5\% \text{ of } x = 12.5\% \text{ of } y$$

$$\text{i.e., } x = \frac{125}{7.5}y = \frac{5}{3}y \rightarrow (*)$$

$$\text{Also, } x - y = 1660 \Rightarrow \frac{5}{3}y - y = 1660 \text{ (from *)}$$

$$\Rightarrow \frac{5y - 3y}{3} = 1660$$

$$\Rightarrow \frac{2y}{3} = 1660$$

$$\Rightarrow y = \frac{1660 \times 3}{2}$$

$$\Rightarrow y = 2490.$$

Problem 11 :- If 50% of  $(x-y) = 30\%$  of  $(x+y)$ , then what percent of  $x$  is  $y$ ?

$$\text{Soln: } 50\% \text{ of } (x-y) = 30\% \text{ of } (x+y) \Leftrightarrow \frac{50}{100}(x-y) = \frac{30}{100}(x+y)$$

$$\text{Then } 5(x-y) = 3(x+y), \text{ i.e. } 2x = 8y \Leftrightarrow 2x = 8y \Leftrightarrow x = 4y$$

$$\begin{aligned} 5x - 5y &= 3x + 3y \\ 5x - 3x &= 3y + 5y \end{aligned} \quad \begin{aligned} \circ \circ \text{ Reqd. \%} &= \left(\frac{y}{x} \times 100\right)\% = \left(\frac{y}{4y} \times 100\right)\% = 25\% \end{aligned}$$

(4)

Problem (12): A earns  $33\frac{1}{3}\%$  more than B, how much percent does B earn less than A?

Soln:- Required percentage =  $\left[ \frac{\frac{100}{3}}{100 + \frac{100}{3}} \times 100 \right] \% = \left[ \frac{\left(\frac{100}{3}\right)}{\left(\frac{400}{3}\right)} \times 100 \right]$

$$= \left[ \frac{100}{400} \times 100 \right] \% = 25\%$$

UNIT-II - PROFIT AND LOSS

We know I. Gain = (S.P) - (C.P)      II. Loss = (C.P) - (S.P)

III. Loss or gain is always reckoned on C.P

IV. Gain % =  $\left( \frac{\text{Gain} \times 100}{\text{C.P}} \right)$       V. Loss % =  $\left( \frac{\text{Loss} \times 100}{\text{C.P}} \right)$

VI.  $\frac{(100 + \text{Gain \%})}{100} \times \text{C.P}$

VII.  $\text{S.P} = \left( \frac{100 - \text{Loss \%}}{100} \right) \times \text{C.P}$

VIII  $\text{C.P} = \frac{100}{100 + \text{Gain \%}} \times \text{S.P}$

IX  $\text{C.P} = \frac{100}{(100 - \text{Loss \%})} \times \text{S.P}$

X. If an article is sold at a gain of say, 35%, then  
 $\text{S.P} = 135\% \text{ of C.P}$

XI If an article is sold at a loss of say, 35%,  
 then  $\text{S.P} = 65\% \text{ of C.P}$

Pb.1. Mansi Purchased a car for Rs. 2,50,000/- and sold it for Rs. 3,48,000/-. What is the percent profit she made on the car?

Soln:- C.P. = Rs. 2,50,000 ; S.P. = Rs. 3,48,000

$$\text{Profit} = \text{Rs. } (3,48,000 - 2,50,000) = \text{Rs. } 98,000$$

$$\therefore \text{Profit \%} = \left( \frac{98,000}{2,50,000} \times 100 \right) \% = 39.2\%$$

Pb.2:- If C.P is Rs. 2516 and S.P is Rs. 2272, find the % Loss?

Soln:- C.P = Rs. 2516, S.P = Rs. 2272, Loss = Rs. (2516 - 2272)

$$\therefore \text{Loss \%} = \left( \frac{244}{2516} \times 100 \right) \% \quad \left[ = \text{Rs. } 244 \right]$$

$$= 9.69\%$$



(8)

Pb. (3):- Find S.P., when (i) C.P = Rs. 56.25, Gain = 20%.  
 (ii) C.P = Rs. 80.40, Loss = 15%.

Soln.:- (i) S.P = 120% of 56.25 Rs. =  $\left(\frac{120}{100} \times 56.25\right)$  Rs. = Rs. 67.50.  
 (ii) S.P = 85% of Rs. 80.40 = Rs.  $\left(\frac{85}{100} \times 80.40\right)$  = Rs. 68.34

Pb. (4) :- A gold bracelet is sold for Rs. 14500 at a loss of 20%.  
 what is the Cost price of the gold bracelet?

Soln.:- C.P = Rs.  $\frac{100}{80} \times 14500$  [C.P =  $\frac{100}{(100 - \text{Loss}\%)} \times \text{S.P}$ ]  
 = Rs. 18125

Pb. (5) :- The owner of a cell phone charges his customer 23% more than the cost price. If a customer paid Rs. 7011 for a cell phone, then what was the cost price of the cell phone?

Soln.:- C.P = Rs.  $\left(\frac{100}{100+23} \times 7011\right)$  = Rs. 5700 [C.P =  $\frac{100}{(100 + \text{Gain}\%)} \times \text{S.P}$ ]

Pb. (6) :- If the cost price is 96% of the selling price, then what is the profit percent?

Soln.:- Let S.P = Rs. 100. Then, C.P = Rs. 96, Profit = Rs. 4  
 $\therefore$  Profit % =  $\left(\frac{4}{96} \times 100\right)\%$  =  $\frac{25}{6}\%$  = 4.17%

Prob: (7) The selling price of 30 items is equal to the purchase price of 25 items. what is the profit or loss percent?

Soln.:- Let C.P of each article be Rs. 1  
 Then C.P of 30 items = Rs. 30 & S.P of 30 items = Rs. 25  
 Loss % =  $\left(\frac{5}{30} \times 100\right)\%$  =  $16\frac{2}{3}\%$

Prob (8) :- Monika purchased a pressure cooker at  $\frac{9}{10}$ th of its selling price and sold it at 8% more than its S.P.  
 Find her gain percent

Let the S.P be Rs. x, Then C.P = Rs.  $\frac{9x}{10}$ , Receipt = 108%

Gain = Rs.  $\left(\frac{27x}{25} - \frac{9x}{10}\right)$  = Rs.  $\left(\frac{108x - 90x}{100}\right)$  = Rs.  $\frac{18x}{100}$  = Rs.  $\frac{27x}{25}$  of Rs. x

$\therefore$  Gain % =  $\left(\frac{18x}{100} \times \frac{10}{9x} \times 100\right)\%$  = 20%

⑨

Problem ⑨:- A Tradesman sold an article at a loss of 20%. If the selling price had been increased by Rs. 100, there would have been a gain of 5%. What was the cost price of the article?

Soln: Let C.P be Rs.  $x$ .

$$\text{Then, } (105\% \text{ of } x) - (80\% \text{ of } x) = 100 \text{ or } 25\% \text{ of } x = 100$$

$$\therefore \frac{x}{4} = 100 \text{ (or) } x = 400$$

$$\text{So, C.P} = \text{Rs. } 400$$

Problem ⑩ After getting two successive discounts, a shirt with a list price of Rs. 150 is available at Rs. 105. If the second discount is 12.5%. Find the first discount.

Soln:- Let the first discount be  $x\%$ .

$$\text{Then, } 87.5\% \text{ of } (100 - x)\% \text{ of } 150 = 105$$

$$\Rightarrow \frac{87.5}{100} \times \left(\frac{100-x}{100}\right) \times 150 = 105 \Rightarrow 100-x = \frac{(105 \times 100 \times 100)}{150 \times 87.5} = 80$$

$$\therefore x = 100 - 80 = 20$$

$$\therefore \text{First discount} = 20\%$$

Problem ⑪:-

i) Find the odd man out: 3, 5, 7, 12, 17, 19 ans: 12 (others are prime)

ii) 1, 4, 9, 16, 20, 36, 49 ans:- 20 [ $\because 1^2, 2^2, 3^2, 4^2, 5^2, 6^2, 7^2$ ]

iii) 6, 13, 18, 25, 30, 37, 40 [ $\because$  diff. between two terms, 7, 5, 7, 5, 7, 5,  $\therefore$  ans. 40]

iv) 1, 8, 27, 64, 125, 311 [ans. 311, since  $1^3, 2^3, 3^3, 4^3, 5^3, 6^3 = 216$ , here 311]

v) 2000, 2004, 2008, 2012, 2016, 2019 [ans. 2019, others are leap years]

vi) 0, 2, 6, 12, 20, 30, ?

$$[\text{ans: } 7^2 - 7 = 49 - 7 = 42]$$

$$\text{ans: } \boxed{42}$$

Sequence in this format;  
 $1^2 - 1, 2^2 - 2, 3^2 - 3, 4^2 - 4, 5^2 - 5, 6^2 - 6, 7^2 - 7, \dots$

vii) Rose, lily, Malligai, Sembaruthi, banana, thalampud

ans: banana (fruit) (all the others are flowers)



(10)

## Central Tendency

1. Calculate the Mean for the following data

18, 15, 18, 16, 17, 18, 15, 19, 17, 17

Ans.  $\bar{x} = \frac{18+15+18+16+17+18+15+19+17+17}{10}$

$$= \frac{170}{10} = 17.$$

2. Calculate the Mean for the given data.

$x_i$	15	16	17	18	19
$f_i$	2	1	3	3	1

Ans.  $\bar{x} = \frac{\sum f_i x_i}{\sum f_i}$  ;  $i = 1, 2, \dots, 5$

$$= \frac{(2 \times 15) + (1 \times 16) + (3 \times 17) + (3 \times 18) + (1 \times 19)}{2 + 1 + 3 + 3 + 1}$$

$$= \frac{170}{10} = 17$$

3. Find the Median for the following data.

18, 20, 15, 19, 21, 25, 16,

Ans: Write the given data in ascending order

15, 16, 18, 19, 20, 21, 25

Median = 19 if Number of terms is odd.

4. Find the Median for the following data

18, 15, 17, 19, 17, 19.

Ans: Write the given data in ascending order

15, 17, 17, 18, 19, 19

$$\therefore \text{Median} = \frac{17+18}{2} = \frac{35}{2} = 17.5$$

(11)

5. Find the mean, median and mode for the following data.

6, 8, 2, 5, 9, 5, 6, 5, 2, 3

Ans: Mean =  $\frac{6+8+2+5+9+5+6+5+2+3}{10}$

$$= \frac{51}{10} = 5.1$$

Median: 2, 2, 3, 5, (5, 5), 6, 6, 8, 9

$$\text{Median} = \frac{5+5}{2} = \frac{10}{2} = 5$$

Mode is a data which occurs often.

Here 5 occurs three times.

$$\therefore \text{Mode} = 5.$$

6. Find the A.M of  $n$  natural numbers.

Ans: A.M of first  $n$  natural numbers

$$= \frac{\sum x_i}{n}$$

$$= \frac{1+2+\dots+n}{n}$$

$$= \frac{n(n+1)}{2n}$$

$$= \frac{n+1}{2}$$



## Coding - Decoding <sup>(12)</sup>

1. If in a certain language, MADRAS is coded as NBESBT, how is BOMBAY coded in that code?

- a) CPNCBX    b) CPNCBZ    c) CPOCBZ    d) CQOCBZ  
e) None of these.

Ans: Each letter in the word is moved one step forward to obtain the corresponding letter of the code. (b)

2. In a certain code, TRIPPLE is written as SBHOOKD. How is DISPOSE written in that code?

- a) CHRONRD    b) DSOESPI    c) ESJTTE    d) ESOPSID  
e) None of these.

Ans: Each letter in the word is moved one step backward to obtain the corresponding letter of the code. (a)

3. In a certain code, MONKEY is written as XDJMNL. How is TIGER written in that code?

- a) NQPTJHOJ    b) NQPTJOHI    c) NQTPJOHJ    d) NQPTJOHJ  
e) None of these.

Ans: The letters of the word are written in reverse order and then each letter is moved one step backward to obtain the code. (e).

4. In a certain code, COMPUTER is written as RFUVQNPC. How is MEDICINE written in the same code?

- a) EOJDJEFM
- b) EOJDEJFM
- c) MFEJDJBE
- d) MFEDJJOE
- e) None of these.

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

5. If in a certain language, GAMBLE is coded as FBLCKF, how is FLOWER coded in that code?

- a) GKPVFQ
- b) EMNVDK
- c) GMPVDS
- d) HNQYGT
- e) ~~EKNVDQ~~

Ans: The first, third and fifth letters are each moved one step backward, while the second, fourth and sixth letters are each moved one step forward to obtain the corresponding letters of the code. (b)

6. If in a certain language, NATURE is coded as MASUGF, how is FAMINE coded in that code?

- a) FBMJND
- b) FZMHND
- c) GANIOE
- d) EALIME
- e) FZNI ME

Ans: The second fourth and sixth letters of the words remain unchanged, while the first, third and fifth letters are each moved one step backward to obtain the corresponding letters of the code. (c)



7. If DEHIJ is coded as 43541 and CALCUTA as 82589662, how can CALCUT be coded?

- a) 5279431
- b) 5948918
- c) 8251896
- d) 8543691

Ans:

The alphabets are coded as follows:-

D	E	L	H	J	C	A	U	T
4	3	5	4	1	8	2	9	6

So, in CALCUT, C is coded as 8, A as 2, L as 5, I as 1, U as 9, T as 6. Thus the code for CALCUT is 8251896 (c)

8. In a certain code, RIPPLE is written as 613382 and LIFF is written as 8192. How is PILLER written in that code?

- a) 318826
- b) 318286
- c) 618826
- d) 338816

Ans! The alphabets are coded as shown!

R	I	P	P	L	E	F
6	1	3		8	2	9

So, PILLER, P is coded as 3, I as 1, L as 8, E as 2, R as 6. Thus, the code for PILLER is 318826 (a)

9. If ROSE is coded as 6821, CHAIR is coded as 73456 and PREACH is coded as 961473, what will be the code for SEARCH?
- a) 246173    b) 214673    c) 214763    d) 216473

Ans: The Alphabets are coded as shown.

R	O	S	E	C	H	A	I	P
6	8	2	1	4	3	1	5	9

So, in SEARCH, S is coded as 2, E as 1, A as 1, R as 6, C as 4, H as 3. Thus, the code for SEARCH is 214673. (b).

10. If GIVE is coded as 5137 and BAT is coded as 924, how is GATE coded?

a) 5427    b) 5724    c) 5247    d) 2547    e) none of these.

Ans: The Alphabets are coded as shown.

G	I	V	E	B	A	T
5	1	3	7	9	2	4

So, GATE, G is coded as 5, A as 2, T as 4 and E as 7. Thus, the code for GATE is 5247 (c).



## Ruzzle Test (16)

1. Read the following information carefully and answer the questions that follow:-

These are six cities A, B, C, D, E and F.

A is not a hill station.

B and E are not historical places.

D is not an industrial city.

A and D are not historical cities.

A and B are not alike.

- Which two cities are industrial centers?  
a) A & B    b) E & F    c) C & D    d) B & F    e) A & D
- Which two cities are historical places?  
a) A & C    b) D & F    c) C & F    d) B & E    e) A & D.
- Which two cities are hillstation?  
a) A & B    b) C & A    c) B & D    d) A & F    e) None of these.
- Which city is a hillstation and Industrial Centre but not a historical place?  
a) E    b) F    c) A    d) B    e) C
- Which two cities are neither historical places nor industrial centres?  
a) A & B    b) D & E    c) F & C    d) B & D    e) None of these.

(16)  
Solution! The given information can be analysed as follows:

	A	B	C	D	E	F
Historical	x	x	✓	x	x	✓
Industrial	✓	x	✓	x	✓	✓
Hill stations	x	✓	✓	✓	✓	✓

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

1. clearly, A, ~~E~~, C and F are industrial centres. So, the answer is (b)

2. clearly, C and F are historical places. So, the answer is (c)

3. clearly, B, C, D, E and F are hill stations. So, the answer is (c)

4. E alone is a hill station and an industrial centre but not a historical place. So, the answer is (A).

5. B and D are neither historical places nor industrial centres. So, the answer is (d)



2) Read the following information carefully and answer the questions that follow:

(i) Five friends P, Q, R, S & T travelled to five different cities of Chennai, Calcutta, Delhi, Bangalore, Hyderabad by five different modes for transport of bus, train, Airplane, car and Boat from Mumbai.

(ii) The person who travelled to Delhi did not travel by boat.

(iii) R went to Bangalore by car and Q went to Calcutta by Airplane.

(iv) S travelled by boat whereas T travelled by train.

(v) Mumbai is not connected by bus to Delhi & Chennai.

1. Which of the following combinations of person and mode is not correct?

- a) P - Bus    b) Q - Airplane    c) R - Car    d) S - Boat  
e) T - Airplane.

2. Which of the following combinations is true for S?

- a) Delhi - Bus    b) Chennai - Bus    c) Chennai - Boat  
d) Data inadequate    e) None of these.

3. Which of the following combinations of place and mode is not correct?

- a) Delhi - Bus    b) Calcutta - Aeroplane    c) Bangalore - car  
d) Chennai - Boat    e) Hyderabad - Bus.

4. The person travelling to Delhi went by which of the following modes?

- a) Bus    b) Train    c) Aeroplane    d) car    e) Boat.

5. Who among the following travelled to Delhi?

- a) R    b) S    c) T    d) Data inadequate  
e) None of these.

	Place	Mode
P	Hyderabad	Bus
Q	Calcutta	Aeroplane
R	Bangalore	Car
S	Chennai	Boat
T	Delhi	Train.

1. Clearly, the incorrect combination is T - Aeroplane  
∴ the answer is (e)

2. Clearly, correct combination for S is Chennai to Boat,  
∴ the answer is (e)

3. Clearly, the incorrect combination is Delhi to Bus  
∴ the answer is (a).



4. clearly, it travelled to Delhi by train, answer is (b)

5. clearly, it travelled to Delhi, so the answer is (c).

Q) Read the following information and answer the questions based on it?

In a school, there were five teachers A & B were teaching Hindi and English C & D were teaching English and Geography. D & A were teaching Mathematics & Hindi. E & B were teaching History and French.

1. Who among the teachers was teaching maximum no. of subjects?

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

2. Which of the following pairs was teaching both Geography and Hindi?

- a) A & B    b) B & C    c) C & A    d) D & B    e) none of these

3. More than two teachers were teaching which subjects?

- a) History    b) Hindi    c) French    d) Geography    e) Mathematics

4. D, B and A were teaching which of the following subjects?

- a) English only    b) Hindi and English    c) Hindi only    d) English & Geography    e) Maths & Hindi

(21)

Problems in Mean - Median - mode

Pb ① Find the range and coefficient of range for the following data:-

25, 67, 48, 53, 18, 39, 44

Soln. :- L = Largest data & S = Smallest data

L = 67 & S = 18

∴ Range  $R = L - S$  and Coefficient of Range =  $\frac{L-S}{L+S}$

∴  $R = L - S = 67 - 18 = 49$

Coefficient of range =  $\frac{L-S}{L+S} = \frac{67-18}{67+18} = \frac{49}{85} = 0.576$

Pb ② :- Find the Range for the following distribution:-

Age	16-18	18-20	20-22	22-24	24-26	26-28
no. of students	0	4	6	8	2	2

here, L = 28 (Largest 28, since Upper limit of class interval)

S = 18 (since in c.I no. of students = 0)

∴  $R = L - S = 28 - 18 = 10$  yrs (∵ next c.I, lower limit is 18)

=

we know that, Variance  $\sigma^2 = \frac{\sum (x_i - \bar{x})^2}{n}$

and Standard deviation,  $\sigma = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n}}$

Pb ③ :-

Find the standard deviation (S.D) for the following data.

13, 8, 4, 9, 7, 12, 10.

$x_i$	$x_i^2$	$x_i$	$x_i^2$
13	169	7	49
8	64	12	144
4	16	10	100
9	81		
		63	623

$\bar{x} = \frac{\sum x_i}{n} = \frac{13+8+9+7+4+12+10}{7}$

$\bar{x} = \frac{63}{7} = 9$

$\sigma = \sqrt{\frac{\sum x_i^2}{n} - \left(\frac{\sum x_i}{n}\right)^2} = \sqrt{\frac{623}{7} - 9^2}$

$\sigma = \sqrt{89 - 81} = \sqrt{8} = 2.83$



another formula =  $\sigma = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n}}$  or  $\sqrt{\frac{\sum x_i^2}{n} - \bar{x}^2}$

$x_i$	$x_i - \bar{x}$	$(x_i - \bar{x})^2$
18	9	81
8	-1	1
4	-5	25
9	0	0
7	-2	4
12	3	9
10	1	1
68		68

$$\sigma = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n}} = \sqrt{\frac{106}{7}}$$

$$\sigma = \sqrt{8} = 2.83$$

$$\boxed{\sigma = 2.83}$$

$$\bar{x} = \frac{\sum x_i}{n} = \frac{68}{7} = 9$$

Pr. (1) : Find the mean and Variance of first  $n$  natural nos.

Solution :-

$$\text{wkt, mean} = \frac{1+2+3+\dots+n}{n}$$

$$= \frac{n(n+1)}{2n} = \frac{n+1}{2}$$

$$\begin{aligned} \text{Variance} = \sigma^2 &= \frac{\sum x_i^2}{n} - \left(\frac{\sum x_i}{n}\right)^2 \\ &= \frac{n(n+1)(2n+1)}{6n} - \left[\frac{n(n+1)}{2n}\right]^2 \end{aligned}$$

$\left[ \begin{array}{l} \sum x_i^2 = 1^2 + 2^2 + 3^2 + \dots + n^2 \\ \sum x_i = (1+2+\dots+n) \end{array} \right]^2$

$$= \frac{(n+1)(2n+1)}{6} - \left[\frac{n(n+1)}{2n}\right]^2$$

$$= \left(\frac{n+1}{2}\right) \left[\frac{2n+1}{3} - \frac{n+1}{2}\right]$$

$$= \left(\frac{n+1}{2}\right) \left[\frac{2(2n+1) - 3(n+1)}{6}\right]$$

$$= \left(\frac{n+1}{2}\right) \left[\frac{4n+2-3n-3}{6}\right]$$

$$= \left(\frac{n+1}{2}\right) \left(\frac{n-1}{6}\right)$$

$$\sigma^2 = \frac{n^2-1}{12} = \text{Variance}$$

(23)

Qb (5) :- The mean and std deviation for 15 data's are respectively 10, 5 as found. From the data one is misprint as 8 instead of 23, find the correct mean and standard deviation

Soln :- here  $n=15$ ,  $\bar{x}=10$ ,  $\sigma=5$ ,  $\bar{x} = \frac{\sum x}{n}$ ,  $\sum x = 15 \times 10 = 150$

wrong data = 8

Correct data = 23

$$\text{Corrected } \sum x = 150 - 8 + 23 = 165$$

$$\text{Corrected } \bar{x} = \frac{165}{15} = 11$$

$$\therefore \text{Std deviation, } \sigma = \sqrt{\frac{\sum x^2}{n} - \left(\frac{\sum x}{n}\right)^2}$$

$$\text{wrong S.D. } \sigma = 5 = \sqrt{\frac{\sum x^2}{15} - (10)^2}$$

$$25 = \frac{\sum x^2}{15} - 100$$

$$\therefore \frac{\sum x^2}{15} = 100 + 25 = 125$$

$$\text{wrong } \sum x^2 = 1875$$

$$\text{Corrected } \sum x^2 = 1875 - 8^2 + 23^2 = 2340$$

$$\therefore \text{Corrected S.D. } (\sigma) = \sqrt{\frac{2340}{15} - (11)^2}$$

$$= \sqrt{156 - 121}$$

$$\sigma = \sqrt{35}$$

$$\sigma = 5.9,$$



## Problem 1

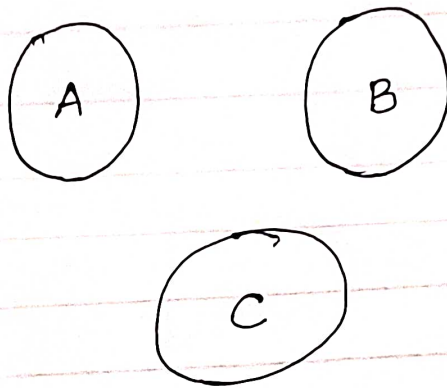
## UNIT 10 - LOGICAL SEQUENCE

Q1 Suppose you are given a group of 3 items. Then if the items evidently belong to three different groups, the Venn diagram representing it would be as shown along side.

Ex. Doctors, Engineers, Lawyers

These 3 items bears no relationship to each other.

So they are represented as above, by 3 disjoint figures.

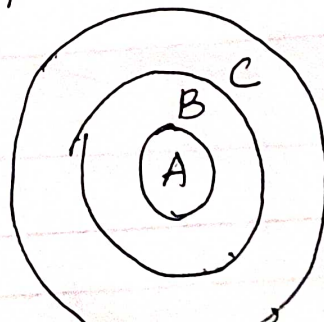


### EX 2

Q15. If one item belongs to the class of the second and the second belongs to the class of third, then the representation is in the form of three concentric circles, as shown.

Ex. Seconds, Minutes, Hours.

Clearly, seconds are a part of minutes and minutes are a part of hours. So, the Venn diagram would be as shown in the adjoining figure with circle A representing seconds, B representing minutes and C representing hours.



3. If two separate items belong to the third, they are represented by two disjoint circles inside a bigger circle.

Ex. Table, chair, Furniture

Clearly, table and chair are separate items but both are items of furniture. So they would be represented as in the adjoining fig. with circle A representing Table, circle B representing chair and circle C representing Furniture.

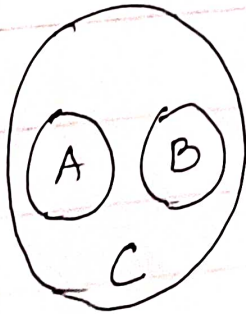


fig.

4) If two items belong to the class of the 3<sup>rd</sup> s.t. some items of each of these two groups are common in relationship circles enclosed within a bigger circle

Ex. Males, Fathers, Brothers.

Clearly, some fathers may be brothers. So, fathers and brothers would be represented by two intersecting circles. Also, both fathers and brothers are males. So, the diagrammatic representation would be as shown in fig. with circle A representing Fathers, circle B representing Brothers and circle C representing males.

