

CSAT

Pre + Practice

Just cross the limit safely

Maths

Reasoning

Reading Comprehension

$$1 \quad 5 \times 2 = 1$$

$$5 \times 2 \times 2 = 1$$

$$5^2 \times 2^3 = 2$$

$$2^2 \times 5^3 = 2$$

Product



$$2^m \times 5^n$$

$$\hookrightarrow \text{No. of zeros} = \min(m, n)$$

$$Q \quad 1 \times 5 \times 10 \times 15 \times 20 \times 25 \times 30 \times 35 \times 40 \times 45 \times 50 \times 55 \times 60$$

How many zeroes?

All are multiples of 5

∴ Number of 5 will come more than that of 2

So, if we calculate only sum of 2

$$\begin{array}{c} \textcircled{1} \quad \textcircled{2} \quad \textcircled{3} \quad \textcircled{4} \\ \underline{2 \times 5} \quad \underline{2 \times 2 \times 5} \quad \underline{15 \times 2} \quad \underline{2 \times 2 \times 2 \times 5} \\ \textcircled{5} \quad \underline{\underline{2 \times 25}} \quad \underline{2 \times 2 \times 15} \\ 1+2+1+3+1+2 \\ = 10 \end{array}$$

∴ Num of 0's = 10 ✓

$$Q: \quad 2 \times 4 \times 6 \times 8 \times 10 \times 12 \times 14 \times 16 \times 18 \times 20$$

Find the sum of zeroes?

$$\begin{array}{c} 5 \times 2 \quad 5 \times 2 \times 2 \\ \underline{1+1} \\ \therefore \text{Num of zeros} = 2 \end{array}$$

Q: How many numbers are there between 100-300 which either begin with or end with 2?

Q: How many numbers are there between 99-1000 such that digit 8 occupies the unit place.

$$101 - 299$$

Method 1.

$$\text{Case 1} \quad \underline{2} \quad \underline{10 \times 10} = 100 \quad +$$

$$\text{Case 2} \quad \underline{1/2} \quad \underline{10} \quad \underline{2} = 20 \quad -$$

$$\text{Case 3} \quad \underline{2} \quad \underline{10} \quad \underline{2} = 10 \quad \underline{110}$$

$$\begin{array}{c} \cancel{2} \quad \cancel{8} \\ \cancel{0}, \cancel{1}, \cancel{2}, \cancel{3}, \cancel{4}, \cancel{5}, \cancel{6}, \cancel{7} \\ \cancel{1}, \cancel{2}, \cancel{3}, \cancel{4}, \cancel{5}, \cancel{6}, \cancel{7} \\ 10 \times 10 = 100 \end{array}$$

$$\begin{array}{c} \cancel{2} \quad \cancel{8} \\ \cancel{1}, \cancel{2}, \cancel{3}, \cancel{4}, \cancel{5}, \cancel{6}, \cancel{7} \\ \cancel{1}, \cancel{2}, \cancel{3}, \cancel{4}, \cancel{5}, \cancel{6}, \cancel{7} \\ 9 \times 10 = 90 \end{array}$$

Method 2

$$101 - 199$$

$$\underline{1} \quad \underline{10} \quad \underline{2} = 10$$

$$200 - 299$$

$$\underline{2} \quad \underline{10} \quad \underline{10} = \underline{100}$$

$$2 \quad \underline{10} \quad \underline{9} = 90$$

$$1 \quad \underline{10} \quad \underline{2} = 10$$

$$2 \quad \underline{10} \quad \underline{2} = 10$$

Q: How many 5 digit prime numbers can be obtained by using all the digits 1, 2, 3, 4, 5, without repetition of digits.

Prime Number → only divisible by 1 and itself.

$$1+2+3+4+5 = \frac{15}{3}$$

$$\therefore \text{Not prime} = \textcircled{5}$$

Divisibility concept

Divisible by 2 = -- 2/0

Divisible by 3 = sum of digit / 3

Q: A 8 digit number 4382746B leaves remainder 0 when divided by 3. How many values of B are possible?

4382746B

$$\frac{33+2x}{3} = 0$$

- 1x
- 2x
- 3✓
- 4x
- 5x
- 6✓
- 7x
- 8x
- 9✓
- 0✓

Here: Num 176 is added to 5B7 and the sum of obtained is 7A3 where A, B are integers.

It is given that 7A3 is exactly divisible by 3
the only possible value of B is —

$$\begin{array}{r}
 176 \\
 5B7 \\
 \hline
 7A3
 \end{array}
 \quad
 \begin{array}{r}
 7\textcircled{1}3 \text{ } 1 \text{ } 3 \\
 10+9x \quad 6x \quad 9x \\
 1x \quad 5x \quad 9x \\
 2x \quad 6x \quad 8x
 \end{array}$$

1 3 6

5 (8) 7

$$\begin{array}{r}
 7 \text{ } \underline{\textcircled{2}/5/8} \text{ } 3
 \end{array}$$

Q1: How many zeros will be there

in the value of $7 \times 14 \times 21 \times \dots \times 2100$?

$$7[1 \times 2 \times 3 \times \dots \times 200]$$

$$7 \times 200! \quad \frac{200}{5} = 60$$

$$\frac{60}{5} = 12$$

$$\frac{12}{5} = 2$$

$$\underline{\underline{74}} \checkmark$$

Q2: The number of times the digit

5 will appear while counting

the integers from 1 to 1000

$$\begin{array}{r} 1 - 1000 \\ 1 - 100 \quad 5 - \\ 1 - 10 \end{array}$$

1

$$\text{Q2: } \begin{array}{c} 55 \\ \downarrow \\ 2 \end{array} \quad \begin{array}{c} 555 \\ \downarrow \\ 3 \end{array}$$

Largest sum = 95

$$\begin{array}{c} \text{Case 1} \quad \text{Case 2} \\ \begin{array}{c} \underline{\underline{10}} \quad 5 \quad | \quad 5 \quad 10 \\ 0, 1, 2, 3, \dots, 9 \quad \quad \quad 0, 1, 2, 3, \dots, 9 \end{array} \\ \begin{array}{c} \text{ones} \quad \text{tens} \\ 10 + \quad 10 \\ = 20 \end{array} \end{array} \checkmark$$

1 - 1000

Largest sum = 995

$$\begin{array}{c} \begin{array}{c} \underline{\underline{10}} = 5 \quad | \quad 5 \quad 9 \quad 5 \quad 7 \quad 7 \\ 0, 1, 2, 3, \dots, 9 \quad \quad \quad 10 \quad 10 \quad 10 \end{array} \\ \begin{array}{c} 100 \\ 100 \\ 100 \\ 100 \\ 300 \end{array} \end{array}$$

Q3: Find out the numbers in

which digit 5 will appear
while counting the integers from
1 to 1000

$$\dots - 1 - 1 -$$

Q4: If all numbers from 501 to 700
are written, what is the total
sum of times digit 6 appears?

$$501 - 700$$

Largest number

699

$$\begin{array}{c} 2 \times 10 \\ \begin{array}{c} \underline{\underline{2}} \quad 9 \quad 5 \\ 5 \quad 6 \quad 1, 2, 3, \dots, 9 \end{array} \quad \begin{array}{c} \underline{\underline{2}} \quad 5 \quad 9 \quad 5 \\ 5 \quad 6 \quad 0, 1, \dots, 9 \end{array} \quad \begin{array}{c} 10 \quad 10 \\ 0, 1, \dots, 9 \quad 0, 1, \dots, 9 \end{array} \end{array}$$

$$\begin{array}{c} 20 \quad 20 \quad 100 \\ \oplus \quad \oplus \quad \\ 160 \end{array}$$

Q5: How many times are there between
99 and 1000 such that the digit 8
occupies the unit place?

$$100 - 999$$

$$\begin{array}{c} \underline{\underline{8}} \\ 0, 1, 2, 3, \dots, 9 \quad 0, 1, \dots, 9 \end{array}$$

$$9 \times 10 = 90 \checkmark$$

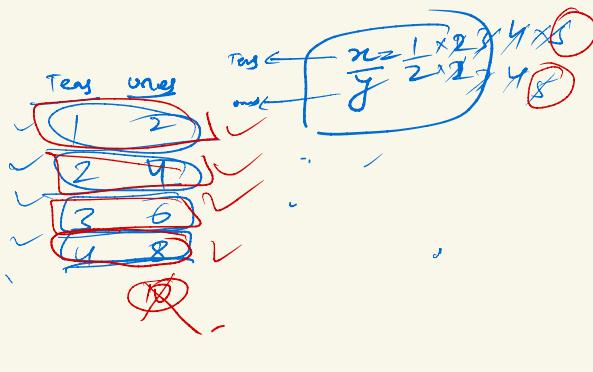
Ques: The ratio of a two-digit natural number to a number formed by reversing its digit is 4:7.
The number at each pair is —

1, 2, 3, ..., 9

$$\frac{x}{y} = \frac{4}{7}$$

$$\frac{\square \square}{\square \square} = \frac{4(10x+y) + (x,y)}{7(10x+y) + (x,y)}$$

$$98(x,y) = 36(8,1)$$



? only
4 pairs.

2 1 6
$2 \times 100 + 1 \times 10 + 6 \times 1$

$$x \ y = 10x+y$$

$$yx = 10y+x$$

$$\frac{10x+y}{10y+x} = \frac{4}{7}$$

$$70x+7y = 40y+4x$$

$$36y = 66x$$

$$3y = \frac{66x}{2} = \frac{33}{2}x$$

$$\frac{x}{y} = \frac{2}{1}$$

$$x=y$$

$$\begin{array}{rcl} a=1 & b=2 & = 12 \\ a=2 & b=4 & = 24 \\ a=7 & b=6 & = 26 \\ a=4 & b=8 & = 48 \end{array} \checkmark$$

$$a=8 \quad b=\cancel{10} \quad b \text{ can't be } 20 \text{ as it is}$$

Ques: A sum consist of 3 digits, which the middle one is zero and their sum is 4.

If the number formed by interchanging the first and last digit is greater than the number itself by 188, then the difference between the first and last digit is —

$$\frac{0}{x} \frac{0}{y} = 4$$

$$\begin{array}{r} x \ 0 \ y \\ - \ y \ 0 \ x \\ \hline 1 \ 8 \ 8 \end{array}$$

$$\begin{array}{r} 100x + 10x + y \\ 100y + 10x + 0 \\ \hline 99x - 99y = 188 \\ 99(x-y) = 188 \\ x-y = 2 \end{array}$$

Ques: Let xyz be a 3 digit number,
where $(x+y+z)$ is not a multiple of 3
then $x^2 + y^2 z + z^2$ is not divisible by —

~~8~~ ~~9~~ ~~22~~ ~~$x+y+z$~~

$$x+y+z = 3(\square) \times$$

$$\begin{aligned} &+ xyz = 100x + 10y + z \\ &+ yz x = 100y + 10z + x \\ &+ zxy = 100z + 10x + y \end{aligned}$$

$$\begin{aligned} &\Rightarrow 111x + 111y + 111z \\ &= 111(x+y+z) \quad \text{Divisible by 3} \\ &= 3(37)(x+y+z) \quad \frac{9}{21} \end{aligned}$$

~~9~~ ✓ ~~3~~ ~~22~~ ~~$x+y+z$~~

- Q. In a school every student is assigned a unique identification number. A student is a football player if and only if the identification number is divisible by 4, whereas if the identification num is divisible by 6 then cricket. If every number from 1 to 100 is assigned to each student then how many of them play Cricket as well as football?

Football \Rightarrow Divisible by 4

Cricket \Rightarrow Divisible by 6

Cricket as well as Football

= Divisible by both 4 & 6

Lowest Common Factor

$$\begin{aligned} \therefore \text{LCM} &= [4, 6] \\ &= 2 \times 2 \times 3 \\ &= 12 \quad \checkmark \end{aligned}$$

many divisible by 12

12, 24, 36, 48, 60, 72, 84, 96

1 — 100

4/8/2/6/10

-4/-8/-2/-6/-10

=80 ✓

Divisible by 4 \rightarrow Football
Divisible by 6 \rightarrow Cricket

54, 92, 6, 10, 12

6, 12

12, 24

36

72

48

54

60

66

72

78

84

90

96

: 8

Q:- If R and S are different integers both divisible by 5 then which of the following is not necessarily true?

- (a) $R-S$ is divisible by 5 ✓
(b) $R+S$ is divisible by 10 ✗ $S+S$ ✓
(c) $R \times S$ is divisible by 25 ✗
(d) R^2+S^2 is divisible by 5

$$\begin{array}{c} R \\ \downarrow \\ 5 \end{array} \quad \begin{array}{c} S \\ \downarrow \\ 10 \end{array}$$
$$5 + 10 = 15 \times$$

$$25 + 100 = 1$$

Que: one page is torn from a booklet whose pages are numbered in the usual manner starting from the first page as 1.

The sum of two numbers on the remaining pages is 195. The torn page contains which of the following numbers.

- (a) 5, 6
(b) 7, 8
(c) 9, 10
(d) 11, 12

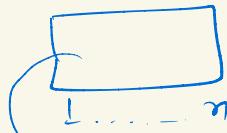
$$100 \text{ pages} = \frac{1+2}{2}, \dots, \frac{n}{2}$$

$$195 + 13 = 208 \frac{1}{2} = \checkmark$$

$$195 + 15 = 210 \frac{1}{2} \checkmark$$

$$195 + 19 = 214 \frac{1}{2} \checkmark$$

$$195 + 29 = 217 \frac{1}{2} \checkmark$$



! Page torn = 2 pages are removed

$$\begin{aligned} 1 \dots n \text{ pages sum} &= 1+2+3+\dots+n \\ &= \frac{n(n+1)}{2} > 195 \end{aligned}$$

$$n = 20 \quad 10$$

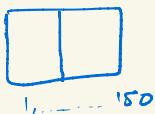
$$\frac{20 \times 21}{2} = 210$$

8, 12 15

Que: What is the total number of digits printed if a book containing 150 pages is to be numbered from 1 to 150?

$$3692 \rightarrow ④ \text{ digit}$$

$$46726 \rightarrow ⑤ \text{ digit}$$

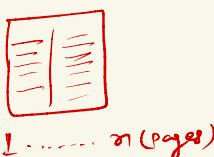


$$\begin{array}{c} 1 - 99 | 100 - 149 | 150 \\ \downarrow \quad \downarrow \quad \downarrow \\ 1,2,\dots,9 \quad 0,1,2,\dots,9 \quad 0,1,2,3,4,5,6,7,8,9,10 \\ 9 \times 10 \quad 1 \times 5 \times 10 \quad 1 \\ 90 \quad * \quad 50 \quad * \quad 1 = \boxed{141} \\ = \underline{\underline{4500}} \end{array}$$

$$\begin{array}{c} 1 - 150 \\ \downarrow \\ \text{single digit } 1 - 9 = 9 \\ + \\ \text{double digit } 10 - 99 = 90 \\ + \\ \text{triple digit } 100 - 150 \\ = 51 \times 9 \\ = 153 \end{array}$$

Q-A printer numbers the pages of a book starting with 1 and uses 3089 digits in all. How many pages does the book have?

$$\boxed{342}$$



$$\begin{array}{c} \text{many} \\ \boxed{1} \\ \begin{array}{c} 3089 \\ \frac{2889}{200} \\ 0 \\ = 150 \end{array} \\ \begin{array}{c} 9 \times 1 \\ 90 \times 2 \\ 900 \times 3 \\ 50 \times 4 \\ 1049 \end{array} \end{array}$$

$$\begin{array}{c} 1 - 9 = 9 \times 1 = 9 \\ 10 - 99 = 90 \times 2 = 180 \\ 100 - 999 = 900 \times 3 = 2700 \\ 2889 \\ \hline 2089 \\ 2089 \\ \hline 2889 \\ 2889 \\ \hline 200 \\ 200 \\ \hline 0 \end{array}$$

$$1492 \rightarrow 6 \text{ digit}$$

$$251 \rightarrow 3 \text{ digit}$$

Single digit \Rightarrow	Range $1 - 9$	Range 9	digit $9 \times 1 =$	9
double digit \Rightarrow	$10 - 99$	90	$90 \times 2 =$	180
Triple digit \Rightarrow	$100 - 999$	900	$900 \times 3 =$	2700

$$\begin{array}{c} 3089 \\ 2889 \\ \hline 200 \\ 200 \\ \hline 0 \end{array}$$

$$\text{Four digit} \Rightarrow 1000 - 1049 \quad 50 \times 4$$

$$\boxed{50}$$

Que: let A3BC and DEF be 4 digit number where each letter represents a different digit greater than 3. If the sum of the numbers is 15902, then what is the difference b/w the values of A and D?

$$\begin{array}{r} \text{A} \ 3 \ \text{B} \ \text{C} \\ + \text{D} \ \text{E} \ 2 \ \text{F} \\ \hline 1 \ 5 \ 9 \ 0 \ 2 \end{array}$$

$$4 \oplus 6 \oplus \oplus 9$$

greater > 3
different
A B C D E F

$$C+F=12$$

(8,4) ✓
(7,5) ✗

$$\begin{array}{r} \text{A} \ 3 \ \text{B} \ 8 \\ + \text{D} \ \text{E} \ 2 \ 4 \\ \hline 0 \ 2 \end{array}$$

$$\begin{array}{r} \text{A} \ 3 \oplus 8 \\ + \text{D} \ \text{E} \ 2 \ 4 \\ \hline 1 \ 5 \ 9 \ 0 \ 2 \end{array}$$

$$\begin{array}{r} \text{A} \ 3 \ 7 \ 8 \\ + \text{D} \ \text{E} \ 2 \ 4 \\ \hline 1 \ 5 \ 9 \ 0 \ 2 \end{array}$$

$$\begin{array}{r} \text{A} \ 3 \ 7 \ 8 \\ + \text{D} \ \text{E} \ 5 \ 2 \ 4 \\ \hline 1 \ 5 \ 9 \ 0 \ 2 \end{array}$$

$$(9,6) = \textcircled{15}$$

Que: while adding the first few continuous natural numbers, a candidate missed one of the numbers and wrote the answer as 177. what was the number missed?

Natural number

$$n-1, n, n+1 \quad \textcircled{177}$$

$$\frac{n(n+1)}{2} = 177$$

$$n-1 + n + 1 =$$

$$2n =$$

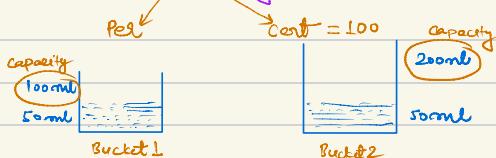
$$\frac{(n-1)(n+1)}{2} = 177 + \textcircled{x}$$

$$354$$

$$(n-1)(n+1) = 354 + 2x$$

$$\underline{12} \times 14 =$$

★ Percentage



$$\frac{50}{100} \times 100 = 50\% \quad \text{which bucket looks more filled?}$$

$$\frac{50}{200} \times 100 = 25\%$$

$50\% > 25\%$ because of % of water filled.

Q: 70 problems carry equal marks

$$10 \text{ Arithmetic} \rightarrow 70\%$$



✓

$$30 \text{ Algebra} \rightarrow 40\%$$

$$30 \text{ Geometry} \rightarrow 60\%$$

Failed!

$$\text{Passing \%} = 60\%$$

How many more questions would have to be answered correctly to earn 60% passing marks

~~$$10 \times \frac{70}{100} + 30 \times \frac{40}{100} + 30 \times \frac{60}{100}$$

$$7 + 12 + 18 = 37$$

37 Q

$$\frac{170}{300} \times 100 = \frac{30 \times 60}{100}$$

$$\Rightarrow 56.66\% = 37 \text{ Q}$$

$$\frac{17}{30} = \frac{37}{60} \times 100 = \frac{37 \times 100}{60} = \frac{3700}{60} = 61.66\%$$~~

Each problem is 1 mark

$$70$$

```

    /   \
  10   30   30
  |   |   |
Arith Alg Geo

```

$$70\% \text{ of } 10 \quad [60\% \text{ of } 30] \quad [60\% \text{ of } 30]$$

$$7 + 12 + 18 = 37 \text{ Q} \times 1$$

$$= 37 \text{ marks obtained}$$

Police!

$$70 \text{ Q} \times 1 = 70 \text{ marks}$$

$$\therefore \text{Passing marks} = 60\% \text{ of } 70$$

$$= 42 \text{ marks}$$

$$\therefore \text{Required} = 42 - 37 = 5 \text{ marks} = \boxed{5 \text{ Q}}$$

$$\text{Income} = 100 \text{ £}$$

Q.2

$$35\% \text{ of Income} = \text{Food} \Rightarrow 35\% \text{ of } 100 = 35$$

$$25\% \text{ of } " = \text{children} \Rightarrow 25\% \text{ of } 100 = 25$$

$$\text{Remaining } 80\% \text{ of } " = \text{House Rent} \Rightarrow 60\% = 60 \quad \boxed{60}$$

? % of Income left with?

$$\text{Remaining} = \text{Savings} = 40$$

$$80\% \text{ of } 40 = \boxed{32}$$

$$\begin{array}{r}
 35\% \\
 25\% \\
 \hline
 60\% \\
 40\% \times 80 = \boxed{32\%} \\
 \hline
 8\%
 \end{array}$$

$$\therefore \text{Savings} = \frac{8}{100} \times 100 = \boxed{8\%}$$

Ques:

A scores 30% of marks failed by 15 marks

B scores 40% of marks and obtained 25 marks more. These require to pass.

passing % ?

Each and Every candidate should pass



$$30\% + 15 = 40\% - 35$$

$$50 = 10\%$$

$$5 \text{ marks} = 1\%$$

$$15 \text{ marks} = 3\%$$

$$\therefore \text{Passing} = 37\%$$

$$35 \text{ marks} = 7\%$$

$$\text{Passing} = 37\%$$

$$\text{Fail} + \text{Marks} = \text{Pass}$$

$$\text{Pass} - \text{Marks} = \text{Pass}$$

$$30\% \text{ of } x + 15 = 40\% \text{ of } x - 35$$

$$50 = 10\% \text{ of } x$$

$$= \frac{10}{100} \times x$$

$$1500 = x$$

$$\frac{30}{100} \times 1500 + 15 = 165 \text{ passing marks}$$

$$\therefore \% = \frac{165}{1500} \times 100 \quad (37\%) \quad \checkmark$$

$$a) 30 + 30 = 40\%$$

$$60 = 40\%$$

$$\frac{60}{40} = 1\%$$

$$\frac{50}{100} \times \frac{3}{2} = 1\%$$

$$150$$

$$\text{Passing marks} = 40\%$$

get 30 mark

Failed by 30 marks

Max marks?

$$30 + 30 = 40\%$$

$$\frac{60}{40} \times 100 = 1.5 \times 100\%$$

$$15 \times 10 = 105\%$$

$$150 \quad \checkmark$$

$$A = B + 20 \quad \text{---} \quad ①$$

$$B + 20 = A$$

$$A - B = 20$$

$$5\% = 20$$

$$1\% = \frac{20}{5} \times 100$$

$$100\% = 400 \text{ Marks}$$

$$D = A - S \text{ of } A$$

$$A + \frac{5\%}{100} \times 400 \quad A - 20 = A - \frac{5\%}{100} A$$

$$100\% + \frac{5}{100} = 20$$

$$A - A + \frac{5}{100} A = 20$$

$$\frac{1}{100} A = 20$$

$$\frac{1}{100} A = \frac{20}{400} \quad (38\%) \quad \checkmark$$

$$\% \downarrow = \frac{A - D}{A} \times 100$$

$$S = \frac{20}{A} \times 100$$

$$A = 400$$

$$\frac{x}{100} \times \frac{y}{100} \rightarrow \frac{x \times y}{10000} \times 100$$

$$\% \text{ error}$$

$$\frac{2010 - 2015}{2015} = \frac{\text{Pop}_{2015} - \text{Pop}_{2010}}{\text{Pop}_{2010}} \times 100$$

12 attempted \rightarrow full marks is all 12

obtain: 60%. All questions carry equal marks

Ques:

Number of Q = ?

$$\frac{12}{x} \times 100 = 60\% \quad \frac{12}{20} \times 100 = 60\%$$
$$\frac{12}{x} \times 100 = 60\% \quad x = 20$$
$$60\% \quad x = 20$$

Ques:

$$\text{Total } 300 = 180 + ? \quad |$$

$$\text{Literate } 150 \quad 70\% \times$$

$$\frac{70}{100} \times 180 \quad \text{Literate}$$
$$= 126 \rightarrow \underline{\text{Male}}$$

$$150 - 126 = 24 \quad \text{Female Lit.}$$

Each problem \rightarrow 1 marks

$$12 \rightarrow 60\%$$

$$\frac{12}{60} \leftarrow : 1\%$$

100%

$$\frac{1}{5} \times 100$$
$$20$$

Ques: male
70%
 $\frac{2}{7} \times 20$

$$\frac{2}{7} \times 20$$

$$20$$

$$10$$

M

female
30%
 $\frac{3}{10} \times 20$

$$20$$

$$\frac{2}{3}$$

$$= \underline{\underline{\frac{2}{3}}}$$

Ques:

$$12\% < 30$$

$$6\% > 200$$

$$22\% > 100$$

$$990 \quad (30 - 100)$$

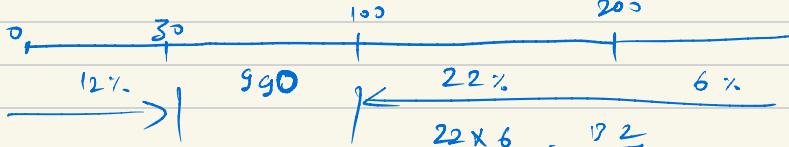
$$? \quad (100 - 200)$$

$$22\%$$

$$2\%$$

$$200$$

$$6\%$$



$$22 \times 6 \quad \frac{132}{100} = \frac{132}{100}$$

$$\frac{12}{100} + \frac{990}{100} = \frac{16}{100} \times 100 = 16$$

$$\frac{132}{100} = 1.32$$

$$9.18$$

$$\text{Pop1} = 100\% \quad \frac{16}{100} \times 1500 = 1500$$

$$60\% = \frac{990}{100} \times 100 = 990$$

$$30 - 100 = 100 - 94$$

$$\frac{16}{100} = 16$$

$$= 66\% = 990$$

$$\text{Pop1}$$

$$1\% = \frac{990}{100} \times 100 = 990$$

$$1650$$

$$18\% = \frac{990}{100} \times 168 = 168$$

$$22\% - 6\% = 16\%$$

$$= 264$$

Ques.

Men Women

60 40

24 > 50k
16 > 50

(20) (12)

(36) > 50k

$$\frac{6}{12} \times 100 = 50\% = 30\%$$

(16)
(M)

60%

(F)
40%

(24)

(36)

(12)

(28)

16 out of 100 > 50k

$$\frac{28}{40} \times 100 = 70\% \quad \underline{\text{Ans}}$$

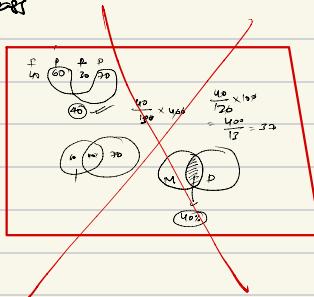
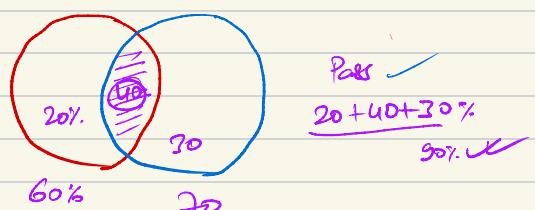
$$16 - 24 = 12$$

Basic Prelims ✓

Ques.

	Math	Phys	Both
%	60%	20%	40%

3% students pass

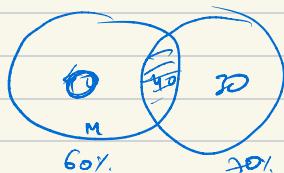
Formula

$$\text{Pass} = \sum \text{individual} - \text{Common}$$

$$\text{Pass} = 40 + 70 - 40 = 70\% \checkmark$$

 $\therefore \text{Failed} = 20\% \checkmark$

Q2:



20%, Pass
 Failed 20% ✓

Ques.

65.8% Phys

Maths
 59.2%

2000 Candidate

$$2000 \times \frac{65.8}{100}$$

$$2000 \times \frac{59.2}{100}$$

$$\begin{array}{r}
 1316 \\
 1184 \\
 \hline
 2500 \quad \text{Ans}
 \end{array}$$

$$\% \text{- Total} = 100\%$$

$$\text{Phys} \% = 65.8\%$$

$$\text{Maths} = 59.2\%$$

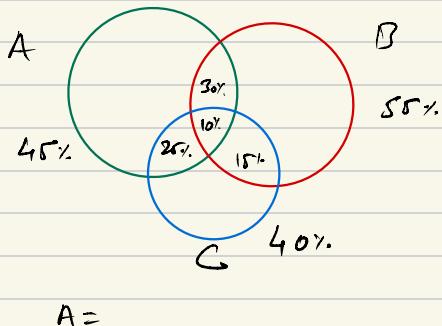
Formula % Total = $\sum \text{individual} - \text{Common}$

$$100 = 65.8 + 59.2 - \text{Common}$$

$$\text{Common} = 128 - 100 = 28\%$$

$$\frac{25}{100} \times 2000 = \boxed{500} \text{ Ans}$$

Que: A 45%, B 55%, C 40%.



$$A =$$

Set Theory Formula

Direct Method

Individual	2 common	3 common
45%	30%	10%
55%	15%	
40%	25%	
	<u>140%</u>	<u>70%</u>
	(+)	(-)
		(+)

(80%) Read Magazine

$\therefore 20\% \text{ Not Read}$

Set Theory Formula

DIRECT METHOD

Individual	2 common	3 common
45%	30%	10%
55%	15%	
40%	25%	
	<u>140%</u>	<u>70%</u>
	(+)	(-)
		(+)

80% Read Magazine

$\therefore 20\% \text{ Don't Read}$

Que: 6 80% Cars

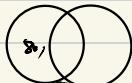
60% Mobiles

Q7:

55% owned both

80%

50%



$$80\% \times 60\%$$

$$\begin{array}{r} 80 \\ 60 \\ \hline 140 \end{array}$$

55%

Ans

80% \Rightarrow Cars

60% \Rightarrow Mobile

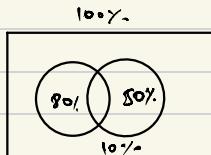
50% \Rightarrow Both

55%

% of Total = Individual - Common

$$= 80 + 60 - 55$$

$$= 85\% \text{ Ans}$$



$$a+b = 90$$

$$a+b = 120$$



80% \Rightarrow shopping

50% \Rightarrow sightseeing

10% \Rightarrow Rest

90% \Rightarrow outside

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$\% \text{ Total} = \sum(\text{Individual}) - \text{Common}$$

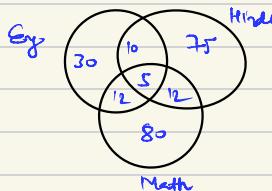
$$90\% = (130) - \text{Common}$$

$$\therefore \text{Common} = 40\%$$

$$80 - 40 = 40\% \text{ shopping}$$

Ques: 8

$$\text{Total} = 500$$



$$\begin{matrix} 30 & 12 \\ 80 & 10 & 5 \\ 75 & 12 \end{matrix}$$

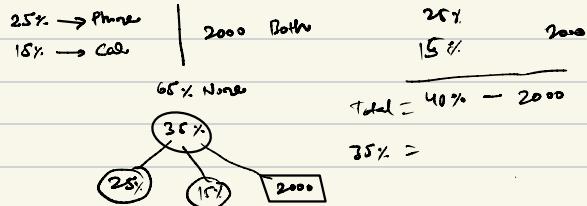
31.2% failed

$$\begin{aligned} \text{Total failed} &= \frac{185 - 34 + 5}{500} \\ &= 185 - 29 \\ &= 156 \end{aligned}$$

$$\frac{34}{500} \times 100 = 6.8\% \text{ Ans}$$

$$\frac{185}{500} \times 100 = 37\% \text{ Ans}$$

Ques 9.



Ques 10.

A

20%

22%

16%

Total failed: 58%

$$\therefore \text{Pass} = 42\%$$

Min failed

84%

Min Pass will happen when
max fail

$$\therefore 20 + 22 + 16 = 58\%$$

$$\therefore \text{Min Pass} = 42\%$$

Max Pass will happen when min
student fail

$$\therefore 16\%$$

$$\text{Max fail} = 84\%$$

Min, Max (42, 84%) AB

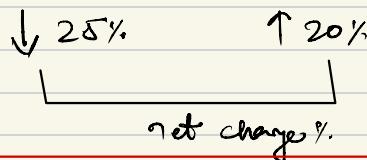
Percents

Problem based on Successive Change

Q1: $\downarrow 25\%$, then $\uparrow 20\%$. net change

$$100 \xrightarrow{\downarrow 25\%} 75 \xrightarrow{+15\%} 90$$

$\therefore 10\% \text{ Ans}$



Net change formula $\Rightarrow \left(x + y + \frac{xy}{100} \right) \%$

Sign convention $\downarrow = -$ $\uparrow = +$

$$\begin{aligned} x &= -25 & -25 + 20 + \frac{-25 \times 20}{100} \\ y &= 20\% & = -5 + -5 \\ & & = -10\% \text{ Ans} \end{aligned}$$

Q2:

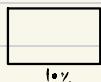
$$1\% \approx 10$$

$$\therefore 100\% = 10 \times 100 = 1000 \text{ Ans}$$

$$\begin{aligned} -10 + 10 + \frac{-10 \times 10}{100} &= -10 \\ 0 + -1 &= -1 \rightarrow 10 \end{aligned}$$

$\therefore 100\% = \underline{\underline{1000}}$

Q:



20%

10%

$$20 + -10 + \frac{20 \times -10}{100}$$

$$10 - 2$$

$$\text{Area} = x \times y$$

$$8\% \text{ Area}$$

Quantity \Rightarrow Age / weight / Height / sum $\propto \%$ $y\%$

$$\% \text{ Result} = \left(x + y + \frac{xy}{100} \right)$$

(Sign)

$\uparrow x\%$

$\uparrow y\% \downarrow$

so that net change become zero

Que -

$$\text{Area} = l \times b$$

(constant)

$$100 = 10 \times 10$$

$$100 = 15 \times 20.66$$

$$\frac{100}{15} = 6.6$$

$$\begin{array}{r} 100 \\ 6.6 \\ \hline 9.34 \\ 5.86 \end{array}$$

$$\frac{10 - 6.6}{15} \times 10^2$$

$$= .34 \quad \frac{7.56 \times 10}{75.6} \quad \frac{4}{15} \times 10^2$$

$$A = x \times y$$

$$\% \text{ Net chng} = x + y + \frac{xy}{100}$$

$$y = \frac{100 - x}{100 + x}$$

$$0 = 50 - y - \frac{y \times 10}{100}$$

$$-50 = -2y - \frac{y}{2}$$

$$+100 = +3y$$

$$y = \frac{100}{3} = 33.33$$

Que:

$$0\% = 25\% - y\% - \frac{25 \times y}{100}$$

$$-25 = -4y - \frac{y}{4}$$

$$-25 \times 4 = -8y$$

$$-100 = -8y$$

$$-20\% = y$$

Q6

$$1.10x = x + y + \frac{xy}{100}$$

$$0 = x - 35 - \frac{x \times 35}{100}$$

$$35 = x - \frac{35x}{100}$$

$$35 \times 100 = 100x - 35x$$

$$35 \times 100 = 65x$$

$$+ \frac{2x \times 100}{65}$$

13

$$0.5384 \times 100 = 53.84\% \underline{\text{Ans}}$$

$$13) 70 \overline{(} 0.5384$$

$$\begin{array}{r} \times 50 \\ \hline \end{array}$$

$$\begin{array}{r} 29 \\ \hline 110 \end{array}$$

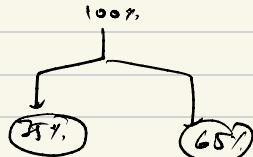
$$\begin{array}{r} 104 \\ \hline \end{array}$$

$$\begin{array}{r} \underline{+ 60} \\ \hline \end{array}$$

MISCELLANEOUS PROBLEM OF PERCENTAGE

Type-I Voting Types

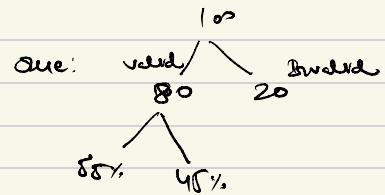
a:



$$30\% = 2250$$

$$1\% = \frac{2250}{30} \times 10^4$$

$$= 7500 \checkmark \text{ Ans}$$



$$7500 \times \frac{80}{100} = 7500 \times \frac{4}{5}$$

$$= 3000 \times 2 \\ = 2700 \checkmark \text{ Ans}$$

Que:

a b c
c - 35% of c 42% of c
c -



$$\frac{7}{15} \times 100 = 20$$

$$= 52.84 \times 20$$

$$= \frac{52.84 \times 20}{100}$$

$$= 10.568 \checkmark \text{ Ans}$$

Lec-18

7:00