```
/* set the times */
TL0 = 0x18;
TH0 = 0xE0;
TR0 = 1 // start TM0
while (Tf = =0;) // waittes flag
TR0 = 0; // stop timer
}
```

0190 − 1000 = 7143

1110 0000 0110 0000

0xE0 0x18

```
TL0 = 0x18
TH0 = 0xFC;
```

TR0 = 0

Tf0 = 0

65536 − 1000 = 64536

TH0 = 0xFC

TL0 = 0x18

Hardware control of Timer -

Gate = 1, TR0 = 1 $\overline{INTR}$ = 1/0 stop

```
Void main()
{
TMOD = 0x09
TR0 = 1;
while (1)
{ if (TF ==1)
  TF=0;
}
}
```

To Set Baud Rate

```
TH1 = TL1 = 253
TR1 = 1;
```

① Tx char 'A' serially through UART to Hyperterminal

```
#
Void uart_init (void);
void uart_Tx (unsigned char );

void main ()
 {
  uart_init ( );
  uart_Tx ('A');
  while (1);
 }
void uart_init (void)
 {
  Scon = 0x40;
  TMOD = 0x20;
  TH1 = TL1 = 253;
   TR1 = 1;
 }
Void uart_tx (unsigned char d)
 {
    SBUF = d;
  while (TI == 0;
    TI = 0;
}
```

Q Rx characters

```
#
Void uart_init(void);
Void uart_tx (unsigned char);
unsigned char uart_Rx (void);

Void main()
{
unsigned char x;
uart Init ( );
while (1)
{
x = uart_Rx ( );
uart_Tx (x);
}
Void uart_init(void)
{
SCON = 0X50 ;
TMOD = 0X20;
TH1 =TL1 = 253;
TR1 =1;
}
Void uart_Tx (unsigned char)
{ sbuf =d
while (TI==0))
TI = 0;
}
unsigned char uart_rx (void)
{
while (RI ==0)
RI= 0;
return SBUF ; }.
```

Q Define the fu" to Transmit the string.
integer, float

```
void uart_str ( unsigned char *p)
{
while (*P)
Suart_Tx ( *P++);
}
```

unsigned char a[ ]=
"Anandita"

Q. WALP to demonstrate Ex Int 0 in low level triggering

```
LEDO  Bit P1.0
CSEG  AT 0
LJMP  MAIN
// Ex-Int 0 - ISR
CSEG  AT 0003H
CLR   LEDO
SETB  LEDO
RETI
// main Line prog.
CSEG  AT 100H
MAin : S
  SETB  EA // Global Int Enable bit
  SETB  EX0 // Enable Ex Int 0
  CLR   IT0 // Low level Trig.
Repeat:
    INC R0
    SJMP Repeat
END
```

to demo. EX0 & EX1 in falling Edge triggering

```
LED  Bit P1.0
LED  BIT P1.0
CSEG AT 0
LMP  MAIN
CSEG AT 0003H
CLR LED0
SETD LED0
RETI

CSEG AT 0013H
  CLR LED1
SETB LED1
RETI
//Main-Line prog.
MAIN:
SETD EA
SETD EX0
SETD EX1
SETD IT0
SETD IT0
```

(SETD IT0)
Falling Edge trig.

ECP to EXT-0 in(L·L·T)

```
#include <reg51.h>
Sbit  led = P1^0;
Void. ext_int0_isr (void) interrupt 0
{
  LED=0;
  LED = 1;
}
Void main()
{
  int c=0
    EA=0 ;
    EX0=1;
IT LED=0;
   while (1)
   {
    (c++);
   }
}
```

(I0 * 8) + 3

EPP: to demonstrate two Ex·0 ie. EX0 & EX1 in falling edge

```
# include <reg51.h>
Sbit Led1 = P1^0 ;
Sbit Led2 = P1^0;
Void ext_int0_isr (void) interrupt 0
{
  Led1 = 0
  ;
  ;
  ;
IT0=1
IT0 = 1
```

Ex:- Tx a char serially through UART using interrupt

```
#include <reg51.h>
void serial_isr(void) interrupt 4
{
  if (TI == 1)
    TI = 0;
}
void main()
{
  int cnt = 0;
  SCON = 0x40;
  TMOD = 0x20
  TH1 = TL1 = 253
  TR1 = 1;
/* Enable serial interrupt */
  EA = 1
  ES = 1;
/* Initiate the Tx */
  EA = 1;
  ES = 1;
/* Initiate the Transmission */
  SBUF = 'A';
  while (1)
  {
    cnt ++ ;
  }
}
```

Q ESP to receive & re-transmit the same char. using interrupt method.

```
#include <reg51.h>
unsigned char x
void serial_isr(void)
    interrupt 4
{
  if (TI == 1)
  TI = 0
  else
  {  RI = 0;
  x = SBUF ; // read the Rx byte
  SBUF = x; // Initiate the Tx
  }
}
void main()
{
  int cnt = 0;
/* initiate the UART */
  SCON = 0x50 ;
  TMOD = 0x20;
  TH1 = TL1 = 253
  TR1 = 1;
/* Enable serial int. */
    EA = 1;
    ES = 1;
  while (1)
  {
    cnt ++;
  }
}
```

write 'A' into EPROM (AT 24C08) read back the same data & display it on alpha numeric Lcd.

```
#include "testing_i2c.h"
Extern void Lcd_init(void);
extern void Lcd_cmd(unsigned char);
Extern void Lcd_data (unsigned char);
extern void string (unsigned char *);

Void main ()
{
 Lcd_init ();
 String ("I2C_test:");
 delay_1ms (500);
 I2C_slave_write (0xA0, 0x00, 'A');
 Lcd_data (i2c_slave_read (0xA0, 0x00);
  while (1);
 }.
```

```
#include<reg51.h>
#include<intrins.h>
sbit SCL = P3^2;
sbit Sda = P3^3;
extern void delay_1ms(int);
void i2c_start(void)
{
 SCL = 1;
 Sda = 1;
 Sda = 0;
}
void i2c_stop(void)
{
   Sda = 0;
   SCL = 1;
   Sda = 1;
}
void i2c_bytewrite(unsigned char d)
{
unsigned char j;
for(j=0; j<8; j++)
 {  SCL = 0;
    Sda = df(0x80>>j)?1:0;
    SCL = 1;
   }
}
unsigned char i2c_byteread(void)
{
unsigned char j, buf=0;
for(j=0; j<8; j++)
{   SCL = 0;
    _nop_();
    SCL = 1;
    if(Sda)
     buf |= (0x80>>j);
    }
    return buf;
}
void i2c_ACK(void)
{
    SCL = 0
    Sda = 1
    SCL = 1; while(Sda==1)
   SCL = 0;
}
void i2c_NOACK(void)
 {
    SCL = 0;
   Sda = 1
    SCL = 1;
    SCL = 0;
}
void
```

```
void  i2c_slave_write (unsigned char sa,
                       unsigned char s_addr,
                       unsigned char dat)
{
    i2c_start();
    i2c_bytewrite(sa);
    i2c_Ack()
    i2c_bytewrite(s_addr);
    i2c_Ack()
    i2c_bytewrite(dat);
    i2c_Ack()
    i2c_stop()
    delay_1ms(10);
}

void
unsigned char i2c_slave_read (unsigned char sa,
                              unsigned char s_addr)
{
    unsigned char buff;
    i2c_start();
    i2c_bytewrite(sa);
    i2c_Ack();
    i2c_bytewrite(s_addr);
    i2c_Ack()
    i2c_start();
    i2c_bytewrite(sa|1);
    i2c_Ack()
buff = i2c_byteread();
    i2c_noack();
    i2c_stop();
    return buff;
}
```

LED

① delay of 1 ms.

```
delay 1ms (void);
void main ()
{
  delay 1_ms();
  while ();
}
void delay -1ms (void)
{
  unsigned char i;
  for (i=250; i>0; i--);
  for (i=247; i>0; j--);
```

② delay 1_ms (unsigned int);

```
void main()
{
  delay-1ms (1000);
  while (1);
}
void delay-1ms (unsigned int dly)
{
  unsigned char i;
  for (dly; dly>0; dly--)
{
  for(i=250; i>0 ;;i--);
  for (i=    ; i>0 ;i--);
}
```

VOICES

Your Syllabus

Avg.
Mixture
Partnership
7.
P & Loss
✓ Time & work
✓ Pipes & Cistern
✓ Simple Interest
✓ Compound Interest
✓ Time & Distance
✓ Boats & Streams
✓ Problem on trains
Ratio & proportion
N.O. Ages

Calculation Tricks.

① No. which end with 5

squaring $(\overset{1}{2}\overset{\downarrow}{5})^2 \longrightarrow 625$

$\downarrow 3$

$(35)^2 \longrightarrow 1225$

$\downarrow 4$

$(95)^2 \longrightarrow (9025)$

$\downarrow 10$

→ Neighbours of two.

① $(102)^2 \longrightarrow 10404$

$\overset{+2}{\underset{104}{}}$

② $104 \longrightarrow 10816$

$\overset{+4}{\underset{108}{}}$

③ $(98)^2 \longrightarrow 9604$

$\overset{-2}{\underset{96}{}}$

$(96)^2 \longrightarrow 9216$

$\overset{-4}{\underset{92}{}}$

→ Neighbours of 50

(Base 50)

Ex $(52)^2 \longrightarrow 2704$

$\overset{+2}{\underset{54/2 = 27}{}}$

$\overset{-2}{}$

$54 \longrightarrow 2916$

$\overset{+4}{\underset{58/2 =}{}}$

$(47)^2 \longrightarrow (2209)$

$\overset{-3}{\underset{44/2}{}}$

Multiplication:

→ 2 digit No: Base 10 — $12 \times 13 \rightarrow 156$ (12 → 2, 13 → 3; $2 \times 3 = 6$)

Base 100 → $99 \times 98 \rightarrow (9702)$ (−1, −2)

Base 10 — $95 \times 96 \rightarrow 9120$ (-5×-4)

Base 100 — $67 \times 98 = 6566$ (-33, -2)

Base 50 ($10 \times 5 = 50$) — $54 \times 49 \rightarrow 53\,(-4)$ (+4, −1)

$53 \times 5 = 265\,(-4)$

$2650 - 4 = 2646$

Base 20 (10×2) — $23 \times 21 \rightarrow 24\,(+3)$ (+3, +1)

$24 \times 2 = 48\,(+3) \Rightarrow 483$

→ 3 digit No.

Ex 123

321

39483

steps

023

021

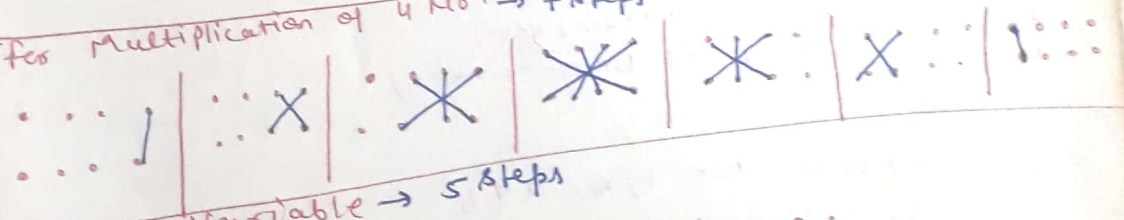
483

306
024
7344

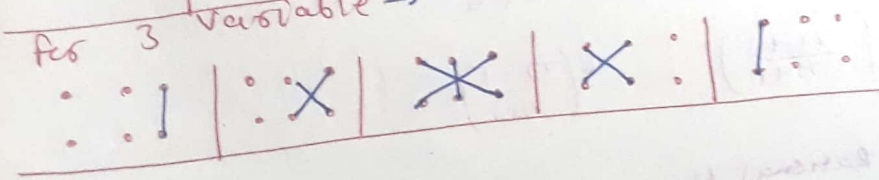
059 x058

059 40
058 45
3422 85

For Multiplication of 4 No. → 7 steps.



For 3 Variable → 5 steps



H.C.F & L.C.M of No.

① $\frac{b}{a}$ - Exactly, a is factor of b.
if b is multiple of a.

② Product of two No. = product of their H.C.F & L.C.M.

③ Co-prime → two No. r said to be co-prime if their HCF is 1.

④ $HCF = \left(\frac{\text{HCF of Numerators}}{\text{LCM of Denominators}}\right)$

$L.CM = \left(\frac{\text{L.CM of Numerator}}{\text{HCF of Denominators}}\right)$

→ for n-Rational No. b/w a & b

$a\left(\frac{n+1}{n+2}\right)$. $b\left(\frac{n+1}{n+1}\right)$

Ex Find 4 Rational No. b/w 3 & 4.

4+1 = 5

$3 \times \frac{5}{5} = \frac{15}{5}$ $\quad 4 \times \frac{5}{5} = \left(\frac{20}{5}\right)$

Sol $\frac{15}{5}, \frac{16}{5}, \frac{17}{5}, \frac{18}{5}, \frac{19}{5}, \frac{20}{5}$

→ Rational No. b/w 3 & y → $\frac{3+y}{2} = \left(\frac{7}{2}\right)$

→ How to convert Recuring Decimal into fraction

Ex $0.\overline{6}$

Let $x = 0.666$ — ①

Multiply both side by 10

$10x = 6.66$ — ②

Sub ① in ②

$9x = 6$

$x = \frac{6}{9} = \left(\frac{2}{3}\right)$

Ratio & proportion & mixture

A : B = 1 : 2
B : C = 3 : 4
C : D = 6 : 8
D : E = 12 : 16

A : B : C : D : E ?
A = 1 × 3 × 6 × 12 = a
E = 2 × 4 × 8 × 16
B = 3 × 6 × 12 × 2
C = 6 × 12 × 2 × 4
D = 12 × 2 × 4 × 8

A : B ⇒ A : B : C
a = a × b
B = B
c = B × c

Note (A) : B If a part of entity same then $\frac{a}{B} \times \frac{B}{C} \times \frac{C}{D} \times \frac{D}{A} = 1$
D : C
C : D
D : A

Proportion

Let a, b, c, d

① Normal proportion
a : b :: c : d (extremes, mean)
or $\frac{a}{b} = \frac{c}{d}$

① continue proportion
$\frac{a}{b} = \frac{b}{c} = \frac{c}{d}$

Componendo & Dividendo Law

$\frac{a}{b} = \frac{c}{d} \Rightarrow \left(\frac{a+b}{a-b}\right) = \left(\frac{c+d}{c-d}\right)$

$\frac{a}{b} = \frac{c}{d} \Rightarrow \frac{a+b}{b} = \frac{c+d}{d}$

$\frac{a}{b} = \frac{c}{d} \Rightarrow \frac{a-b}{b} = \frac{c-d}{d}$

Q Least No that must be subtracted from 4, 5, 7 So that the 3 No. must be in Continue prop.

(4 − x) (5 − x) (7 − x)

$\frac{4-x}{5-x} = \frac{5-x}{7-x}$

x = 3

Q $x = \frac{ab}{a+b}$ $(a \neq b)$ value of $\frac{x+2a}{x-2a} + \frac{x+2b}{x-2b}$ is

$\frac{x}{2a} = \frac{2b}{a+b}$

Variation

Direct
$P \propto Q$
$P = KQ$ (K = constant)

Indirect
$P \propto \frac{1}{Q}$
$P = \frac{K}{Q}$

Ex $P \propto Q$ $P \propto m \Rightarrow P \propto Qm$
$P \propto Q$ & $P \propto \frac{1}{m}$ $= P \propto \frac{Q}{m}$
$P \propto \frac{1}{Q}$ & $P \propto \frac{1}{m}$ $= P \propto \frac{1}{Qm}$.

No of coins = $\frac{\text{Total value}}{\text{Denomination}}$

Ex:- 2 Rs of 25 Paise coins

$\Rightarrow \frac{2}{1/4} =$ (8 coins)

Q A bag contain Rs 90 in coins of denomination of 50 Paise, 25 Paise & 10 paise. If coins of 50 paise, 25 paise & 10 paise are in the ratio of 2 : 3 : 5, then no. of 25 paise coin in bag.

No. of coins × denomination = total value

$50 = \frac{1}{2} \times 2x +$
$25 = \frac{1}{4} \times 3x +$
$10 = \frac{1}{4} \times 5x +$
$\Big\} = 90$

$x = 40$

25 paise coins = (120)

Mixture

Fresh grapes contain 90% of water by weight while dried grapes contain 20% water by weight what is the weight of dry grapes available from 20 kg of fresh grapes

Fresh grapes: 90% water, 10% Pulp

Dried grapes: 20% water, 80% Pulp

$\frac{20 \times 10}{100} = 20$ kg fresh grapes

$\left(x \cdot \frac{80}{100}\right)$ x kg Dry grapes

$x = 2.5$ kg

Q In a alloy z of c are in the ratio 1 : 2
In 2nd alloy z & c are in 1 : 2 : 3
If mixed for new alloy of ratio 5 : 8

① $z : c = 1x/3 : 2x/3$

② $2y/5 : 3y/5$

$\frac{z}{c} = \frac{5}{8} = \frac{\frac{x}{3} + \frac{2x}{y}}{\frac{2x}{3} + \frac{3y}{5}} \Rightarrow \frac{x}{y} = \frac{3}{10}$

Q Find ratio in which the content of two vessels have to be mixed to get new mixture in which ratio of m : w in 2 : 1

$5x$	$10y$
3 : 2	7 : 3
m : w	m : w

① $5x/5$ 2 : 1 ② $10y/10$

$3x/5 \quad 2x/5 \quad 7x/10 \quad 3y/10$

$\frac{\text{milk}}{\text{water}} = \frac{2}{1} = \frac{\frac{3x}{5} + \frac{7y}{10}}{\frac{2x}{5} + \frac{3y}{10}}$

$\frac{6x + 7y}{4x + 3y} = \frac{2}{1}$

$2x = y$

$\left(\frac{x}{y} = \frac{1}{2}\right)$

$x : y = 1 : 2$

$\frac{10\% (10,000)}{100}$

6000

$\frac{4000 \times 100000}{100}$

$\frac{5 \times 80000}{100}$

$\frac{4000}{10,000} \times 100$

D.I

1993 → 25 Lack.

		M:F
UP	28	4:3
Bihar	21	3:2
AP	0	4:3
K	13	4:5
M	10%	4:5
T.N	11%	3:4
K	8%	5:6

Q 28% 25 L

up

$\frac{\frac{4}{7}(28) + \frac{4}{9}(10) + \frac{5}{11}(8)}{100} \times 100$

⇒ $16 + \frac{40}{9} + \frac{40}{11}$

$\frac{\frac{3}{7}(9) +}{\frac{4}{7} \times (11)} \times 100$ 2.4

$\frac{3 \times 9 \times 5}{4 \times 11} \times 100$

11 × 25 Lack

6 × 5 = 20% 4. → 50

30 = 80

45 × 5 = 35 × 4

28 (7) + 21 (5)

(7)(38 + 33)

$\frac{38 \times 7}{33 \times 5}$

5.0

$\frac{\frac{4}{7} \times 11}{\frac{6}{11} \times 8} \times$

$\frac{2 \times 6 \times 11 \times 11}{6 \times 7 \times 8}$

$\frac{3}{55}$

121

$\frac{45\% \cdot 8}{100} + \frac{35\% \cdot 4}{100}$

$\left(\frac{9}{4} + \frac{7}{5}\right)$

$\frac{45 + 28}{20}$

$\frac{73}{20} \times 9$

73

T.N = 11% 25 Lack

$\frac{4}{7}(30) + 11\% \; 250000$

$25 \times \frac{3}{7}$ 11 × 250000

% → fraction.

$\frac{1}{2}$ → 50%

$\frac{1}{3}$ → 33.33 $(33\frac{1}{3})$%

$\frac{1}{4}$ → 25%

$\frac{1}{5}$ → 20%

$\frac{1}{6}$ → 16.66%

$\frac{1}{7}$ → 14.28%

$\frac{1}{8}$ → 12.5%

$\frac{1}{9}$ → 11.11%

$\frac{1}{10}$ → 10%

$\frac{1}{11}$ → 9.09%

$\frac{1}{12}$ → 8.33%

$\frac{1}{13}$ → 7.69%

$\frac{1}{14}$ → 7.14

$\frac{1}{15}$ → 6.66%

$\frac{1}{16}$ → 6.25%

$\frac{1}{17}$ → 5.88%

$\frac{1}{18}$ → 5.55%

$\frac{1}{19}$ → 5.26

$\frac{1}{20}$ → 5%

42.75% of 960

42.75 of 960

50% − 6.25%

$\frac{1}{2} \times 960 - \frac{1}{16} \times 960$

480 − 60 = 420 − 9.6

⇒ 410.4

1% 960 = 9.6

32% of 55 = 55% of 32.

a% of b = b% of a

16 + 1.6 = 17.6

24% of 225 = 25% of 24

~~25% of 225~~ ⇒ 200% + 25.

~~225~~ ⇒ 48 + ~~8~~

⇒ 54

83.33% of 1296.

83.33 = $\frac{5}{6}$

50% 33.33

or

10% 8.33

$10 \times \frac{1}{12}$ & $\frac{5}{6}$ of 1296 = 1080

91.66 of 2472

100% − 8.33

1 − $\frac{1}{12}$ $\frac{11}{12}$

$\frac{11}{12} \times 2470 = 2266$

⑦ 87.5% of 2432

100 − 12.5

1 − 1/8 = 7/8

7/8 × 2432 = 2128

⑧ 14.3% of 238

14.28 % of 238

1/7 × 238 = 34

⑨ 44.44% of 936

4 × 11.11 of 936

4 × 1/9 × 936 = 416

⑩ 45% of 2662

50% − 5%

1331 − 133.1

⇒ 1197.9

(45/99)

= 45% of 2662

45.45 % of 2662.

5 × 9.09 %

5/11 × 2662 = 242 × 5

⇒ 1210

⑩ 42.84% of 245

245 × 42.84

(200 × 5/10)

3 × 14.28 = 3/7 × 245 = 105

19/July/18

Test of Divisibility (ABCD)

① 2 → ABC 0/2

② 3 → $\left(\frac{A+B+C+D}{3}\right)$

③ 4 → AB$\left(\frac{CD}{4}\right)$

④ 5 → ABC 0/5

⑤ 6 → ABCD is even & $\left(\frac{A+B+C+D}{3}\right)$

⑥ 7 →

⑦ 8 → A$\left(\frac{BCD}{8}\right)$

⑧ 9 → $\left(\frac{A+B+C+D}{9}\right)$

⑨ 10 → ABC 0

⑩ 11 → $\overset{\oplus}{A}\ \overset{\ominus}{B}\ \overset{\oplus}{C}\ \overset{\ominus}{D}$

$\left[\frac{(B+D)-(A+C)}{11}\right]$ or = 0

Cyclicity

unit digit

→ used for calculating unit digits:

① cyclicity of 1 = [1]

1^n → unit digit always 1

② 2 → [2; 4, 8, 6] (1, 2, 3, 4)

③ 3 → [3, 9, 7, 1] (1, 2, 3, 4)

④ 4 → [4, 6] (1, 2)

Unit digit of 4^n depends on n

if n = odd, unit digit = 4

n = even " " = 6

⑤ 5 → always [5]

⑥ 6 → [6]

⑦ 7 → [7, 9, 3, 1] (1, 2, 3, 4)

⑧ 8 → [8, 4, 2, 6] (1, 2, 3, 4)

⑨ 9 → [9, 1] (1, 2)

⑩ 0 → [0]

~~for finding unit digit~~

(2, 3, 7, 8, 4, 9)

⑥ ×

if Non zero Rem → Process

Zero Rem → SC

Procedure

base when = 6

" " odd = 1

Conclusion:

0, 1, 5, 6 → Same unit digit

(2, 3, 7, 8) → Freq. is 4

(4, 9) → " is 2

Finding Zeros at Last in the Expression.

There should be multiple of 10 direct (10 × 10 ---)

+

Detailed multiple (hidden) → (5×2)

→ **Note**

The total No. of (2×5) combinations in the Expression is equal to No. of zeros at last in the expression

Least No. of (2×5) = No. of zeros at last

Ex. $25 \times 4 \times 7 \times 16 \times 10 \times 8 \times 100$.

$5^2 \times 2^2 \times 7 \times 2^4 \times 5 \times 2 \times 2^3 \times 2^2 \times 5^2 = (2^{12} \times 5^5)$

Least = $\boxed{5}$ $\therefore (2^5 \times 5^5)$

Hence 5 zeros at last.

Ex How many zeroes at last in

① $\lfloor 6$ ② $\lfloor 100$

→ $\lfloor 6 = 6 \times 5 \times 4 \times 3 \times 2 \times 1 =$

$= 2 \times 3 \times 5 \times 2 \times 2 \times 3 \times 2 \times 1 =$

$(2\times5)^n \Rightarrow (2^4 \times 5^1) \Rightarrow (2\times5)^1$ least = $\boxed{1}$ zero.

Note → for any factorial greater than $\lfloor 4$, total No. of 5 in the expansion are always less than total No. of 2 in the expression.

Since Least power is always our answer.

i.e. The exponent of 5 is nothing but total No. of zeros at last in the expansion.

S.C $\lfloor 145 = \frac{145}{5}^{29} + \frac{145}{25}^{5} + \frac{145}{125}^{1} \Rightarrow [29+5+1] = (35$ zero at last)

formula → $\boxed{\frac{x}{5^1} + \frac{x}{5^2} + \frac{x}{5^3} + \cdots \frac{x}{5^n}}$ $\quad 5^n \leq x$

This conceptual formula is applicable for all the prime No.

Q what is highest power of 3 in expⁿ 100!.

$\frac{x}{3} + \frac{x}{3^1} + \frac{x}{3^2} + \cdots \frac{x}{3^n}$ $\quad 3^n \leq x$.

$\frac{100}{3} + \frac{100}{9} + \frac{100}{27} + \frac{100}{81}$

$33 + 11 + 3 + 1 \Rightarrow \boxed{48} \Rightarrow \boxed{3^{48}}$

Ex $\boxed{10}^{13}$

$\frac{10}{5} = \boxed{2}$.

$2 \times 13 = (12$ zero at last)

To find No. of factors →

Ex How many factors of 1800.

① Prime factorize → $2^3 \times 3^2 \times 5^2$

② write all power seperetly ↳ 3 2 2

③ add 1 to each opower. ⟶ (3+1) (2+1) (2+1)

④ multiply. ⟶ $4 \times 3 \times 3 = \boxed{36}$

find even factors

① Prime factorize

② write all powers separately

③ don't add 1 in the 2's power

④ Multiple. $2^3 \times 3^2 \times 5^1$

even factors = $3 \times (2+1) \times (2+1)$

$\Rightarrow \boxed{27}$

find odd factors

① Prime factorize

② do not consider the section of 2 at all. ~~2^3~~ $\times 3^2 \times 5^2$

$(2+1) \times (2+1) = \boxed{9}$

Total − even = odd

V → Vinculum (Bar)

B → [{

O → ( )

D → ÷

M → *

A → +

S → -

→ HCF of $\left(\frac{a}{b}\right)$: $\frac{\text{HCF of Numerator(N)}}{\text{LCM of Denominator(D)}}$

→ LCM of $\left(\frac{a}{b}\right)$: $\left(\frac{\text{LCM of N}}{\text{HCF of D}}\right)$

→ $a^3+b^3=(a+b)(a^2-ab+b^2)$

→ $a^3-b^3=(a-b)(a^2+ab+b^2)$

→ $a^4-b^4=(a^2)^2-(b^2)^2$

$=(a^2+b^2)(a^2-b^2)$

→ $(a+b)^2-(a-b)^2=4ab$

→ $(a+b)^2+(a-b)^2=2(a^2+b^2)$

→ Remainder theorem

$\left(\frac{axbxc}{n}\right)$ i.e. (axbxc divided by n) = Remainder of $\left(\frac{a_n \times b_n \times c_n}{n}\right)$

where a_n is remainder when a is divided by n

b_n " " " b " " " n

c_n " " " c " " " n.

Ex Find Remainder of $\frac{15}{3} \times \frac{17}{5} \times \frac{19}{5}$ when divided by 7

$\frac{1 \times 3 \times 5}{7} \Rightarrow \frac{15}{7} = \frac{1}{7}$ ⇒ Remainder 1

Polynomial theorem:

$(x+a)^n = {}^nC_0 x^n a^0 + {}^nC_1 x^{n-1} a^1 + {}^nC_2 x^{n-2} a^2 + {}^nC_3 x^{n-3} a^3 + \cdots {}^nC_{n-1} x^1 a^{n-1} + a^n.$

$\frac{(x+a)^n}{x} = \frac{({}^nC_0 x^n + {}^nC_1 x^{n-1} a + \cdots {}^nC_{n-1} x^1 a^{n-1} + {}^nC_n a^n)}{x}$

↳ Remainder is $\left(\frac{a^n}{x}\right)$ bcz rest of term contain x hence completely divisible by x.

Ex $\frac{9^{99}}{8} \Rightarrow \frac{(8+1)^{99}}{8} \rightarrow \frac{1^{99}}{8} = \boxed{1}$ Ans

$\frac{5^{100}}{7} \Rightarrow \frac{(25)^{50}}{7} \Rightarrow \frac{(7\times3+4)^{50}}{7} = \frac{4^{50}}{7} \Rightarrow \frac{2^{100}}{7} = \frac{(2^3)^{33}\times2}{7}$

$\Rightarrow \frac{(7+1)^{33}\times2}{7} \Rightarrow \left(\frac{1\times2}{7}\right) \Rightarrow \boxed{2}$ Ans

Case 1 → on dividing a number by a, b & c, if we get a−K, b−K, c−K as remainder resp. then number will be = n × LCM of [a, b, c] − K

Ex on dividing a No. by x by 4, 5, & 6 we get remainder 3, 4, 5 & find the No. (x).

	4	5	6
Remainder	3	4	5

= (4−1) (5−1) (6−1) i.e. K=1

So that No. will be.

n × LCM of (a, b, c,) − K

n × LCM (4, 5, 6) − 1

⇒ 60n − 1 if n=1 = 59 is the smallest such natural No.

for highest No →

Case 2 → on dividing a no(x), by a, b, & c ^ eq, if we we get K as remainder always then that be No.

No. will be x = (n−1) LCM (a, b, c) + K,

Ex if 5, 6, 7, x is dividing by. , we get 2 as remainder then what is x.

(n−1) LCM (a, b, c) + K → (n−1) LCM (5, 6, 7) + 2.

⇒ (n−1) 210 + 2

⇒ 2 is such a smallest No.

nex will be = 210 + 2 = 212

Case 3 → if a no. after adding K is exactly divisible by a, b, c then that No. will be x = n * LCM (a, b, c) − K

Ex find a No. which after adding 7 is divisible by 10, 11, 12.

n LCM (10, 11, 12) − 7 ⇒ n 660 − 7 = 653 (n=1).

24/July/2018 Veiter

Loss & profit

1) CP (cost Price)
2) SP (Selling Price)
3) MP (Masked ")

Profit = SP > CP = SP - CP
Loss = CP > SP = CP - SP
discount

$$\% \text{ Profit} = \left(\frac{SP - CP}{CP}\right) \times 100$$

or $\left(\frac{\text{Profit}}{CP}\right) \times 100$

$$\% \text{ Loss} = \frac{CP - SP}{CP} \times 100$$

$\left(\frac{\text{Loss}}{CP}\right) \times 100$

→ In profit & loss → CP is always reference
→ In discount → MP is " "

Q SP = 1499 filpkart give 20% of 20% cashback & Amazon give 10% discount & 30% cashback.

Take 100 as reference always price.

f.

100 —20%→ 80 —20%→ 64.
D: -20
Cash: -16
36% discount total.
-36.

A.

100 —10%→ 90 —30%→ 63
-10 -27
Total disc. 36%
-37

Q If CP = 2400 MP = 3000 SP = (on 10% discount)

SP = 3000 - 300 = 2700 ; 2400 → 300
Profit = 300 CP 100 → ?

$\frac{8}{2400} \times ? = \frac{300 \times 100}{2400}$

? = 12.5 %

Q True weight = 1000 gm false weight = 800 gm.

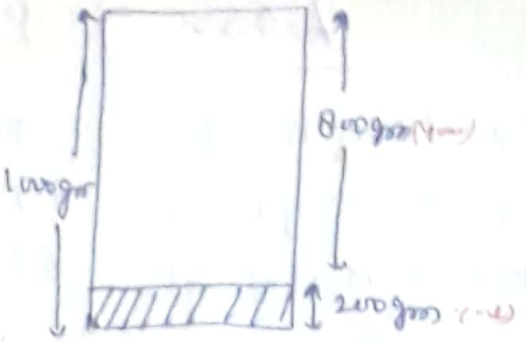
800 ⟶ 200 gm

100 ⟶ ?

? × 800 = 200 × 100

? = 25%

or



$$\text{Profit\%} = \frac{T.W. - F.W}{F.W} \times 100$$

Q

Adyar	Besant Nagar	$\frac{x^2}{100} = \frac{25 \times 25}{100} = 6.25$
(SP) = 49,00,000	49,00,000	
Profit 25%	Loss 25%	

Note:- whenever there is same selling price (SP) & same % of profit & loss. there always be a loss which is given by

$$\text{Loss} = \left(\frac{x^2}{100}\right) \text{ or } \frac{(\text{Profit or Loss})^2}{100}$$

→ (Profit +) (Loss −)

→ Rate ↑ * consumption ↓ = Expenditure constant

$\uparrow \frac{1}{n}$ compensated by $\left(\frac{1}{n+1}\right)\downarrow$

for successive ~~diffcon~~ profit (+) & loss (−).
(A) (B)

$$(P+ \text{ or } L^-) = \left[A + (-B) + \frac{(A)(-B)}{100}\right]$$

① If S.P is different but having same profit & loss on diffent SP. Hence.

$$CP \text{ is } \left(\frac{SP_1 + SP_2}{2}\right) \text{ or } [SP_1 - CP = CP - SP_2]$$

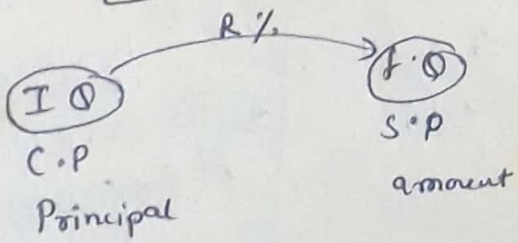
→ If an article is sold at a gain of 20%, then SP = 120% of CP or [(20% of CP) + CP].

→ If an article is sold at a loss of 20%, then SP = 80% of CP.

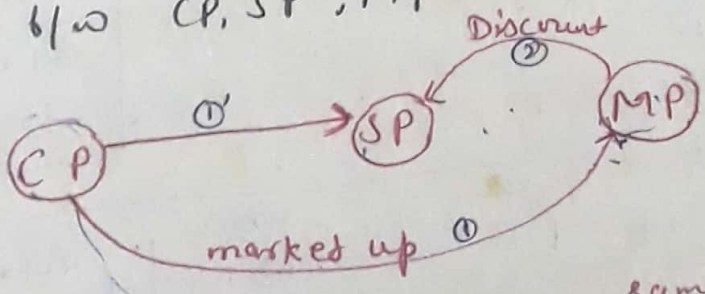
U Tube

$$\text{Final Quality (SP)} = \text{Initial (C.P)} \left(1 \pm \frac{\text{Gain/Loss}}{100}\right)^n$$

n = no. of steps



Relation b/w CP, SP, MP



→ always compare price with same Quantity.

25th July.

Q Cost of 8 article = SP of 6 articles, find out profit/loss %.

$SP\,6 = CP\,(8$

$\frac{SP}{CP} = \frac{8}{6} \Rightarrow \left[\frac{2}{6_3} \times 100\right]$ P

$\frac{SP-CP}{CP} = \left(\frac{8-6}{6}\right) \times 100$ → 33.3% = P

$\Rightarrow \frac{2}{6_3} \times 100 \Rightarrow 33\frac{1}{3}\%$

Sir

CP of 8 = SP of 6.
CP of 8 = 8 Rs
SP of 6 = 8 Rs
CP of 6 = 6 Rs.
6 → 2
100 → ?($33\frac{1}{3}$)

$CP(8) = SP(6)$

$\frac{CP}{SP} = \frac{6}{8}$

CP = 6 6 → 2
SP = 8 100 → $33\frac{1}{3}$

SC

CP of 8 = SP of 6

→ whenever there is such type of Q. then CP b/w SP & SP b/w CP.

Q In 2018, population is 50K. it will ↑ by 10%. what will be the population in 2020 & 2016.

$50,000 = CP\left(1 + \frac{10}{100}\right)^2$

$50,000 = CP\ \frac{11}{10} \times \frac{11}{10}$

2016 → $CP = \frac{50.00000}{11 \times 11}$

$50K\left(1 + \frac{10}{100}\right)^2$

$\frac{11}{10} \times \frac{11}{10} \times 50,000$

2020 → 121 × 500

(60,500)

50,000 $\frac{90}{100} \times \frac{90}{100}$

81 × 500

40,500

SC

100
10% → +10
110
10% → 12
(121)

2018 2020
if 100 → 121.
50,000 → ??

↑ 5%/yr → 9261 → 3 yrs ago → ?

2016 2018
if 100 ← 121
? ← 50,000

Income =

97000 =

Q SP = 96
100 9625
CP = (9

Ans. 77

120

Cubes - 1-20
Square - 1-30

(2) SP(4

$\frac{SP}{CP}$

Ans SP of 4

(3) 10 —
8 ;
80 —
80

(4) 60
SP (

Income = Saving + Expenditure

97000 = 70000 + 27000

Q. SP = 9625 Loss = 23% . what price to get 20% ?

$9625 = CP\left(1 - \frac{23}{100}\right)$

$CP = \left(\frac{9625 \times 100}{77}\right)$

Sol. $77\% = 9625 \Rightarrow 77\% \times ? = 9625 \times 120$

$120\% = ?$

$? = \frac{9625 \times 120}{77}$

$? = 125 \times 120 = 15000$

Cubes - 1-20
Square - 1-30

(2) $SP(4) = CP(3)$. Find P or L%.

$\frac{SP}{CP} = \frac{3}{4} \Rightarrow L = \frac{1}{4} \times 100 = 25\%$

4 → 1
100 → ?

Sol. SP of 4 = CP of 3

4 → 1
100 → ?

? = 25% Loss

(3) 10 → Rs 40 → CP
8 → 34 → SP.
80 → 320 → CP
80 → 340 → SP

$Profit = \frac{20}{320} \times 100 = \frac{50}{8}$

P = 6.25%

(4) 60 Mangoes → 100 → 10% P → (10)

SP (60 M → 10
100 → ?)

$\frac{10 \times 100}{60} \cdot 6 = 10$

(4) SP of 60 − CP of 60 = CP of 10

SP of 60 = CP of 70.

60 → 10

100 → ?

$? = 16\left(\frac{2}{3}\right)$

(5) 28 → 50 Rs → CP 40% profit. How many lemons sold for 100 Rs

? → 100

$\left(\frac{100 \times 28}{56}\right)$ ≠ (56)

CP of (1) $= \left(\frac{50}{28}\right)$

SP of (1) $= \frac{50}{28}\left(1 + \frac{40}{100}\right) \Rightarrow \frac{50}{28} \times \frac{14}{10} = \left(\frac{5}{4}\right)$

SP $= \frac{100}{x}$

$\frac{40}{100} = \frac{100/x}{50/28} - 1 \Rightarrow \frac{4}{10} + 1 = \frac{100}{x} \times \frac{28}{50}$.

$x = \frac{2 \times 28 \times 10}{14} = 40.$

Rs 50 → 28 lemon.

for Rs 100 → 40% 40.

Rs 50 → 40% 20.

hence Rs 70 → 28 lemon. $\Rightarrow \frac{100 \times 28}{70} \Rightarrow$ 40.

Rs 100 → ?

(6) Loss = 5% more 750 Rs than gain of 7.5%.

Find CP.

CP 100x → 95 (SP)

850

$850 = CP\left(1 + \frac{7.5}{100}\right)$

$850\ CP = \frac{107.5}{100} CP$

$CP = \frac{850 \times 1000}{1075}$

95% + 750 = 107.5%

750 = 12.5%

? = 100%.

? = 6000

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(7) 300 → (30+15) → 345

100 +10 → 110

200 (-35)? → (235)?

345 −110 → 235

200 → 35

100 → (17.5)?

OR

(7) 4500 → 15% → 675 (450 + 225)

⅓

1500 +150 → 1650 (10%)

3000 +525 → 3525

4500 − 1650 → 2850

3000 → 525

100 → ?

100 × 525 / 3000 = 17.5

(5) 250 gm → 100 → ?

? = 100 × 250 / 750 = 33⅓

(9) SP = 18000 → Profit

SP = 16800 → loss

Profit = loss ⇒ (18000 − x)/x = (x − 16800)/x

⇒ 2x = 34800

x = 17400 Rs.

SC → CP = 16800 ——— CP ——— 18000

2x = 1200

x = 600 ✓

CP = 16800 + 600 = 17400

25 → 20

10 → ?

20/25

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(10) SP = 1200 Profit → twice.

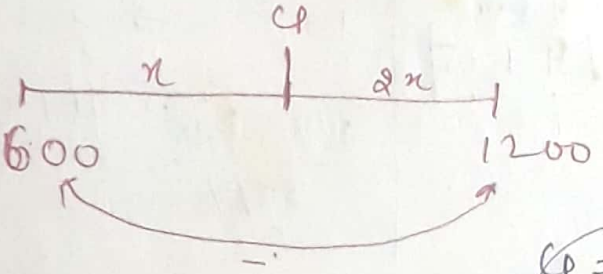
2 (Profit) = (Loss of SP 600)

$2(1200 - x) = (x - 600)$

2400 − 2x = x − 600

3x = 3000

x = 1000 m



⇒ 3x = 600

x = 200

~~2x = 1200 − 600.~~

CP = 800

26/July

(11) Rs 100 → CP

+ 40

140 → MP

12% −28

112 − SP

(12) Successive discount of 10% ; 20% 15%.

→ total discount of 10% 20% & 15%.

Let 100

10% −10

90

20% −18

72

15% −10.8

61.2

$\frac{7.2}{2} + 3.6$

10.8

38.8 %

No need to follow order.

(13) 100 — 25% — 25 — 75 — x% — x

100 — 40 — 60

75 − x = 60 ⇒ 15 = x

10% of 75 → 7.5

20% of 7.5 → 15.0

(14) CP — 10% → SP 344.25 — 10% → MP 450

$344.25 = 450\left(\frac{90}{100}\right)\left(\frac{100-x}{100}\right)$

$100 - x = \frac{344.25 \times 100 \times 100}{450 \times 90}$

x = 15%

s.i.5 450
− 45
405
? 60.75
344.25

5% = 20.25 — 10% = 40.5 (15 = 60.75)
405 ⟶ 60.75
100 ⟶ ?
15% ⟹ 15.0

(15)
50 ⟶ 60
100 12.5 12.5
50 ⟶ 60 + 12.5 = 72.5
? ⟶ (30) ⟹ (20)

60 10
300 × 50 / 72.5 ⟹ (600/29) ⟹
29 145 29

s.i.5
Rs 60 ⟶ 50 pencils
(25%)
75 ⟶ 50 pencils
30 Rs ⟶ ?
? = 30 × 50 / 75 = (20)

(16)
200x (sp) ⟶ CP (100x) 25 ⟶ 25%
75x
75x = 200
x =

(16)
1 ⟶ 200 Rs. ⟹ 125% ⟶ 200
100% = ?
? = 200 × 100 / 125 ⟹ (160)

CP = 6 × 160 = (960)
SP = 1056.
96
960 ⟶ 96
100 ⟶ ? (10)

(17)
125 ⟶ Rs 120 per stool. Transport exp @ Rs 14 for 5.
Tax = 6%. Coolie charge = 250.
1 ⟶ 120
1 ⟶ 14/5 = 2.8 Rs.
6% ⟶ 7.2
250/125 = 2
120 + 2.8 + 7.2 + 2 = 132 → 3800
⟹ 3800 ⟶ CP (165)
SP = 3800 × 125/100 ⟹ 25 × 19 = 475
132 × 125/100 = 165
(475)

(18) let

SP 100x; 9/10 th → CP 90x of SP; 8% → 108x SP

90 → 18

100 → ? (20)

$\frac{18 \times 100}{90} \Rightarrow 20$

$108 = 90\left(\frac{100+x}{100}\right)$

$\frac{108 \times 100}{90} = 100 + x$

$120 = 100 + x$

$x = 20\%$

(19) 7% of SP = 8% of (CP) } CP = ?

9% of SP + 1 = 10% of CP.

let 7 SP = 8 CP

$\frac{SP}{CP} = \left(\frac{8}{7}\right)$

$9SP + 1 = 10SP$

SP = 1.

(CP) 100x → 8% → 82x

$\frac{SP - CP}{CP} = \left(\frac{1}{7}\right)$

$9\%\left(\frac{8}{7} CP\right) - 10\% CP = 1$

$\left(\frac{72-70}{7}\right) CP = 1$

$CP = \left(\frac{7}{2}\right)\% \; 350$

(20) 2 article → 8000

SP 100x

CP =

SP 100x → 40% → 160x

100x → −40% → 60x

SP 8000

① x (2400) → 40% → 140x%

(8000 − x) → −40% → (60% of 8000 − x) 5600

$140x = 4800 - 60x$

$200x = 4800$

$x = 24$

200% x = 4800

100x = ? (2400)

① Percent ⇌

① 4% of x = 12

$x = \frac{1200}{4}$

② x% of 44

$x = \frac{10}{20} \times 1$

44 → 33

100 → ? (75)

x → 75

③ 100x

30%

p — 70x

p − 0.3p

0.7p

p =

sol

70%

100%

?

④

$\frac{164}{7}$

120 x

sol

1

1

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Percentage

① percent ⇄ fraction

① 4% of x = 12

x = 1200/4 (300)

② x% of 44 = 20% 165

x = 20 × 165 / 44 = 150/2

44 → 5x

(x → 75)

③ (100x)

(70x) = 91x

$p - 0.3p = 91$

$0.7p = 91$

$p = 910/7$ (130) = (130)

70% = 91

100% = ?

? = 130

④ $\frac{16}{7}p = 1120$ p = 1

(p = 80)

120 × 80 = 96

140% = 112

120 = (?) (96)

⑤ 110% = 198

100% = ?

? = 198 × 100 / 110 = (180)

⑥ 140 → 300 − 150

15% → (450)

150% → 300

1% → ?

(? = 200)

⑦ 100 + 6 = 106

100 ⟷ 106

? ⟷ 156

? = 159 × 100 / 106 = (150)

⑧ 100 ... 40 ... 30% ... 120

(70%)

100 − 40 = 60 ... (88)

⑨ 100x —20→ 80 (Rent) —25% −20→ 60 —15% −8.1→ 54

(9) 100x —20%→ 80 —25% (20)→ 60 —10%→ 54 —15%

100

20 → R
25 → F
10 → T
15 → E
18 → HE.
88

100 ⟶ 12
? ⟶ 4800

? = 4800×100 / 12

= 40,000 (40k)

(10) 100 —20→ 80 —25% (20)→ 60 —30% (18)→ 42 —50% → 21

~~4200~~ (600)
~~12600~~ ⟶ ~~21~~ 7

x = 600 Rent (18 × 600) = 10800

21 ⟶ 12600
18 ⟶ ?
? = 10,800

(11) 100 —4%→ 96 —Remain 10%→ 86.4 (~~77.76~~) 90%

86.40
77.76
8.64x = 108

x = ~~10800~~ / ~~8.64~~ = 12.5

Apples ⇒ (1250.0)

(12) 100 —20→ 120 —24→ 144

100 ⟷ 144
? ⟵ 540

540×100 / 144 ⇒ 1500 / 4 = 375

(13) 100

42.5x + 5 = 52.5x − 15
20 = 10.0x
x = 2
Marks = 200

Pass Marks

0 — 42.5% — 5m — | — 15m — 52.5% — 100

10% ⟶ 20

42.5% ⟶ ? = 85

PM = 85 + 5 = 90

(14) 100 → D. 60 x − 15, 40 x − 10

60x − 15 + 40x − 10 = 50x.
50x = 25
x = 1/2

(20)

~~75%~~ ⟶ 50%
⟶ ~~100~~
50% = 25
40% = ? (20)

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(15) (100) — 30 Apple or 50 mango.

20 → Auto

Rs 50 → mango → 25 mango.

Rs 100 → 30 mango

Rs 30 → ?

? = 30×30 / 100 ⇒ [9]

(16) salary insufficient

100 —(−15)→ 85 (saving)

spend 15 (20%) → 18

+17 → 102 (−20) → 86

14% ↑ → 114

(17)

100% × 100 = 10000

↓ ↓

120 × x = 10000

x = 10000 / 120 ⇒ 83.3

16.7 = $16\frac{2}{3}$% Ans

(18) R ↑ 20% H ↓ $\left(\frac{100}{3}\right)$%

$v = \pi R^2 h$

⇒ $\frac{120}{100} \times \frac{120}{100} \times \left(1 - \frac{100}{300}\right)$

⇒ $\frac{48 \times 2}{100}$ ⇒ $\frac{86}{100}$

x = 150

x = 15000 = 15 K

(18) $v = \pi R^2 H$

R ↑ → 20%

H ↓ $33\frac{1}{3}$%

let R = 5 —20%→ r = 6

H = 3 —$33\frac{1}{3}$→ h = 2 (−3)

$v = \pi 5^2 3 = 75\pi$ → $\pi 6^2 2 = 72\pi$

75 → 3

100 → ?

? = 4% R

(19) P C E

100 × 100 = 10000

↓

125 × x = 10000

x = 80

Change in Consumption =

100 → 80. i.e. 20%

Rate × Consumption = Exp.

(20) P

100 × 100 = 10000 − 550

↓ ↓ 5.5%

70 × x = 9450

x = 9450 / 70 = 135

100 → 135 → 35% Ans

(21) 100

10% → 10 invalid

valid → 90

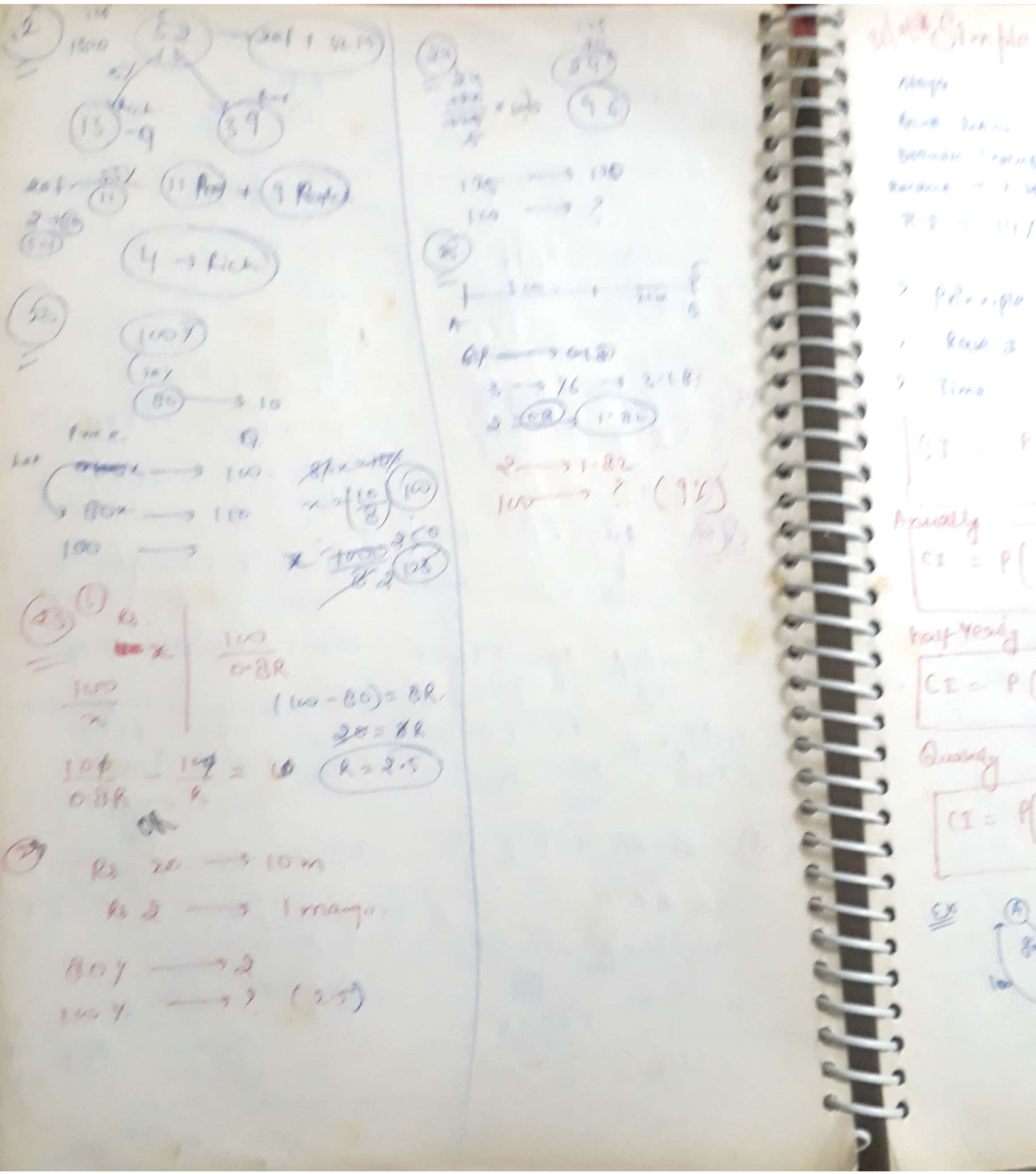
70% → 63 win

30% → 27

63x − 27x = 5400

36x = 5400

x = 150



31/7/18 Simple Interest & C.I

Staya
Bank : Indian
Branch : coimbatore
amount = 2.75 L
R.I = 14% ↓ PA.

17.5 L	17.5 L
36% Pa (3% Pm)	11.5% Pa
60,000	3 Y
	60,240

> Principle amount
> Rate of Interest
> Time

> Simple Interest
> Compound "
> Amount

$$SI = \frac{PTR}{100} \quad or \quad \frac{PNR}{100}$$

$\frac{PRT}{12 \times 100}$ month.

amount = Principle + Interest.

SI — Remains constant every year.

CI

Annually

$$CI = P\left(1+\frac{R}{100}\right)^{N} - P$$

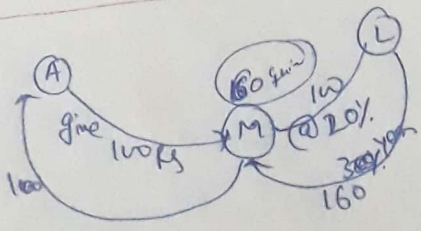
half Yearly

$$CI = P\left(1+\frac{R/2}{100}\right)^{2N} - P$$

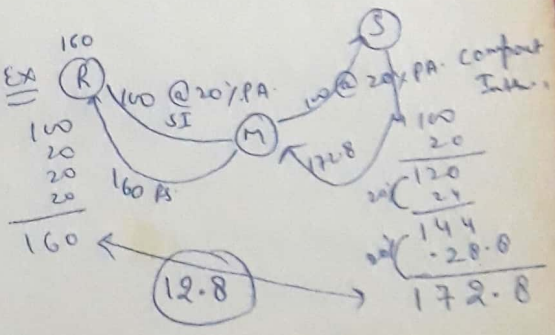
Quately

$$CI = P\left(1+\frac{R/4}{100}\right)^{4N} - P$$

Ex



Ex



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(2) 20% PA

SI

100

20

20

20

20% P.A.

CI

100

20

40 + 4

20 + 8.8

44

20%

* SI is same for all time periods.

* 1st yr of CI is same as SI.

CI & SI 1st yr Relation b/w SI & CI. Rs 3 Y.

Rs 2 Y

Ratio Relation $= \frac{CI}{SI} = \left(1 + \frac{R}{100}\right)$

Difference Relation $= CI - SI = P\left(\frac{R}{100}\right)^2$

Difference Relation.

$CI. - SI. = P\left(\frac{R}{100}\right)^2\left(\frac{R}{100} + 3\right)$

8(1) 100

R% = 4%

T = 2 Y

100

4

4

108

Rs

100

?

? =

(2)

(3)

CI

T

SI

I

II

(1) 100 SI — R% = 4% — T = 2Y

100 CI — R = 5% — T = 3Y

100
4
4
108

100
5
5
5
115

Rs 100 ⟶ 7
? ⟶ 245

? = 3500

(2)
100
15
15
15
15
160

100 ⟶ 160
? ⟶ 8800

? = 5500

(3) CI = 404 Rs
T = 2
SI =

SI	CI
100	100
100	100
150	150
150	225
400	475

	SI	CI
I	200	200
II	200	200 + 8
	400	408

200 ⟶ 8
100 ⟶ ? (4)
? ⟶ 200.

? = 5000

(4) CI = ? P = 5000 T = 2
R = 12%

M1
5000
CI 600
600 + 72
6272
1272

M2 5000
600
5600
12%

100
5
105
5.25
110.25
5.5125
115.7625

11.025
5.5125

100 ⟵ 115.7625
? ⟵ 9261

$A = P(1 + R/100)^N$

$9261 = P(1 + 5/100)^3$

$9261 = P\left(\frac{105}{100}\right)\left(\frac{105}{100}\right)\left(\frac{105}{100}\right)$

1/Aug/18

P = ?
T = 2y
R = 6% PA.
A = 11236.

MI

$A = P\left(1+\frac{R}{100}\right)^{N}$

100 or 100
6 6
106 6 + .36
6.36 112.36
112.36

100 → 112.36
? → 11236.

? = 10000

(6) P = 20000
T = 3y.
Interm R = 5%. 7% 9%.

20000) 5%
1000
21000
1470) 7%
22470
2022.3) 9%
24492.3

OR

SI 20000) 5%
1000
21000
1400 7%
22400
1800) 9%
24200

(6) Default Data give SI.

9% + 7% + 5% = 21%

20,000 → 21% → ?

? = 24200

(7) 10000
5% → 500
10500
500) 10%
11000
2200) 20%
13200

9800

11000
2200

OR 5% → 500

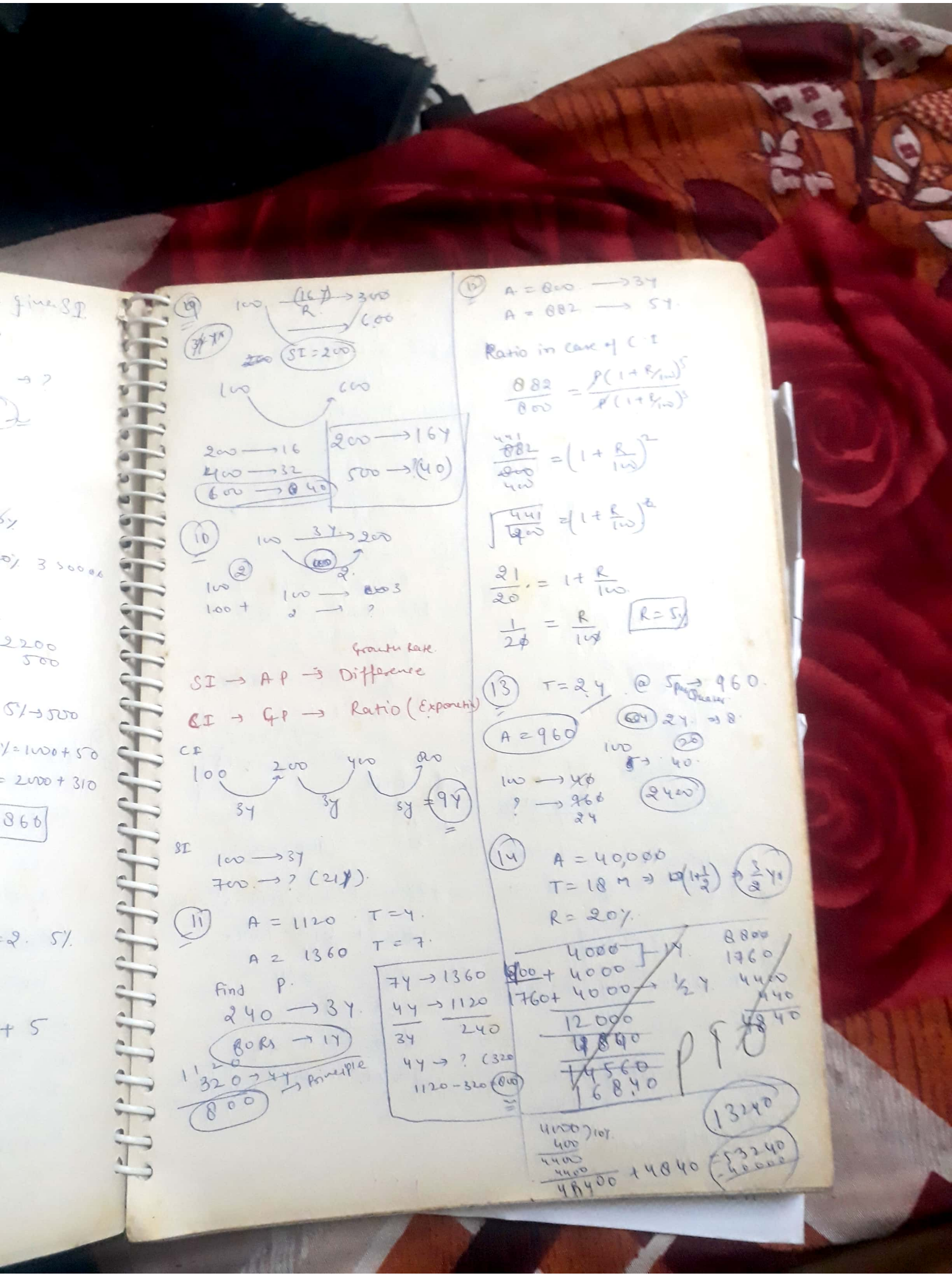
10000
500
10500
1050
11550
2310
13860

10% = 1000 + 50
20% = 2000 + 310

3860

(8) P = 2000 T = 2. 5%.
SI
100 100
100 100 + 5
200 205

Diff = 5



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4000
4000 + 400
4000 + 840
13240

(15) P = 10,000
T = 2 y 3 m (2 y + 3)
⇒ $\left(2 + \frac{1}{4}\right)$ y.
R = $\frac{20}{4}$ % (5)

10,000
2000 CI for 2 y
2000 + 400
14400 — 20%/4 = 5%
720
15120

(16) SI → (23%) 4 CI 2 y → 20%
20,000 20,000
4600 4000
4600 4000 + 800
4600
9200 − 8800

400

(17) A = 5000 3 y CI & SI
20% pa

SI	CI	
1000	1000	2200
1000	1000 + 200	
1000	1000 + 440	

Diff 640

(18) R = 10% T = 3 y
CI − SI = 15.50
100
10 10
10 10 + 1
10 10 + 2.1
100 → 3.1
? → 15.50
? = $\frac{15500}{31}$ = 500

(19) P = 1500 A B
R = 12%, 14% pa
SI = 186 (26%)
100x
12x = 186
24x = 186
x = $\frac{186}{24}$ = 775
Rs 775

A	B
x	(1500 − x)

12% x + 14% (1500 − x) = 186
12% x + 210 − 14% x = 186
2% x = 24
x = 12
2% x → 24
100% x → ? 1200

S = 1400
@ 5% pa
S + (more)

If (Samir =
Sunil ko ki

100 (200
3 years

Q A su
equal
be 20
each in

[66

S = 1400 @ 5% p.a. for 3 y. A

S + more

Sunil. for 3y. @ 7% p.a. at SI.

If Samir = 210.

Sunil ko kitna diya.

for 3 yr.

$21\%[1400+x] - 15\%[1400] = 210$

$x = 600$ (21% ≡ 126, 100% = ?)

$1400 + x = 1400 + 600$

$= 2000$

100 → 200 → 400 → 800

3 years, 3 yrs, 3y = 9 years

Q A sum of Rs 550 is to be repaid in two equal installments. If the rate of interest be 20% Compounded annually, then the value of each installment is :

$550 + 110 = 660$.

P. I ('x')

$[660 - x] + 20\%[660 - x] = x$

Rate * Consumption = Expend.

100 * 10. = 1000.

132 * ? = 1100

Work, Time & Day

Q

Shiva 6 | Shankar 9

① if they work together how many days r required to complete the work

② work alternatively (Shiva, Shankar)

③ Shiva & Shankar worked for '2' days after '2' days shiva left.

④ Shiva started work after 2 days, Shankar joined him.

Solⁿ ① 6, 9 > 18 < 3 unit, 2 unit; 5

Days = $\frac{18}{5}$ ⇒ $3\left(\frac{3}{5}\right)$ days.

1 day ⟶ 5 unit
? ⟶ 18 unit

② If shiva start work 1st.

6 | 9 ⇒ 15

S | S.
① 3 2 25
② 25
③ 5
④ ③ ⇒ ⑦

(7 day)

1 2 3 4 5 6 7
2 3 2 3 2 3 2 3

8th day shiva → 3 unit

but 1 remain

so → $\frac{1}{3}$rd day.

Total $(7 + \frac{1}{3})$ day.

③ (5 + (5) ⇒ 2 days − 10 unit. remaining 8 unit. completed by shanker. $\frac{8}{2}$ ⇒ (4 day)

Total days = 6 day.

Extra days taken by shanker = 4 day

④ 6 unit → 2 day

1 d ⟶ 5 U
? ⟶ 12 U

12 unit remaining → $\frac{12}{5}$ ⇒ $2\left(\frac{1}{5}\right)$ ⇒ $4\left(\frac{1}{5}\right)$ days

S.C. ②

2 day ⟶ 5 unit
? ⟶ 15 (multiple of 5)

6 day ⟶ 15 unit

shiva 1 day ⟶ 3 unit

7 day ⟶ 18 unit

If shankar starts −

6 d ⟶ 15 unit

1 day ⟶ 2

$\frac{1}{3}$ ⟶ 1

$7\frac{1}{3}$ | 18.

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③ If Shiva do remaining work –

2 * 5 = 10 (18 − 8)

1 day ⟶ 3 unit

? ⟶ 8 unit

$T = \frac{8}{3} = 2\left(\frac{2}{3}\right)$

Total – $2 + 2\frac{2}{3} = \left(4\frac{2}{3}\right)$

OR

6		9
	18	
3		2
let x		2
work $3x$		4 = 18.

$x = 4\left(\frac{2}{3}\right)$ Total days.

remaining days – $4\frac{2}{3} - 2 = \boxed{2\left(\frac{2}{3}\right)}$

If Shankar do work & Shiva left after 2 days.

Shiva	Shan.
3	2
2	x

$6 + 2x = 18.$

$2x = 12$

$\boxed{x = 6}$ total days.

Remaining days required by shankar $6 - 2 = \boxed{4 \text{ days}}$

④

a	B	
3	2	unit.
x	$(x-2)$	

$3x + 2x - 4 = 18$

$5x = 14$

$\boxed{x = 2\left(\frac{4}{5}\right)}$ total days.

Sir

$2 \times 3 = 18 - 6 = 12$

1 day ⟶ 5 unit

? ⟶ 12 units.

$\frac{12}{5} = \boxed{2\left(\frac{2}{5}\right)}$ Ans

Q Metro water

4 Hr

Motor

2 Hr

4 lt

2 Hr

1 lt → 1 Hr

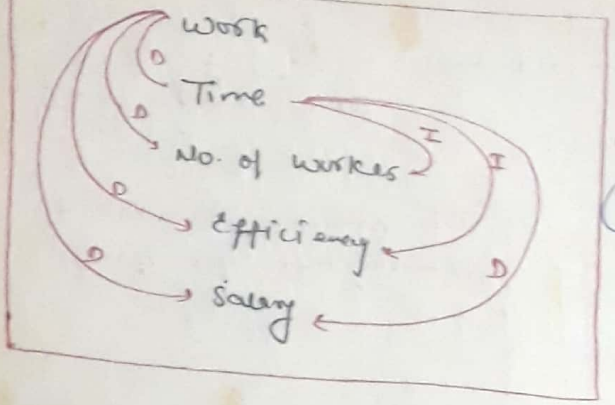
Input

Leakage

1 Hr.

4 Hr

o/p.



Always check the Relation

(1) $A+B = 40$ d. $\}$ $B = 2C$
$A+C = 60$ d.

$B+C = 120 \Rightarrow 2C+C = 120$

$C = 20$

40 / 60 $>$ 120 (3 / 2)

$A+B = 3$
$A+C = 2$

$B = 2C$

1 unit → 1 day
120 unit → ?

120

(2) $A = 3B$
$B = 2C$

$A+B+C = 12$
$6C+2C+C = 12$
$9C = 12$

$9C \longrightarrow 12$
$1C = 12 \times 9 = 108$

$A = x$
$B \Rightarrow 3x$
$C = 2x$ $>$ $6x$ (6 / 2)

$3 = C$

C → 3 unit in 1 day.
6 unit in 2 day

(3) $A = 40$ d
$B = 30$ d $>$ 120 (3 / 4)

$3(10) + 4(10) + C(10) = 120$.

$30 + 40 + C10 = 120$.

$C10 = 50$

10 day $C = 10$

Cap = (1)

10 day → 50 unit
? → 120 unit

? = 24

(4) $A = 3B$ $A = B - 60$

$2B = 60$ $B = 20$

$A = 60$
$B = 20$ $>$ 60 (1 / 3)

$\frac{60}{4}$ (15)

(4) $A = 3B$, $A = B - 60$.

A	B
x	3x
30	90

$2x = 60$
$x = 30$
$3x = 90$

90 / 3 = 1 → 4
? → 90

? = 22½

(5) $A+B = 8$ d
$B+C = 6$ day
$A+C = 12$ d
$A+B+C = ?$
$2(A+B+C)$
$(A+B+C) =$

(6) $A = 8$
$B = 10$
$C = 12$

3 day →
9 days

$9\left(\frac{3}{5}\right)$

(7) P =
Q =

7x
3u

24 unit

13)
x3
399

(8) A =
B =

Check the

(5) A+B = 8 d
B+C = 6 day
A+C = 12 d
A+B+C = ?

2(A+B+C) = 26
(A+B+C) = 13 d.

24 → 3, 4, 2 → 9

1 day → 4.5 unit
? → 24 unit

? = 5 (1/3)

(6) A = 8
B = 10
C = 12

240 → 30, 24, 20 → 74

3 day → 74 × 3
9 day → 222
18 Remain.

9 days + 18/30 × 3

9 (3/5)

120 → 15, 12, 10 → 37
3 d → 37
7 day → 111

(7) P = 8 d.
Q = 6 d.

24 → 3, 4 → 7

7 × 3 → 21
3 unit → R did.

24 unit → 3200 / 24 = 133.33

133.33 × 3
399.99

(8) A+B = 12
B+C = 16

48 → 4, 3

A = 5 d
B = 7 d
C = 13 d

A+2B+C = 7 unit
4 × 5 + 2 × 3 × 7 + C13 = 7 × 48
20 + 42 + C13 = 336
62 + C13 = 336

(8) A+B = 12
B+C = 16

48 → 4, 3

A = 5 } 5
B = 7 } 2
C = 13 } 11

5 × 4 = 48/20 = 28
2 × 3 = -6 = 22

11 d → 22 unit
? → 48 unit

? = 24 d.

(9) 12 M , 9 D.

Chain Rule 6 d , (6+12)

$$\frac{M_1 D_2 T_1}{W_1} = \frac{M_2 \times D_2 + T_2}{W_2}$$

12 × 9 = 108
12 × 6 = -72
36.

1 d → 10 m²
? → 36 m²

? = 2

7/08/18

(10) M = 12 T = 8H D = 18

16M D = 9 T = ?

$12 \times 8 \times 18 = 16 \times 9 \times T$

T = 12 Hr

(11) M = 5 60kg D = 3

kg = ? M = 8 D = 5

$\frac{5 \times 3}{60} = \frac{8 \times 5}{?}$

? = 160 kg.

(12) 24 = M D = 16

8 = WM D = 72.

24 = Ch D = 32

10 M + 15 W + 24 Ch

1 M = 16 x 24

1 W = 72 x 8

1 Ch = 32 x 24

$10M = \frac{16 \times 24}{5} + \frac{72 \times 8}{15} + \frac{32 \times 24}{24} =$

$\Rightarrow \frac{192}{5} + \frac{192}{5} + 32 =$

$\Rightarrow \frac{192 \times 2 + 32 \times 5}{5} = \frac{384 + 160}{5}$

$\Rightarrow \frac{544}{5} \Rightarrow 108\left(\frac{4}{5}\right)$

24M x 16 = 24C x 32 ⇒ 1M = 2C

8W + 72 = 24C + 32 ⇒ 3W = 4C

20C + 20C + 24C = ?

64C → ?

24C → 32

$? = \frac{64 \times 32}{24} \Rightarrow \frac{256}{3} \Rightarrow 85\left(\frac{1}{3}\right)$

(13) 5M + 6B = 40.4D.

4M + 3B = 6D.

3M + 6B = ?

20M + 24B = 24M + 10B.

4M = 6B

3M + 4M = 7M. → ?

9M → 40.

$\frac{36}{7} \Rightarrow 5\left(\frac{1}{7}\right)$

(14) P = (Q + R)

P + Q	R	Q
15	60	?

15P + 15Q = 60R.

15P = 60R − 15Q.

15Q + 15R = 60R − 15Q.

30Q = 45R.

10 2 5

100 = 27R.

$\frac{1}{P} = \frac{1}{Q} + \frac{1}{R}$

$\frac{1}{P} + \frac{1}{Q} = \frac{1}{15}$

$\frac{1}{R} = \frac{1}{60}$

$\frac{1}{15} - \frac{1}{Q} = \frac{1}{Q} + \frac{1}{R}$

$\frac{1}{15} - \frac{1}{R} = \frac{2}{Q}$.

$\frac{1}{15} - \frac{1}{60} = \frac{2}{Q}$

$\frac{4-1}{60} = \frac{2}{Q} = \frac{3}{60} = \frac{2}{Q}$

Q = 40

(21) A B C
6 9 12
36
6 4 3 = 13
1Hr 1Hr 1Hr
6 9 12
13 Hr ⟶ 36
2 Hr ⟶ 26
? = 6 Hr
6 Hr 26
1 Hr ⟶ 6 Hr
1 Hr ⟶ 4
8 ⟶ 36.

(22) A B C
20 30 -60
60 lt
3 2 -1 ⇒ 4
3 min ⟶ 4 lt
4 lt ⟶ 15 mint/lt
? ⟶ 60 mit.
(15) mint
3 mint ⟶ 4 lt.
16 mint.
14 cycle × 3 = (42 mint)
14 " × 4 = 56 lt
42 m ⟶ 56 lt
1 m ⟶ 3
1/2 ⟶ 1
43 1/2 = 58
or
58 - 1
53 - 2
54 3
53 4
53 5
53 6
54 (7) min
60

(23) F_1 F_2 F_3
12 15 20
60 lt
5 4 -3
2 Hr ⟶ 17 lt.
6 Hr ⟶ 51 lt
1 Hr ?
7 Hr 60

(24) A + B + C
(8 Hr)
8 Hr
(A + B + C) + 2 Hr + (A + B)
25% ⟶ 2 Hr
100% ⟶ 8 Hr.
3 75% ⟶ 9
4 100 ⟶ ?
(? = 12)
24 lt
3 (A+B+C) 2 (A+B)
C = 1 ⟶ 24/1 lt
⟶ 24 lt

(25) $f_1 = 4 f_2$
$f_1 = f_2$
1 : 4.
($f_1 + f_2$)
36 Hr.
(5) 5 ⟶ 36.
1 pip ⟶ ?
1 pipe = 180.

Q 1 Monkey can eat 1 coco in 10 mint. How much time is require for 10 Monkey to eat 10 coco.
Ans ⟶ 10 mit.

Q A rat travels 4 mt in 1 mint. in the next mint it sleeps 3 mit. How much time require for a rat to Clime a tree of 20 mt.
1 mint ⟶ 4 mit
1 mit ⟶ -3 m
2 m ⟶ 1 m.
(40) ⟶ gone

1 4 mt ⟶ 1 mint
16 mt
2 mtr ⟶ 1 mt
? ⟶ 16 mt
? = 32 mint
33 mint

Time & Distance

Speed $= \frac{D}{t}$ unit - m/sec, km/hr, mph.

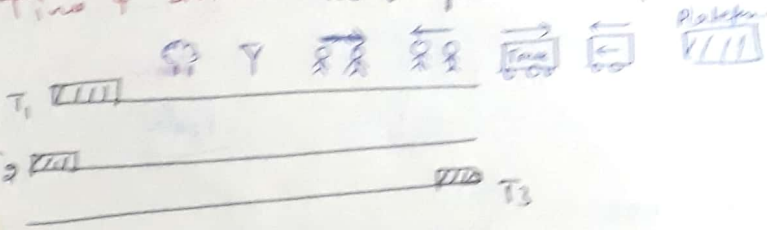
1 km/hr $= 5/18$ m/sec m/sec $= \frac{18}{5}$ km/hr

Avg speed $= \frac{\text{Total distance}}{\text{Total time taken}}$

Relative speed for the same dirn $= |S_1 - S_2|$

" " " opp " $= |S_1 + S_2|$

Time & Distance - Roadways, Railways, water ways.



$\Rightarrow S = d/t$ t_c = crossing time

① $= \frac{L_t}{S_t} = t_c$ (vii) $= \left(\frac{L_t + L_p}{S_t}\right) = t_c$

② $\frac{L_t}{|(S_t - S_{ppr})|_{\text{greater}}} = t_c$ (viii) $\frac{L_{t1} + L_{t2}}{|S_{t1} - S_{t2}|} = (t_c)$

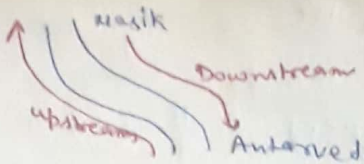
③ $\frac{L_t}{S_t + S_{ppr}} t_c$ (viii) $\left(\frac{L_{t1} + L_{t2}}{S_{t1} + S_{t2}}\right) = t_c$

→ Speed of Man or Boat = = M

→ Speed of stream or current = S

→ Downstream speed = M + S

→ Upstream speed = M − S

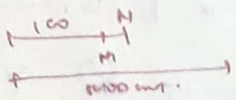


Q In 100 mt Race b/w N & M, M won the race by 10 mt or 5 sec (Loser time), how much time is required for N to cover 1 km.

100 mt → 5 sec.
100 mt → ?

90 mt = 55 sec
100 mt = ?

? = $\frac{55 \times 100}{9}$ ⇒ 6.11 ⇒ 61 sec.



M

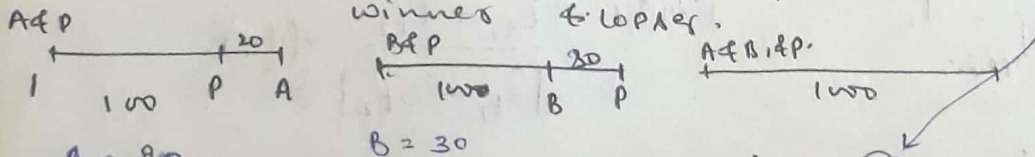
10 mt → 5 sec.
100 mt → ? (50 sec.)

N

45 sec → 100 mt
? → 1000 mt

? = 450 sec

Q In 100 mt Race b/w A & P, A won the race by 20 mt, 100 mt race b/w P & B, P won the compition by 20 mt, In IIIrd compitions b/w A, P & B who will win the race & what in the distance b/w winner & looser.



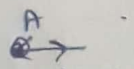
B = 30

A : P (100 : 80) × 10
A : B (100 : 80) × 8

A : P : B = 1000 : 800 : 640 ⇒ 360.

A win 1000 B 640 360

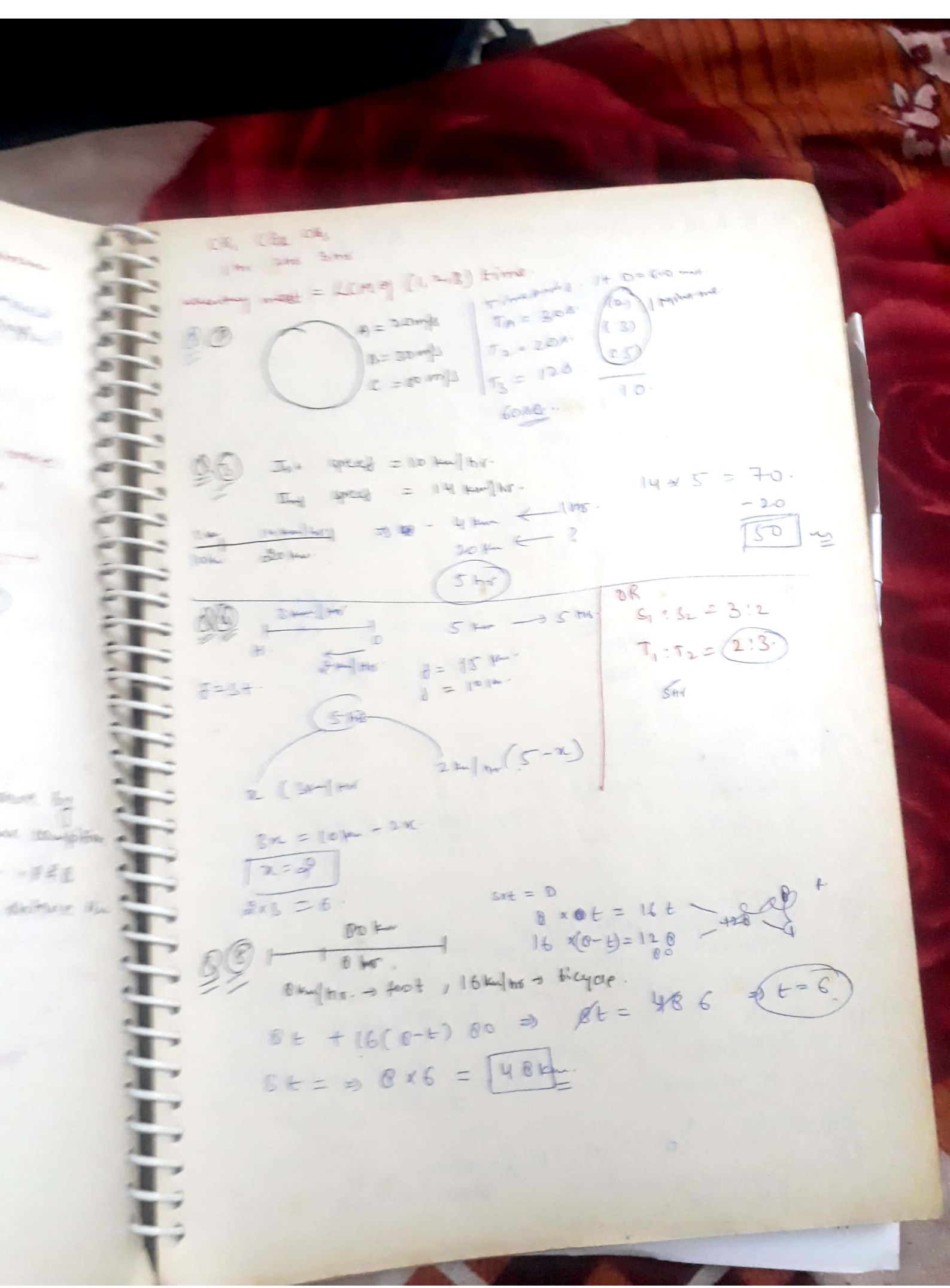
Q1



1 Hr → 6 km
? → 48 km.
? = 8 Hrs.

$\frac{36}{\times 8}$ $\frac{42}{\times 8}$

288 + 336 = 624



10/08/18

Speed of bus without stoppage = 60 kmph
" " " with " = 45 kmph } 15 kmph

what is the stoppage time of bus.

60 min ⟶ 60 km.
? ⟶ 15 km

? = 15 min.

Let without with
45 ⟶ 36
9

60 min ⟶ 45 km.
? ⟶ 9 km

(6) Avg = Total Distance / Total time.

5 : 4

(1st) 50 mt | 40 (2nd) mt

X Y Z

50 mph | 40 mph
1 Hr | 1 Hr

⇒ Total Dist / Total time = (40+50)/(1+1) = 90/2

⇒ 45 mph

(7) 1/3 | 2/3

60 mph | 80 mph.

60 (1st) m ⟶ 120
1 ⟶ 1.5

⇒ 100/2.5 = 72

(8) without 50 mph | with 35

15

60 min ⟶ 15
? ⟶ 15

? = 18 min.

(9) 25 km/hr.
15 min Late.

30 km/hr
5 min early

D. is constant.

20

11:40 11:45 12:40

20/60 hr = d/25 − d/30

1/3 = d(6 − 5)/150 ⇒ 1/150

d = 50 km.

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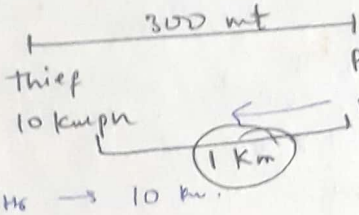
(10) 5 km/hours, 7 mint late; 6 km/Hrs, 5 mint early.

$\frac{1}{7} \leftrightarrow \frac{1}{5} \Rightarrow 12$ mint

$\frac{12}{60} = \frac{d}{5} - \frac{d}{6} \Rightarrow \frac{d}{30} = 6$

Q=11

(11) When police will catch the thief what is distance b/w them after 6 min.



1 hr → 11 km.

$\frac{6}{60}$ hr → ?

$? = \frac{11}{10} \Rightarrow 1.1$ km.

1 Hrs → 10 km.

$\frac{6}{60}$ Hrs → ?

$? = \frac{60}{60} = 1$ Km.

0.1 km = 100 mt

1.3 → 1.7 ⇒ 200

Or OR

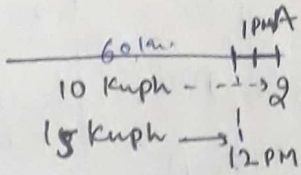
60 min → 1000 mts

6 min → ? (100) → 300 − 100 = 200 mts

? → 300

? = 10

(12)



2 Hr → 5 kmphrs.

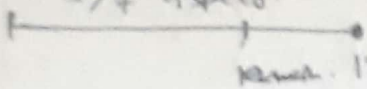
1 Hrs → ?

$2 \text{ Hrs} = \frac{d}{10} - \frac{d}{15} \Rightarrow \frac{d}{30} = 2 \text{ Hrs} \Rightarrow d = 60$ Km

15 Km → 12 PM.

5 Hrs { 8 AM, 1 PM } − 60 (distance) / 5 (time) = 12 kmph

(13)



If speed = x. $D = S \cdot t$

$x \xrightarrow{t} D$

$\frac{5}{7}x \xrightarrow{(t+12)} D$

$D = xt = \frac{5}{7} \times (t + \frac{12}{60})$

$t = \frac{5}{7}t + \frac{12}{5}$

$\frac{2}{7}t = \frac{12}{5} \Rightarrow t = \frac{7}{10} \Rightarrow \frac{7}{10} \times 60 \Rightarrow$ 42 min

$t = 42$

$\frac{5}{7}$ → 12 min late

2 → 12

5 → ?30 — usual

7 → ?42 — today.

$\frac{7}{5}$ → 12 min early

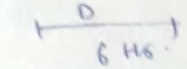
2 → 12

7 → 42 — usual

5 → 30 → today.

$\frac{N}{D} = \frac{\text{usual}}{\text{Today}}$

(14)



$w + R = 6$

$R + R = 4$

$w + w =$ (8)

(15)

$S = d/t$

$t = d/s$

Time to cross each other in opp. dirn

$= \left(\frac{L_{t_1} + L_{t_2}}{S_{t_1} + S_{t_2}}\right)$

$L_{t_1} = 180$

$L_{t_2} = 150$

$S_{t_1} = 15 m/s$

S_{t_2} 15 m/s

$\frac{180+120}{20}$

$\Rightarrow \frac{300}{20} = 15$

15 sec — 15 mt

10 sec → 15(?)

$\frac{330}{30} \Rightarrow$ 11

(16)

(17)

(16) $L_{t_1} = 150$ mt $P_t = 200$ $t_1 = 7$ sec $S_{t_1} = \frac{350}{7} = 50$

L_{t_2} = bridge = 550 mt → Time = ?

$\Rightarrow \frac{550 + 150}{50} \Rightarrow \frac{14}{700}$

Bir

350 mt → 7 sec

700 mt → ? (14) ∴

$\Rightarrow$ 14 sec

(17) $L_{t_1} = 130$ $S_{t_1} = 45$ km/hr. $\frac{130 + \text{Bridge}}{45} = 30$

Bridge = ? $T = 30$ sec.

$130 + \text{Bridge} = \frac{1350}{10}$

$S = d/t$

$t = d/s$

$27 = \left(\frac{L_t}{40}\right) \times \frac{18}{5}$

$t_t = 300$ ∴

Bri = 1350 − 130

Q If a person ↑es his usual speed by 15 km/hr, he reaches his destination one hr earlier than usual time. If he ↓es his speed by 10 km/hr, he will be late by one hr. The distance travel by him —?

$S = Dt$

S	t	s	t
S+15	(t−1)	(S−10)	(t+1)

~~$D = S(t) = (S+15)(t-1) = (S-10)(t+1)$~~

$S(S+15) = \frac{D(15)}{1}$ ① $S(S-10) = \frac{D(10)}{1}$ ②

①/②

$\frac{S+15}{S-10} = \frac{15}{10} \Rightarrow 2S + 30 = 3S - 30$

$D = 300$ km

Q Aman when he increases his speed from 24 km/hr to 30 km/hr he takes 1 hr less than the usual time to cover a certain distance. What is distance usually covered by a man

M1

$S = D/T$

$S = 24$ km/hr, $T_1 = D/24$ (usual time)

$S = 30$ km/hr, $T_2 = D/30$ (speed up)

$T_1 - T_2 = 1 \Rightarrow D = 120$ km

M2

D	t
S = 24	t
S = 30 km/hr	t − 1
$D = S \times t$	$D = S(t-1)$
$D = 24t$	$D = 30(t-1)$

$24t = 30(t-1) \Rightarrow t = 5$ hr

$D = 24 \times 5 = 120$ km

M3 $S = D/T$

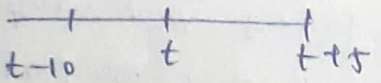
If two different speed.

$$S_1 \times S_2 = \frac{D|S_1 - S_2|}{|T_1 - T_2|}$$

If two different time.

$$t_1 \times t_2 = \frac{D(t_1 \sim t_2)}{(S_1 \sim S_2)}$$

Q You arrive at your school 5 min late if you walk with speed of 4 km/hr, but you arrive 10 min before the scheduled time if you walk with of 5 km/hr. Distance b/w house & school.

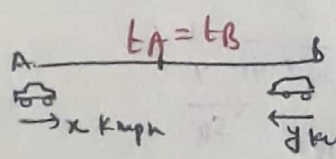


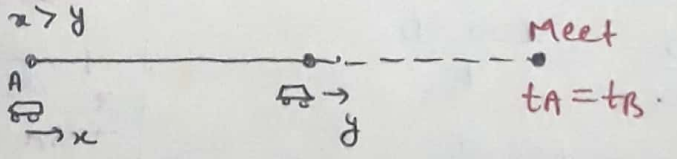
$t = 15$

$4 \times t = \frac{D}{15/60} \Rightarrow 5$ km.

Meeting Point.

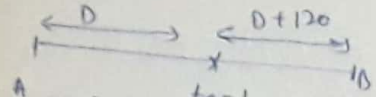
time take by both body at meeting point always equal. if initial time is same.





If initial time is not same, make same.

Q Two trains start from A & B & travel towards each other at speeds of 50 km/hr & 60 km/hr resp. At the time of their meeting, second train has travelled 120 km more than 1st. The distance b/w A & B.

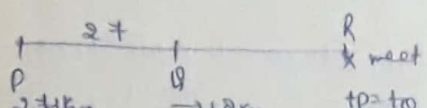


$\frac{D}{50} = \frac{D+120}{60}$ · D = 600 km

A → 50 kmph $t_A = t_B$ ← 60 kmph.

(A + B) = D + D + 120 = 1320 km

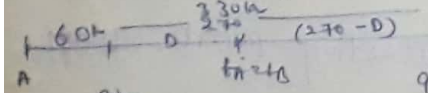
Q P & Q r 27 km Away. Two trains with speed of 24 kmph & 18 kmph resp starts simultaneously from P & Q & travel in same dirn. The meet at R beyond Q find QR is –



$t_P = t_Q$

$\frac{D+27}{24} = \frac{D}{18}$ D = 81 km

Q The distance b/w A & B is 330 km. A start at 8:00 Am towards B at 60 km/hr. Another start at 9:00 Am towards A at 75 kmph. At what time they meet

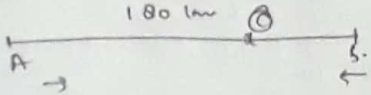


$\frac{D}{60} = \frac{270-D}{75}$

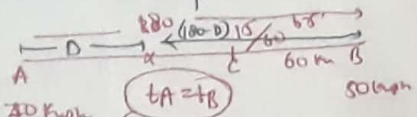
D = 120 km

time = $\frac{120}{60}$ = 2 hrs. 11:00 Am

Q A = 70 kmph. at 11:00 Am



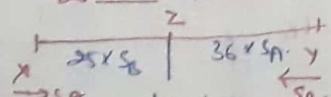
B = 50 kmph. but stop at C for 15 min. C is 60 km away from B. Find meeting pt.



$t_A = t_B$

$t_A = \left(t_B + \frac{1}{4}\right)$

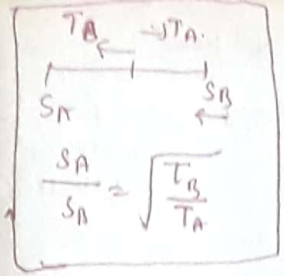
Q A & B start a from opp ends x & y towards Y & X resp They meet one way at pt Z & if A & B take 36 & 25 hr resp after meeting to each other to reach their ends. Find ratio of B speed of A & B.



$\frac{S_A}{S_B} = \frac{25}{36}$

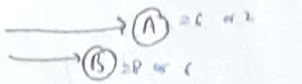
$\frac{25 \times S_B}{S_A} = \frac{36 \times S_A}{S_B}$

$\left(\frac{S_A}{S_B} = \frac{5}{6}\right)$



Concept of Relative speed & Crossing time

Case I When moved in same dirn

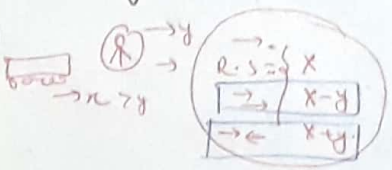


Relative speed = |A − B|

Case 2 when moving in opp / reverse dirn

Relative speed = |A + B|

Crossing time :- $(T = \frac{D}{S})$ t_c = Sum of lengths of two obj / Relative speed

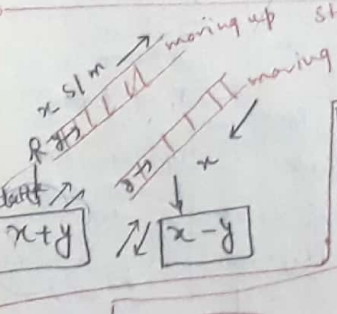


Km → m/s

x km/s ⇒ $x \frac{5}{18}$ m/s

x m/s = $x \frac{18}{5}$ km/hr

ESCALATOR Concept



x = speed of boat
y = speed of water

Upstream (In the opp dirn of water) (x + y) kmph

Downstream (In the dirn of water (y)) (x + y) kmph

Race

S = D/t

S ∝ D — Ist Result — In terms of distance

S ∝ $\frac{1}{T}$ — IInd Result — In terms of time

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Q In a Race of 200 m, B can give a start of 10m to A & C can give start of 20m to B. The start that C give to A, in the race?

B — A — 190m →

$S \propto D$

$\frac{S_B}{S_A} = \frac{200}{190}$

$\frac{S_C}{S_B} = \frac{200}{180}$

$\frac{S_C}{S_A} = \frac{200 \times 200}{180 \times 190} \Rightarrow \frac{200 (D_C)}{171 (D_A)}$

(29) S_C — A → 171 — ⇒ (29m)

Q (18) $\frac{130 + Bridge}{45 \times \frac{5}{18}} = 30$

$130 + B = 1350 \times \frac{5}{18}$

B = 1220 mt.

$375 = 130 + ?$

? = 245 mt.

(19) $\frac{240}{S_{t1}} = 24$ sec. $S_{t1} = 10$ m/s

⇒ $\frac{240 + 650}{10} = ?$

$\frac{890}{10}$ ⇒ ? ⇒ 89 sec

(20) $\frac{4 + 5}{S_{t1} + S_{t2}} = 6 = \frac{4}{S_{t1}}$

$S_{t1} = \frac{84x}{6}$

$S_{t2} = \left(\frac{5}{6}x\right)$

$\frac{9x \times 6}{\frac{4x}{6} + \frac{5x}{6}} = (6 = t_c)$

(21) $\frac{270 + l_{t2}}{(120 + 80)\frac{5}{18}} = 9$

$270 + l_{t1} = \frac{500 \times 5}{18} \Rightarrow 500 - 270$

$l_{t1} = 230$ mt

(22) $l_{t1} = 100$, $l_{t2} = 100$.

faster train 60 sec.

$\frac{200}{60}$ mt $\left(\frac{20}{6}\right)$ speed-faster

$\frac{20}{6}$ → 60 sec.?

? → 10

$? = \frac{20 \times 18}{6 \times 10}$ (2 km/h)

$t_c = \frac{D}{(S_R)}$

Q (22) $S_f + S_s = \frac{200}{10} \times \frac{18}{5}$

$S_f + S_s = 72$

$S_f - S_s = \frac{200}{60} \times \frac{18}{5}$

$S_f - S_c \Rightarrow 12$

$2S_c \Rightarrow 60$

$S_c = 30$ km/h.

(23) $\frac{12}{2 + S_B} = \frac{48}{60}$

48 min → 12 km

60 min → ? (15)

m + s = 15

(m = 13)

$\frac{12 \times 60}{48} = 2 + S_B$

$S_B = 13$ kmph.

(24) $\frac{15 \cdot 3}{3 - m} = \frac{50}{60}x$

$18 = 30 - 810$ m.

m = 15

$\frac{D}{18} = 3 \Rightarrow$ 54 km

100 sec. speed 1 m/s → 60

? → 96

$? = \frac{9}{6} \Rightarrow \frac{3}{2} \times \frac{18}{5}$

⇒ (5.4)

$\frac{D}{26} = \frac{24}{60}$ or 60 min → 26 km
24 min → ? (10.4) ≃

$D = \frac{24 \times 26}{60}$ ⇒ 10.4 km

(26) $\frac{7.5 \text{ km}}{1 \text{ kmph}}$ = (7.5 hr)

m + s = 3
m − s = 2
2m = 5
m = 2.5

1 hr → 2.5
? → 7.5
? = 3 hrs

(24) m − s
50 min → 15 km
60 min → ? (18)

m − s = 18
m = 18 + 3 = 21
m + s = 21 + 3 = 24
1 hr → 24
3 hrs → ?
? = 72

(27) m − s = 4.5 − s = 1
s = (D/t)
1.5 + s = ...
1 hr → 1.5 kmph
3 hrs → 4.5
$\frac{6}{4}$ (1.5 + 1.5 = 3)
(1.5)
2x

(27) m = 4.5
s = 1.5

m + s = 6
m − s = 3 } (6) LCM

$\frac{\text{Total distance}}{\text{Total time}} = \frac{6+6}{1+2} = \frac{12}{3}$ (4)

(25) t = ... + ...
(s + m) = s = 3 km/h
(s − m) =
$\frac{x}{s+m} = \frac{(x - 3/2)}{s-m}$ ⇒ $\frac{d}{m-3} = \frac{3/2\, d}{(m+3)}$

3m − 9 = 2m + 6
m = 15 km/hr

m + s
45 km → 3 km
? → 1 hr
(15 km) (s = 3)
m + s = 45 km
m − s = 12 − 3 = 9
1 hr = 9
= 45

(29) m = 14 s = 2
1920 = $\frac{t}{16} + \frac{t}{12}$

$\frac{1920 \times 16 \times 12}{28}$ t.y $\frac{960}{16} + \frac{960}{12}$
⇒ 60 + 80 = 140

(30) m = 12 kmph
$(m+s) = \frac{45}{3} = 15$ (? = 5)
(m − s) =

Ages

4 yrs → (2)
26 →

"Age difference is always constant"

M P
4 2
26 ? [26/2 = 13] (24) (+) future (after or hence) later = m + 5
present = m
(−) Past (before or Ago) = m − 5

Partnership

→ profit Ratio = Ratio of investment

As per the ratio of "total Investment" divide profit or Loss to the investors in the business

① 6 yrs hence a father age will be three times his son's age. & three yrs ago father was nine times as old as his son. What is the present age of father.

3 ago. — Present — hence +6

f : s | f : s | f : s
x − 3 : y − 3 | x : y | x + 6 : y + 6

f = 3 × s
x + 6 = 3(y + 6)
x − 3y = 18 − 6
x − 3y = 12 —①

(x − 3) = 9(y − 3)
x − 9y = −24 —②

from ① & ②
6y = 36
y = 6 x = 30

6, 12
(4 × 3) × 6
12 : 20 : 35

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(15) 28 : 2:1 $m = 30$ $s = 5$ $30 + x : 5 + x = 2:1$

$x = 20$

$30 + x = 50$

? OR

(M) (3)

2 : 1

1 → 25

2 → ? (50)

(16) M : D

3 : 1   4 → 56, 14

1 → ? (14)

$x : y$ $(x+4) : (y+4)$

$x + y = 56$ $(x+4) = 3(y+4)$

$x - 3y = 8$

$x + y = 56$

$-4y = -48$

$y = 12$

(18) Avg age = 25

$x : y$ $(x+5) : (y+5) : 3$

$\frac{x+y}{2} = 25$

$x + y = 50$

$x + y + 10 = 50$

$x + y = 40$

$25 \times 2 = 50$

+4

+4

+2

60

$\frac{60}{3} \Rightarrow 20$

(17) F S

S 0

25 S   5

$2s = 46$

$S = 23$

$23 - 5 = 18$

(19) $2x + 4 : 5x + 4 :: 5 : 11 \Rightarrow 11(2x + 4) = (5x + 4)5$

$22x + 44 = 25x + 20 \Rightarrow 3x = 24$

$x = 8$ $5x = 40$, $5x - 5 = 35$

(20) 10

$x + 6 : y + 6$ $x : y$

5 : 6

$6x + 36 = 5y + 30$

$6x - 5y = -6$

$x + 4 : y + 4 :: 10 : 11$

$11x + 44 = 10y + 40$

$11x - 10y = -4$

$12x - 10y = -12$

$-x = -8$

$5x + 10 : 6x + 10 :: 10 : 11$

$55x + 110 = 60x + 100$

$5x = 10$

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

$6x + 6 = 15 + 6 = 21$

Six years ago = 5 : 6

Present age   8

Four years ago = 10 : 11

$5x + 10 : 6x + 10 :: 10 : 11$

$x = 2$

$6x = 12$

$6x + 6 = 18$

(21) avg = $\frac{Sum}{Total}$

200 runs 15th inning

avg 14th → $(x + 10)$ avg @ every 15th ?

$\frac{Sum}{14} = x$

Sum = $(14x + 10) = 200$

15th → 200

if avg incr by x then

up to 14 incr by x then x + 14

14 + 10

140

200

−140

60

(20) $(x+12) : (y+12)$ x : y

$\frac{x+y+24}{2} = 20$

$\frac{x+y+c+c}{4} = 20$

$x + y = 28$

$x + y + c + c = 40$

$c + c = 16$

$x + y = 16$

$x - y = 2$

$2y = 14$ 7

(23) 15 days → Rs 90/day.

7th day → 87/day.

7th day → 92 Rs/day.

8th day →

$15 \times 90 = 1350$ 1350

$7 \times 87 = 609$ 1253

$7 \times 92 = 644$

97

SC   90 Rs $7 \times (-3) = -21$

$7 \times (+2) = +14$

−7

on 8th day → 90 + 7 = 97

(24) $8 \times 2 = 16$

50

166

(25) $9 \times 36 = 324$ $15 \times 48 = 720$

$5A + 4M = 36$

$7A + 8M = 48$

$2(12A + 12M = 84 \times 2$

$24A + 24M = 168$

(26) $145 \times 12 = 1740 + 145 =$

$x = 12$ Sum + 5 = 1885

1885

145

−65

80

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(8)

$\frac{1}{3} : \frac{2}{3}$ $\frac{1}{4} : \frac{3}{4}$

→ 7 : 17

Ans (12) capacity

	A	B	
	12	12	
m.	4	3	= 7
w	8	9	= 17

(7) A → B : C = 2 : 3
B → B : C = 4 : 5
6 : 8
A : B = 3 : 4
(3 : 5) Ans

→ always MH 12 times faster than HH.

→ 12 MH > HR
→ 60 SH > MH
→ 720 SH > HR

HH → (12) MH → (60) SH; HH ← (720) SH

Loss or gain →

1 hr of time spent

MH	HH
360	30

4/g 330°

MH	HH
60	5

L/g 55

1 mint of time spent

MH	HH
6°	(1/2)°

(5(1/2)°)

(330° or 55°) 4/g MH > HH → in 1 hr.

5(1/2)° MH > HH → in 1 min

Reasoning Clock

1> 9:05, 5:00, 6:00, 8:30, 9:45 find θ

2> How many times HH & MH will coincide (0°, 30°, 60°, 90°, 180°)

3> At what time HH & MH (0°, 30°, 60°, 90°, 180°)

4> Mirror image of 7:20, 7:15, 7:00, 8:30

5> If HH & MH will coincide for 64 min, what is gain of clock per day

6> " " " " 66 min " " loss.

7> My 9:20 — 10:25, Sis 9:21 — 10:24 } at what time time in the watch is same.

8> 2006 → 2L → -ve, 2010 → 9BL → +ve } at what time I have zero money.

Unit → minute or space. (ms → min space)

① + ⑤

$$\theta = \left|\frac{11}{2}M - 30H\right|$$

5 mint = 30°
1 min space = 6°
Total min. space = 60

→ 60 mint space = 360° ⇒
Total Angle = 360

→ How fast MH from H.H.

HH	MH
12 Hr → 360°	1 Hr / 60 min → 360°
1 Hr / 60 min → 30°	1 min → 6°
1 min → 1/2°	

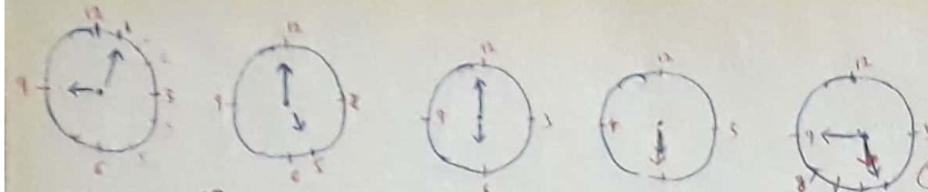
L/4 1 Min → $5\left(\frac{1}{2}\right)$ [6 − 1/2°]

6° : 1/2°

HH	MH
12 Hr → 60 MS	1 Hr → 60 MS
1 Hr → 5 MS	

4/g 1 Hr → 55 MS (60−5)

MH : HH
60 : 5
12 : 1



120
$-2\frac{1}{2}$
$117\frac{1}{2}$

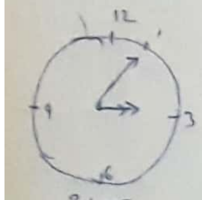
$4 \times 30 = 120$
(1m → $\frac{1}{2}$°)
(5m → $2\frac{1}{2}$)
150

180

0
+15
15

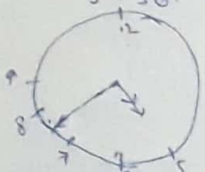
$4:10$
$\frac{45}{2}$
120
$-22\frac{1}{2}$
$97\frac{1}{2}$

For Reflex angle = 360° − (Angle)



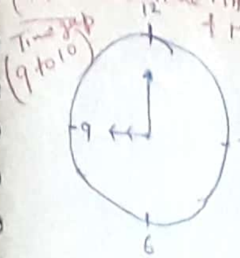
3:05

MH 60
$+2\frac{1}{2}$
$62\frac{1}{2}$



5:38.

MH = 78.
H.H −19

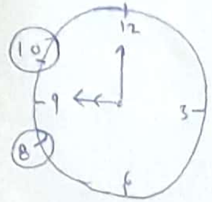


Time gap (9 to 10)

Relatively → HH coincide at at 0° angle −

60 min → 55 ms
? → 45 ms

$? = \frac{60 \times 45}{55} = \frac{540}{11} = 49\left(\frac{1}{11}\right)$ m



30° means → 5 ms gap

60M → 55 ms
? → 40 ms

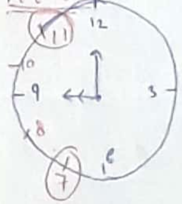
$? = \frac{60 \times 40}{55} \Rightarrow \frac{480}{11} \Rightarrow 43\left(\frac{7}{11}\right)$ minutes

60M → 55 ms
? → 50 ms

$? = \frac{60 \times 50}{55}$

$? = 54\left(\frac{6}{11}\right)$ minutes.

At 60°



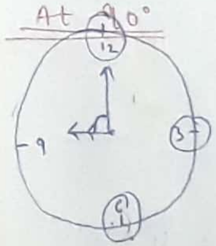
60M → 55 ms
? → 35

$? = \frac{420}{11} = 38\frac{2}{11}$ min

60M → 55 ms
? → 55

? = 60 min

At 90°

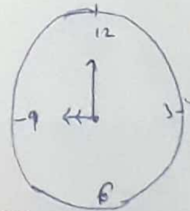


60M → 55 ms
? → 30 ms

$? = \frac{300}{11} \Rightarrow 27\left(\frac{3}{11}\right)$

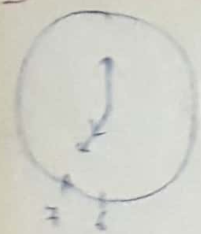
60 → 55 ms
? → 15 ms

$? = \frac{180}{11} \Rightarrow 16\left(\frac{4}{11}\right)$



(1) At what Exact time do the mH & HH of clock
= (1) co-incidence (0°)
(2) Straight line (180°)
(3) Perpendicular (90°)
} each other b/w 7 & 8

Q In b/w 8:00, when they meet at 0°, 30°, 60° & 90°

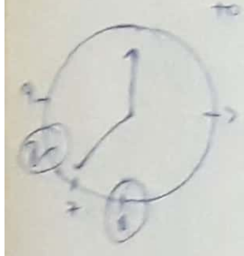


At 0°

$60 \rightarrow 55$

$? \rightarrow 35$

$? = \frac{420}{11} \Rightarrow 38\left(\frac{2}{11}\right)$



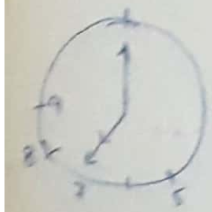
to meet → [(5 min spaces) away]

At 30° → there is 30 MS & 40 MS

$60 \rightarrow 55$ $60 \rightarrow 55$

$? \rightarrow 30$ $? \rightarrow 40$

$? = \frac{360}{11} \Rightarrow 32\frac{8}{11}$ $? = \frac{480}{11} \Rightarrow 43\frac{7}{11}$



At 60° → i.e. (10 MS away) MH & HH

$60 \rightarrow 55$ $60 \rightarrow 55$ MS

$? \rightarrow 25$ $\rightarrow 45$ MS

$? = \frac{300}{11} \Rightarrow 27\left(\frac{3}{11}\right)$ $? = \frac{540}{11} \Rightarrow 49\left(\frac{1}{11}\right)$

At 90°.

$60 \rightarrow 55$ $60 \rightarrow 55$

$? \rightarrow 20$ $\rightarrow 50$

$? = \frac{240}{11} \Rightarrow 21\frac{9}{11}$ $? = \frac{600}{11} \Rightarrow 54\frac{6}{11}$

At 180°

$60 \rightarrow 55$

$? \rightarrow 5$

$? = \frac{60}{11} \Rightarrow \boxed{5\left(\frac{5}{11}\right)}$

Q How many time HH & MH will coincide at 0°, 10, 60, 90, 180

	0° & 180°	any angle
in 1Hr →	1 time	2 time
12Hr →	11 times	22 time
24Hr →	22 time	44 time

[b/w 11 to 1 they coincide only at 1 time]

Q Mirror image = Give time

- 11:60

Q

11:60 (Stand)	11:60	11:60	11:60
- 7:20 given	- 7:15	- 7:00	- 6:30
4:40	4:45	4:60	5:30

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for Every 60 ms → it will cover $65\frac{5}{11}$ mint

(A) 60 m → 55 ms
? → 60 ms
? = $65\left(\frac{5}{11}\right)$ mint.

for 64 min → $1\frac{5}{11}$ (gain)
64 → $\frac{16}{11}$
Rating 24 * 60 → ?
⇒ $\frac{16 \times 24 \times 60}{11 \times 64}$ = $\frac{360}{11}$

66 min → $\frac{6}{11}$
24 * 60 → ?

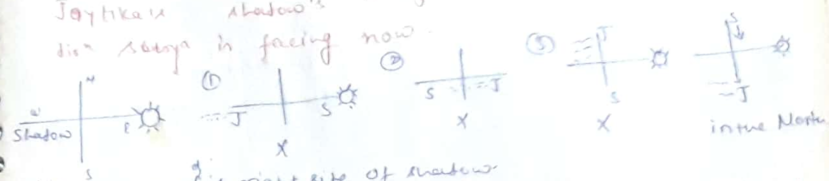
wrong time (incorrect) 9 : 20 (+1) 9 : 21
correct wt 10 : 25 10 : 21
60 min → 5
? → 1 ⇒

10 : 56]2min 12 : 00]2min (4 min)
10 : 58 11 : 58 (1 hr, 60 min)
60 mint → 4 mint
? → 2
? = 30

2006 2018 ← 12 → 98 LA − 2 LA
$12\frac{1}{2}$ yr → 100
? → 2
⇒ $(1/4)$ yrs

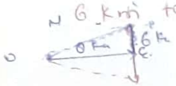
> Always takes correct time as Reference.

Q Jaytika & Surya came at parallel to drink tea. they r facing opposite to each other. Surya In which dirn Jaytika's shadow's is right side of Surya. Surya is facing now



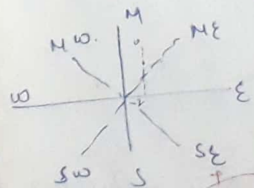
'OR which dirn is right side of shadow.

Rajni Travel's 8 km straight & Turn right & travel
N 6 km to meet Mahesh.
$\sqrt{64 + 36} \Rightarrow$ 10



Q(1) what is the shortest dis. b/w starting pt & ending pt (10 km)
(2) what is the total distance covered by Rajni (14 km)
(3) In which dirn Rajni is traveling finally (W)
(4) w.r.t starting pt. where will be the ending pt. N E
(5) w.r.t. ending pt where is starting pt. (S W)

→ Default dirn should be North.
→ " Angle " " 90°



	R	L
N	E	W
E	S	W
W	N	S
S	W	E

N E
8 6
(1) $\sqrt{8^2 + 6^2}$
(2) 14
(3) E.
(4) N.E
(5) S W.

Q S E N W N
4 2 8 2 6.
(1) $\sqrt{\ldots}$ = $\sqrt{\ldots}$ 10 → 10 N
(2) 22
(3) N
(4) N
(5) S

Q N E W S N
8 6 4 6 2

N	E
4	9

(1) $\sqrt{16+4} = \sqrt{20}$
(2) 26
(3) SN → without simplification
(4) NE within
(5) SW.

Q N_4 E_4 S_4 W_4
(1) 0 M_0 N_0 W_0
(2) 16
(3) W
(4) $SP = EP$ Same point (for week day)
(5) $EP = SP$ (E.)

Mirror Image / water Image

> ANAMIKA MAHESHWARI

> MOMOS > VIOCE2AS > ~~[illegible]~~

> NORWAY

Mirror Image → symmetric abt vertical axis.

A B C D E F G H I J K L M N O P Q
A B Ↄ D Ǝ ꟻ G H I T ꟻ J M N O P Q

R S T U V W X Y Z
Я S T U V W X Y Z

water Image → symmetric abt horizontal axis.

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
∀ B C D E F G H I J K Г W N O b Q Ƙ S ⊥ ∩ Λ M X ⅄ Z

16/Aug/18

1) Find day ?
16.08.2018, 17.03.1996, 30.07.1996 → without reference

2) If 16/08/2018 is Thursday then what day of 26.08.2018, 13.09.2018, 31.12.2018, 14.02.2019 with Reference

3) which year start (or same as) when are same calendar or day.
2017, 2018, 2019, 2020.

4) Sunday, October 1996 then w
Tue. Nov. 2018

5) March 1st which month is starts with same day.

6) Last day of century, 1st day of century

Leap Year

1796 leap year.
(1800) × not a leap year bcz Every century year is not leap yr. (If it is divided by 400 then it is leap yr)
1804 ✓
why
365 1/4 → 5 hrs 48 min. 27 sec.
1/4
1/4
1/4
365 1/4 = 366 days

100 ×, 200 ×, 300 ×, 400 ✓
500 ×, 600 ×, 700 ×, 800 ✓

1 Normal Year :- 365 day → 52 week + 1 odd day.
1 Leap Year :- 366 days - 52 weeks + 2 odd day

Odd day	
0	Sun
1	Mon
2	Tue
3	Wed
4	Thus
5	Fri
6	Sat

Month	Days	(odd day)
Jan	31	(3)
Feb	28/29	(0/1)
Mar	31	(3)
April	30	(2)
May	31	(3)
Jun	30	(2)
July	31	(3)
Aug	31	(3)
Sept	30	(2)
Oct	31	(3)
Nov	30	(2)
Dec	31	(3)

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Q4) Sun, oct 1996 (LY)

oct 01 · 10 · 1996

1995, 09

Y = 119
M : 22
D = 01

142 / 7 → [2] Tuesday

5/10/1996 → Sunday

01 → Tuesday
2
3
4
5
6 → Sunday (6+7) = 13
(13+7) = 20
(20+7) = 27

Tue, Nov 2018

2017* oct*

Y : 21
M : 25
D = 01

47 / 7 = [5] Thursday
2 F
3 S
4 Sun
5 Mon
6 Tue
13
20
27

Thursday, March 1990

1997
1600 300* 97
(0) (1) LY 24 / 48, 73 / 73

Y : 122
M :

01 - Sund
2 M
3 T
4 wed
5 - Thu
12
19
26

Q what is the max gap b/w two successive LY.
Max(4, 8) → [8]

Paternal, Maternal, In-Law

I - Grand Father, Grand Mother,
II - Father, Mother, Aunty, uncle, Father inlaw, Mother inlaw
III I(me), Sis, bro, [cousin], brother inlaw, sis inlaw, wife, husband
IV Son daughter [nephew (S)], [niece (D)], son-in-law, Daughter inlaw
V Grand son, Grand D.

9_{20} Area, Perim | 3D · vol · T.S.A, L.S.A.

Q Table

Square 2 – 30

Cube · 1 → 20.

0 → 0
1 → 1
2 → 2, 4, 8, 6
3 → 3, 9, 7, 1
4 → 4, 6
5 → 5,
6, 6,
7 →

Find out unit digit of –

$(1318)^{20} \to 6$ $(105212)^{17}$ 2 $(718)^{219}$ 2 $(2031)^{6}$, 1 $(111015)^{13}$ 5

$(16)^{1420}$ 6 $(9)^{377}$ 9 $(91624)^{11}$ 4

power/4 = reminder

Reminder
$\frac{4}{0}$ → 6 (even)
→ 1 (odd) or 5 as it is

1 → last digit

2 → (last digit)^2

3 → (last digit)^3

2D	Area	Perimeter
Circle	πr^2	$2\pi r$
Square	x^2	$4x$
Rectangle	xy	$2(x+y)$

3D	Vol.	T.S.A	L.S.A
Cube	a^3	$4a^2$	$6a^2$
Cuboid	lbh	$2h(l+b)$	$2(lb+bh+lh)$
Sphere	$\frac{4}{3}\pi r^3$	$4\pi r^2$	
hemisphere	$\frac{2}{3}\pi r^3$	$3\pi r^2$	$2\pi r^2$
Cylinder	$\pi r^2 h$	$2\pi r(r+h)$	$2\pi rh$
Cone	$\frac{1}{3}\pi r^2 h$	$\pi r(r+l)$	πrl

Seating Arrangement

Default Dir^n = N.

↑ ↑ ↑ ↑ ↑
A B C D E

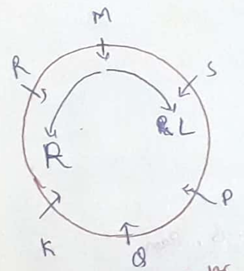
Immediate Right, Right, Extreme left
" Left, Left " Right.

In Restro

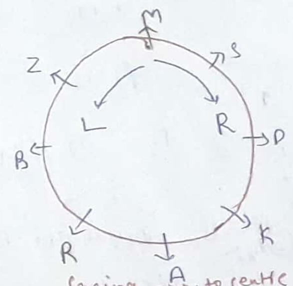
↓ M S P K R

↑ SH V J VaSW

Extreme Right Corner = M, SW
" Left " = R, SW
Diagonal oppo. = SH, R, M, SW.



facing toward center
Clockwise dir^n = Left



facing opp. to centre
CLKwise dir^n = Right.

Q① R S K Kr R G

K > Kr
R > S > K > Kr > R G

~~Hight → S R > S > K > Kr > Ramel > G~~

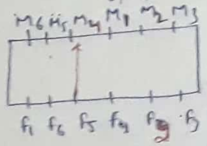
~~weight K > Kr~~

height G Rahul Krishna Kanta Shyam Ram

weight Kanta Sh Rahul Ram Krishna Geeta.

① Geeta ② Kanta ③ Rahul.

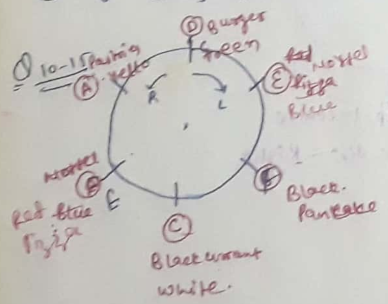
Q 4-7



M4 M1
↓
f4 f2 f3

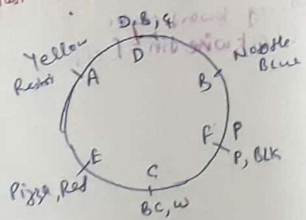
① f6 ② f3 M3, ③ f3 ④ M4

Q 10-15 Pairing



(~~BK~~ ~~E.Y~~) , Pizza M Past, BC, B, Pan

(RB) RB



	BC	Noodles	Burgers	Pizza	Pastri	Pancakes.
Blue	✗	✓	✗	✗	✗	✗
Yellow	✗	✗	✗	✗	✓	✗
White	✓	✗	✗	✗	✗	✓
Black	✗	✗	✗	✗	✗	✗
Green	✗	✗	D	✗	✗	✗
Red	/	✗	✗	✓	✗	✗

Table-

11	12	13	14	15	16	17	18	19
22	24	26	28	30	32	34	36	38
33	36	39	42	45	48	51	54	57
44	48	52	56	60	64	68	72	76
55	60	65	70	75	80	85	90	95
66	72	78	84	90	96	102	108	114
77	84	91	98	105	112	119	126	133
88	96	104	112	120	128	136	144	152
99	108	117	126	135	144	153	162	171
110	120	130	140	150	160	170	180	190

	Name	Previous job.	Surname	P.J ~~Detective~~
①	Hari	sale executive		Doctor.
②		AE	M. Singh	Editor
③	Deepak	A. Editor		
④				Detective
⑤	Hanuman	~~Patnaik~~	Patnaik	

(1)

S/No	Name	Surname	Previous job	Present job
1	Deepak	Singh	RTM	Editor.
2	Ajay	Ojha	AE	Photo.
3	Gautam	Kaine	CE	Detective
4	Harman	Pateik	Advisor.	
5	Hari	Thakur	SE	Doctor.

Deepak/Ajay ✓Advisor ✓PA

✓Gautam d ojha . ✓CE

(2)

	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Deepak							(A)
Sanjay			(A)				
- Komal	(A)						
- Sneha		(A)					
Gautam						(A)	
- Prerna					(A)		
Ajay				(A)			

Probability

Probability → Coins, Dice, Cards, Balls & marbles or socks.

Coins: 1, 2, 3, ⋮, n

Dice: 1, 2

Cards: Pack of 52

↓

coins 1 {H, T} = 2 (0, 1) — 2 — 2^1 → (outcomes) (no. of coins)

coins 2 {HH, HT, TH, TT} = 4 {00, 01, 10, 11} — 4 — 2^2

⋮

coins 3 . . . — 8 — 2^3

16 — 2^4

32 — 2^5

⋮

2^n — 2^n

Dice :-

1 → 6 (outcomes) → 6^1 (1 → No. of Dice; 6 → (outcomes)) → {1, 2, 3, 4, 5, 6}

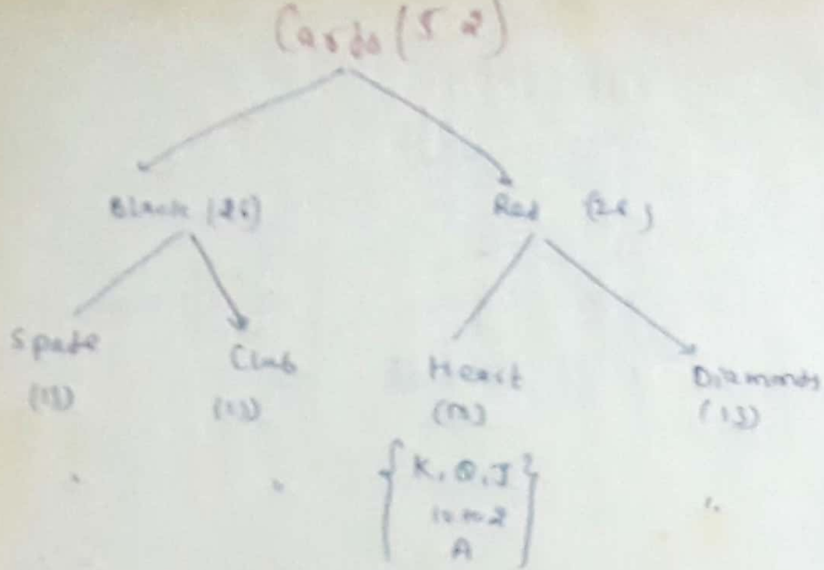
2 → 36 — 6^2 ⟶

{ 11 12 13 14 15 16
21 22 23 24 25 26
31 32 33 34 35 36
41 42 43 44 45 46
51 52 53 54 55 56
61 62 63 64 65 66 }

3 → 216 — 6^3

⋮

n – 6^n — 6^n



Q when a coin is tossed find the prob. of

(1) Getting a head (2) Getting a tail.

($\frac{1}{2}$) → How many favourable o/p / How many outcome on tossing 1 coin. ($\frac{1}{2}$).

Q when 2 coins r tossed find the prob. of

① Getting only 1 Head ② getting at least 1 head.

(00, 01 10 11) $\frac{2}{4} = \frac{1}{2}$ $\frac{3}{4}$

③ Getting 2 head ④ getting at least 2 head.

$\left(\frac{1}{4}\right)$ $\left(\frac{1}{4}\right)$.

Q 3 fair coins r tossed simultaniously

① Getting 1 head $3/8$

② Getting 1 tail → $3/8$

③ Getting at least 1 head $7/8$

④ " " " 2 " $4/8 = 1/2$

⑤ at least 2 head $\frac{4}{8}$

⑥ getting at least 1 head & 1 tail $\frac{6}{8} \to \left(\frac{3}{4}\right)$

⑦ getting more heads than the no of tails $\left(\frac{4}{8}\right)$

{011, 101, 110, 111}

① — 000
② 001
③ 010
011
④ 100
101
110
111

Q One fair coin is tossed successively 3 times find the prob. of

① Getting exactly 1 head or 1 tail. $\left(\frac{3}{8}\right) + \frac{3}{8} = \frac{6}{8} = \frac{3}{4}$

② " No heads $\left(\frac{1}{8}\right)$ $\boxed{\frac{1}{8}}$ $\left(\frac{6}{8}\right) \Rightarrow \boxed{\frac{6}{8}}$

(0,1) (0,1) (0,1)

$\left(\frac{5}{16}\right)$

toss One die 3 time = 3 dice tossed

Q Find the prob. of — when 1 die is rolled —

① Getting a No less than 7 but greater than 0 $\boxed{\frac{6}{6}}$

② Getting a multiple of 3 $\boxed{\frac{2}{6}}$

③ Getting a prime No. $\boxed{\frac{3}{6}}$

④ Getting even No. $\boxed{\frac{3}{6}}$

outcome (1, 2, 3, 4, 5, 6)

Q5 2 dice r Rolled simultaneously find the prob. of

① getting a total of 9 $\left(\frac{4}{36}\right)$

② " " " greater than 9 $6/36$

③ " " " 9 or 11 $\frac{6}{36}$

④ " " doublet $\frac{6}{36}$

⑤ Doublet of even No. $\frac{3}{36}$

⑥ getting a multiple of 2 on one die and getting a multiple of 3 on another die $\frac{11}{36}$

(7) getting sum of No. divisible by 3 or 4 $(20/36)$

(8) " " as prime No. $\frac{15}{36}$

(9) " atleast single 5 $(11/36)$

11	12	13	14	15	16
21	22	23	24	25	26
31	32	33	34	35	36
41	42	43	44	45	46
51	52	53	54	55	56
61	62	63	64	65	66

(2, 3, 5, 7, 11) (10)

(6) [23, 26
32, 34, 36
43, 46,
62, 63, 64, 66]

Q One card is drawn from a pack of 52 cards

(1) Card drawn is black $26/52$

(2) Card drawn is Queen $4/52$

(3) Card " " black & Queen $2/52$

(4) " " " Either black or Queen. $\frac{28}{52}$

(5) " " " " King or Queen $8/52$

(6) " " " " heart or King or Queen $13+3+3$ $\boxed{\frac{19}{52}}$

(6) " " " Neither is spade nor is King. $39-3 \Rightarrow \boxed{\frac{36}{52}}$

(7) " " " " is Ace nor King. $\left(\frac{4}{52}\right)$

Cards (52) → Black (26) → spade (13), Club (13); Red (26) → heart (13), Diamond (13)

K, Q, J, A

$13+3$ $\left(1-\frac{16}{52}\right)$

Q A bag contains 8 Red balls & 4 green balls. Find the prob. that (1) the ball drawn is Red when 1 ball is selected at a Random. $\frac{8}{12}$

(2) All the 4 balls drawn is Red when 4 balls is drawn at a Random.

(3) All the 4 ball drawn is green when 4 balls is drawn at Random.

(4) 2 ball is Red & 1 ball is green when 3 balls is drawn at Random.

(12) → 8 Red, 4 Green

(1) $\frac{^8C_1}{^{12}C_1}$

(2) $\frac{^8C_4}{^{12}C_4}$

(3) $\frac{^4C_4}{^{12}C_4}$

(4) $\frac{^8C_2 * {^4C_1}}{^{12}C_3}$

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

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

If mutually Exclusive.

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

$P(A \cup B \cup C) = P(A) + P(B) + P(C)$

$P(A)$ = Prob. of occurance of an event A.

$P(B)$ = " " " " B

$P(A \cap B)$ = " " " " A and B

$P(A \cup B)$ = " " " " Either A or B or both

$P(A\bar{B})$ = " " " of A & non occurance of event B

$P(A/B)$ = If B is occured, Prob. of occurance of A. (when Event B is already occured)

$P(\bar{A})$ = Prob of non occurrence of event A

$= 1 - P(A)$

$P(\bar{B}) = 1 - P(B)$

Conditional Prob.

1. A die is rolled if the outcome is an odd no. what is the prob that it is a prime no.

2. Two dice are thrown, find the prob that the sum is 8 or greater than 8, if 4 appears on the first die.

3. In a Class 45% student Read Tamil, 30% Read Telgu & 20% read both Tamil & Telgu, One (1) student is selected at random, find the prob that he reads Tamil, if it is known that he reads Telgu.

$P(A/B) = \frac{P(A \cap B)}{P(B)}$ if Cond^n prob of A given B.

If A & B are independent then $P(A \cap B) = P(A) \cdot P(B)$.

$P(A/B) = P(A)$

$P(B/A) = P(B)$

$P(A/B) = \frac{P(A \cap B)}{P(B)}$

$\Rightarrow P(A \cap B) = P(B) P(A/B) = P(A) P(B/A)$

(1)

o/p (B) = {1, 3, 5} $P(B) = (3/6)$

$P(A) = \{2, 3, 5, 1\} = 3/6$

$P(A \cap B) = \{3, 5\} = 2/6$

$P(A/B) = \frac{2/6}{3/6} \Rightarrow \boxed{\frac{2}{3}}$

(2) 2 dice.

(11, 12, 13, 14, 15, 16)
(21, 22, 23, 24, 25, 26)
(31, 32, 33, 34, 35, 36)
(41, 42, 43, 44, 45, 46)
(51, 52, 53, 54, 55, 56)
(61, 62, 63, 64, 65, 66)

$P(A)$ (getting sum >= 8) $= (15/36)$

$P(B) = (4 \text{ appears on 1st dice}) = (41, 42, 43, \textcircled{44}, 45, 46) = 6/36$

$P(A \cap B) = (1/36)$

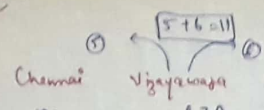
$P(A/B) = \frac{P(A \cap B)}{P(B)} \Rightarrow \frac{1/36}{6/36} = \boxed{\frac{1}{6}}$

(3)

$P(T) = \frac{45}{100}$ $P(Tg) = \frac{30}{100}$ $P(T \cap Tg) = \frac{20}{100}$

$P(T/Tg) = \frac{P(T \cap Tg)}{P(Tg)} = \frac{20}{30} \Rightarrow \boxed{\frac{2}{3}}$

21/08/18



5 + 6 = 11 ⇒ From Vijaya can go to Chennai or Hyd.

Principle of Multiplication - m * n = Dependent (AND)

" " Addition - m + n = Independent (OR)

Letters = 26
Vowel = 5
Consonent = 21

If select 1 vowel and 1 consonent
5 * 21

If select Either Vowel or consonent = (5+21)

P	C
> Arrangement	> Com selection
> $n_{Pr} = \frac{n!}{(n-r)!}$	> $n_{Cr} = \frac{n!}{r!(n-r)!} = \frac{P_r}{r!}$
> order will consider	> order will not be consider.
> Drinking of sambar	> Sambar
> Eating of combo rice	> combo rice.

Q There r 20 buses running b/w Chennai to Tirupati. In how many ways a student can go to Tirupati & Return Chennai in different bus. (Journey depend on both)

⇒ 20 * 19 = 380

MAS ⇄ TPTY

3 * 2
1 * 2
1 * 1 } (6)

3 * 2 = 6.

Q In how many ways can a chairman & vice chairman can be elected from 11 members -

11 * 10 = 110

Q In a placement drive, there r 3 section, ~~three~~, Reasoning, aptitude, electral, containing 10 Q, 5 Q 20 Q. In how many ways a student select ~~to~~ 1 Q from each of the 3 sec

R A E
10 * 5 * 20 = 1000

V.V.S Q A Test paper have 10 Q & each Q have 4 options. If each Q is necessarily attempted find the No. of ways of Answering.

(4)^10

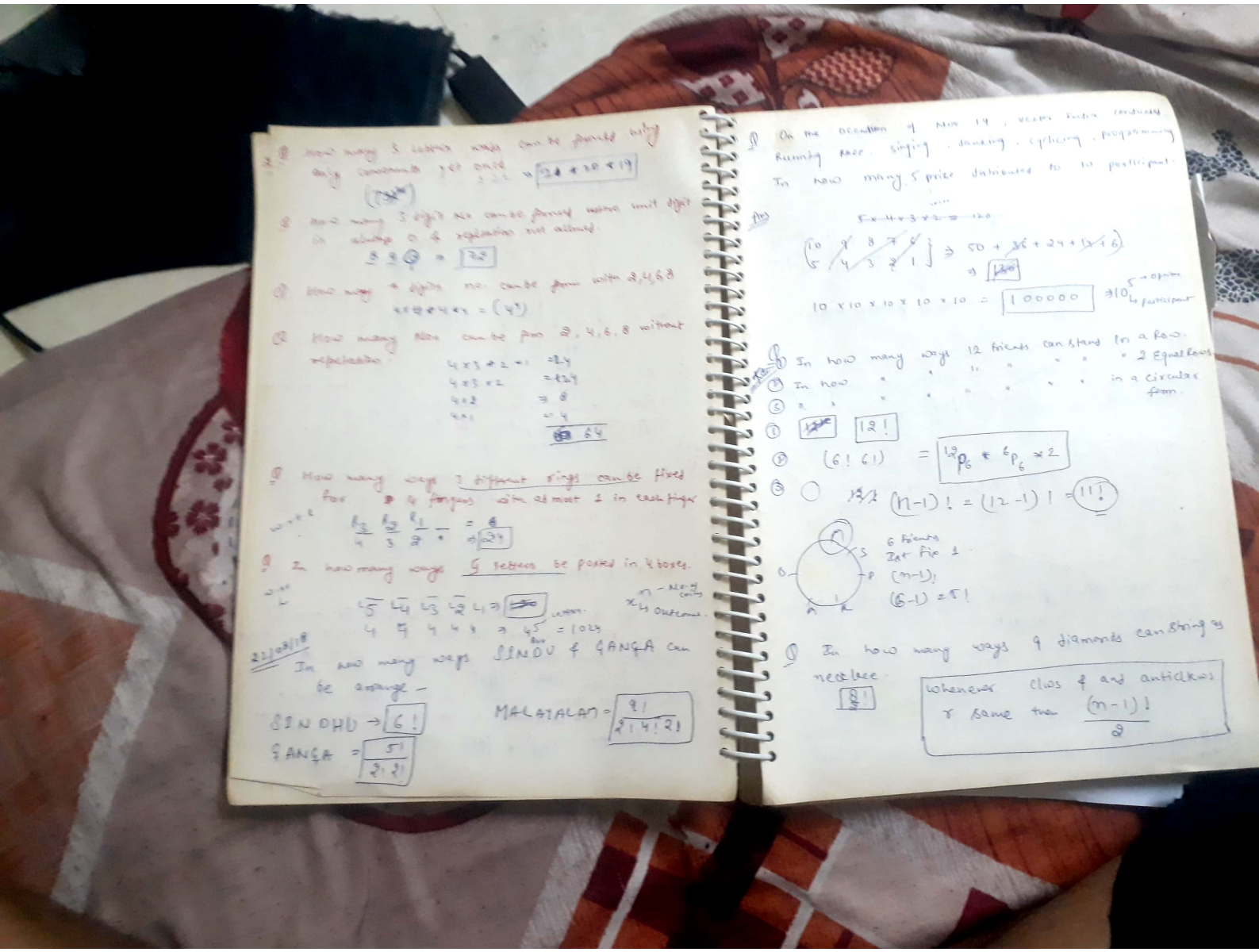
(1) (2)
1 * 4 = 16
4 * 4
1 * 4

4 * 4 * 4 * 4 * 4 * 4 * 4 * 4 * 4 * 4 = 4^10 = 1 * 4

Q A set of 6 Q contain True or false Q's. How how many student can take the test if all the students answer differently from others & must attempt all Q. A

Test Paper (2^6) = (Q)^6

V.V.S Q In the I^st section contain 5 Q with 4 option, Second section have 4 Q with 2 options. In how many ways can the paper be attempted (4)^5 * (2^4)



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1. In how many ways 12 Roses can form a garland.

$(12-1)! = \boxed{11!}$

2. By using 7 point if no one is collinear then how many straight line is possible to make.

Ans To make straight line 2 points required

$^7C_2 = \boxed{21}$

3. How many triangle can be form by using 5 dots.

$^5C_3 = \frac{5 \times 4 \times 3}{3 \times 2} = \boxed{10}$

4. 29 girls have to shakehand with each other, In how many ways they can do this.

$\boxed{^{29}C_2}$

Ans:

5. find the Rank of words 'DOG', 'LION', 'TIGER' 'CHEETA' & 'PANDA'

	Rank
DOG	DGO
GOD	DOG (1)
GOD	GDO
DGO	GOD
~~DOG~~	GOD
OGD	DGO
DOG	

PRIYA

2 2 1 1 0

4! 3! 2! 1! 0!

$48 + 12 + 2 + 1 + 0 = 63$

$63 + 1 = \boxed{64}$

DOG

0 1 0

2! 1! 0!

$0 + 1 + 0 = 1$

$1 + 1 = 2$.

Step① In ~~how~~ write the position according to ~~dictionary~~

2 1 3 → lowest letter will come 1st

CAT

② See how many No. r ten than that No.

No. ten ten → 2 1 3 / 1 0 0

③ write factorial from Right hand side starting from 0

2 1 3

1 0 0

5.x 2! 1! 0!

(1)+ = Ans

Repetation

4 1 3 2 5 3

MAHRSH

$\frac{4}{2!}$ 0 $\frac{1}{2!}$ 0 1 0

5! 4! 3! 2! 1! 0!

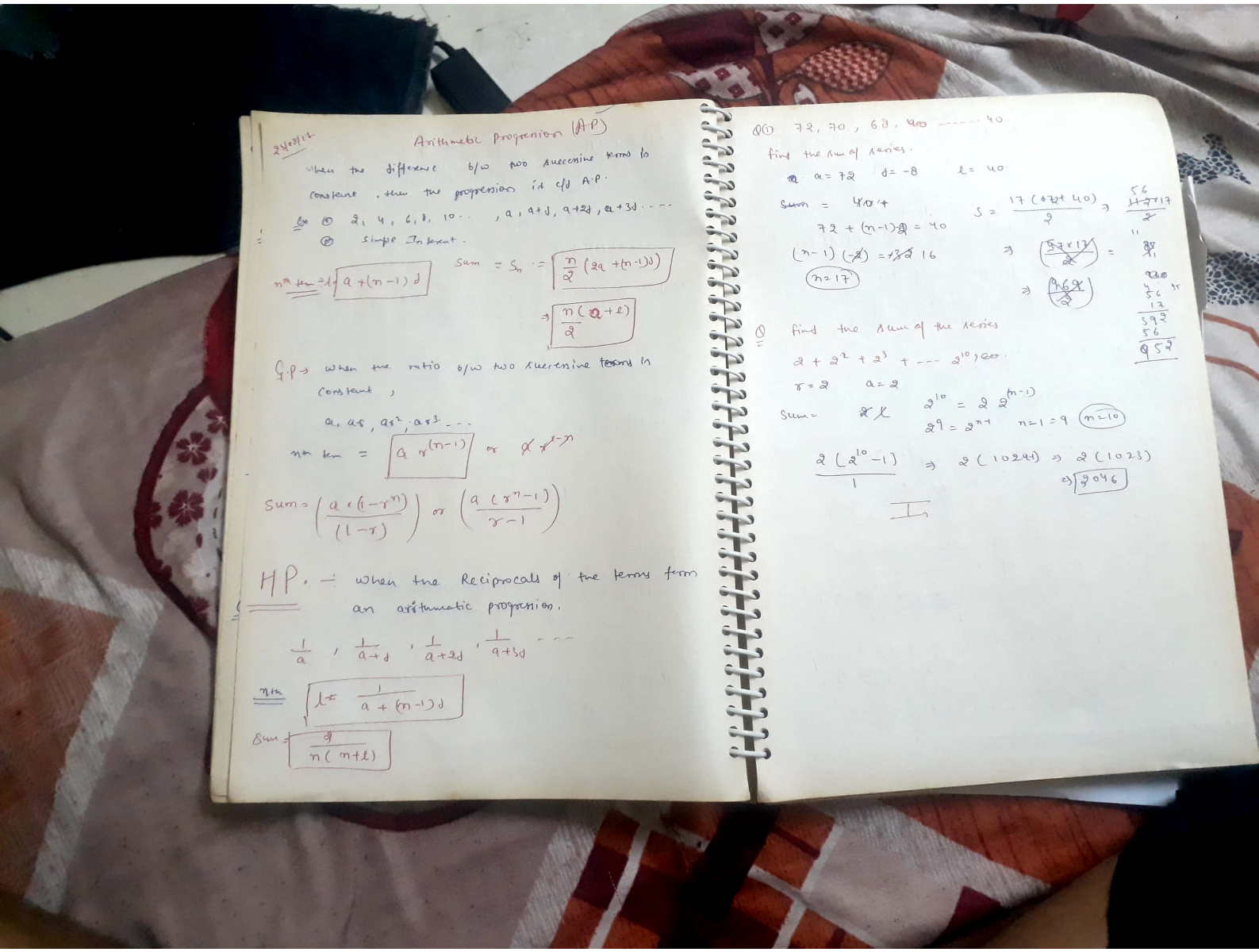
$240 + 0 + 3 + 0 + 1 + 0 = 244$

$\boxed{245}$

4 1 3 2 5 3

MAHRSHA

$\frac{6}{2!2!}$



Arithmetic Progression (A.P)

when the difference b/w two successive terms is constant, then the progression is c/d A.P.

Eg ① 2, 4, 6, 8, 10 ... , a, a+d, a+2d, a+3d ...

② simple Interest.

nth term = $a + (n-1)d$

Sum = $S_n = \frac{n}{2}(2a + (n-1)d)$

$\Rightarrow \frac{n(a+l)}{2}$

G.P → when the ratio b/w two successive terms is constant,

$a, ar, ar^2, ar^3 \dots$

nth term = $ar^{(n-1)}$ or ar^{n-1}

Sum = $\left(\frac{a(1-r^n)}{(1-r)}\right)$ or $\left(\frac{a(r^n-1)}{r-1}\right)$

H.P. → when the Reciprocals of the terms form an arithmetic progression.

$\frac{1}{a}, \frac{1}{a+d}, \frac{1}{a+2d}, \frac{1}{a+3d} \dots$

nth $l = \frac{1}{a + (n-1)d}$

Sum = $\frac{2}{n(n+l)}$

Q① 72, 70, 68, 66 ..... 40.

find the sum of series.

a = 72 d = -8 l = 40

Sum = 4th ?

$72 + (n-1)(-2) = 40$

$(n-1)(-2) = -32$

$n-1 = 16$

$n = 17$

$S = \frac{17(72+40)}{2} \Rightarrow \frac{17 \times 112}{2} = 952$

Q② find the sum of the series

$2 + 2^2 + 2^3 + \dots 2^{10}$?

r = 2 a = 2

Sum = ?

$2^{10} = 2\,2^{(n-1)}$

$2^9 = 2^{n-1}$ $n = 1 = 9$ $(n = 10)$

$\frac{2(2^{10}-1)}{1} \Rightarrow 2(1024) \Rightarrow 2(1023)$

$\Rightarrow 2046$

① Sum of Natural No. =

$1 + 2 + 3 + 4 \cdots n = \boxed{\frac{n(n+1)}{2}}$

② Sum of Square of 'n' natural No.

$1^2 + 2^2 + 3^2 + 4^2 + \cdots n^2 = \boxed{\frac{n(n+1)(2n+1)}{6}}$

③ Sum of Cubes of 'n' natural No.

$1^3 + 2^3 + 3^3 + 4^3 \cdots = \boxed{\left[\frac{n(n+1)}{2}\right]^2}$

④ Sum of first 'n' odd no.

$1 + 3 + 5 + 7 \cdots = \boxed{n^2}$

⑤ Sum of 1st n even no.

$2 + 4 + 6 + 8 \cdots = \boxed{n(n+1)}$

⑥ Sum of Sequare of n odd no.

$1^2 + 3^2 + 5^2 + 7^2 + \cdots = \boxed{\frac{n}{3}(4n^2 - 1)}$

⑦ Sum of square of 'n' even No.

$2^2 + 4^2 + 6^2 + 8^2 + \cdots = \boxed{\frac{2n(n+1)(n+1)}{3}}$

The Sum of the 'n' terms of the following series

(a) $1 + (1+2) + (1+2+3) + \cdots (1+2+3+\cdots n)$

$\Rightarrow \boxed{\frac{1}{6} n(n+1)(n+2)}$

⑥ $1 \cdot 2 + 2 \cdot 3 + 3 \cdot 4 \cdots = \boxed{\frac{n}{3}(n+2)(n+1)}$

⑦ $1 \cdot 2 \cdot 3 + 2 \cdot 3 \cdot 4 + 3 \cdot 4 \cdot 5 = \boxed{\frac{n(n+1)(n+2)(n+3)}{4}}$

Logarithm were develop

difficult & complicated calculation easy.

If 3 No's a, n, n such that

$\boxed{a^x = n}$

then x = Logarithm of the No. n to the base 'a'

$\boxed{x = \log_a n}$

① $\log_a(MN) = \log_a(m) + \log_a(n)$

② $\log_a\left(\frac{M}{N}\right) = \log_a(m) - \log_a(n)$

③ $\log_a(a) = 1$

④ $\log_a m^n = n \log_a m$

⑤ $\log_a(1) = 0$

⑥ $\log_a(m) = \frac{1}{\log_m(a)} = \log_a(m) * \log_m(a) = 1$

(7) $\log_b(n) = \frac{\log_a(n)}{\log_a(b)}$

(8) $\log_a(b) * \log_b(c) * \log_c(a) = 1$

(9) $\log_{a^b}(m)^n = \frac{n}{b}\log_a(m)$

(10) $\log_e(n) = \log_{10}(n) * \log_e(10)$

(1) $\log_2(16) = \log_2(2)^4 = \boxed{4}$

(2) $\log_7\left(\frac{1}{343}\right) \Rightarrow \log_7\frac{1}{(7^3)} = \boxed{-3}$

(3) $\log_{10}(0.001) = \log_{10}\left(\frac{1}{1000}\right) = \boxed{-3}$

(4) $\log_{3\sqrt{2}} 5832 \Rightarrow \boxed{6}$

(5) $\log_x \frac{1}{4} = -1 \Rightarrow \boxed{x = 4}$

(6) $\log_{10}(x) = -2 \Rightarrow x = 10^{-2} \Rightarrow \boxed{\frac{1}{100}}$

(7) $\log_x \sqrt{2} = \left(\frac{1}{6}\right) \Rightarrow x^{1/6} = 2^{1/2}$

$(x^{1/2})^{1/3} = (2^{1/3})^{1/2}$

(8) $\log_{\sqrt{8}} x = 3\frac{1}{3}$ ⇒

(9) $\log_8(128) = \log_8(8 \times 8 \times 2) = x$

(10) $\log_{5\sqrt{5}}(125)$

(11) log5

Rough

$5832 = (3\sqrt{2})^x$

3	5832
3	1944
3	648
3	216
3	72
3	24
2	8
2	4
2	2

$x = 6$

$(3^2 2^2 \sqrt{2})$

$(3^6)(2^3)$

$x^{-1} = \frac{1}{4}$

$x^{-1} = 4^{-1}$

$(x = 4)$

$= \left(\frac{10}{3}\right)$

$(\sqrt{8})^{10/3} = x$

$(2\sqrt{2})^{10/3} = x$

(11) $\log_5 \log_5(3125) =$

(12) The value of $y \log_b$ is equal to

(a) $\log(1) + \log_2 + \log_3$

(b) $\log(1 * 2 * 3)$

(c) $\log(1 + 2 + 3)$

✓(d) All of the above.

A	B	C	D	E	F	G	H	I	J	K	L	M
1	2	3	4	5	6	7	8	9	10	11	12	13
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

(1) MAHESH ⇒ NBIFTI

INDIA =

(2) MAHESH → HAMHSE

INDIA →

(3) MAHESH = 36 $(6)^2$

INDIA = $(5)^2 = \boxed{25}$

(4) MAHESH = 123453

SAM = 521

INDIA IS GOOD = Ni Ri din

Good Boy = Ri bas

boy is kind = bas Tu Ni

Good = Ri

Boy = Bas

IS = Ni

KIND = Tu

Q If sky is blue
blue is green
Green is Red
Red is Rose
Rose is "Dangers"
Danger is safe
Safe is sky

what is the colour for flower

'Danger'

① $P(E) = \frac{\text{favourable outcome}}{\text{Total possible outcome}}$

② $P(\bar{E}) = 1 - P(E)$.

Q 4G, 5 Blue, 2 Red, 3Y = 14.

① If marbles r drawn at Random, what is P of both r Red or at least one is Red.

$\left(\frac{2}{14}\right)\left(\frac{1}{13}\right)\left(\frac{2!}{2}\right) + \frac{2}{14}\cdot\left(\frac{12}{13}\right)2! \Rightarrow \frac{1}{91} + \frac{24}{91} = \frac{25}{91}$

P(RR) → arrangement

for at least → 2 balls (at least Red) → take -ve approach

$1 - P(\text{Not Red}) \Rightarrow 1 - P(XX)$

③ If 3 marbles r drawn, what is P (at least one is yellow.

$1 - P(\text{No any one yellow}) = 1 - P(XXX)$

$\Rightarrow 1 - \frac{11}{14}\cdot\frac{10}{13}\cdot\frac{9}{12}\cdot\frac{3!}{3!}$

$\Rightarrow 1 - \frac{165}{364} \Rightarrow \frac{199}{364}$.

④ If 8 balls r drawn, what is P that there r equal No. of marbals of each colour.

4G, 5B, 2R, 3Y = 14 Ball

$\frac{8}{4} = 2$

$P(GGBBRRYY) = \left(\frac{4}{14}\cdot\frac{3}{13}\cdot\frac{5}{12}\cdot\frac{4}{11}\cdot\frac{2}{10}\cdot\frac{1}{9}\cdot\frac{3}{8}\cdot\frac{2}{7}\right)\times\frac{8!}{2!2!2!2!}$

$= \left(\frac{60}{1001}\right)$

(b) if 3 balls are drawn at random, P(More is green).

$$P(X \times X) = \frac{10}{14} \cdot \frac{9}{13} \cdot \frac{8}{12} \Rightarrow \left(\frac{\cancel{60}^{25}}{\cancel{182}_{91}}\right) \frac{3}{\cancel{12}} \Rightarrow \left(\frac{30}{91}\right)$$

Approximation (Trick)

Time Speed & Distance

Speed = $\frac{\text{Distance}}{\text{time}}$

→ Concept :

Q Aman when he increases his speed from 24 Km/Hr to 30 Km/Hr. he takes 1 Hr less than the usual time . What is Distance

Basic

D.

S = 24 Km $\quad T_1 = \left(\frac{D}{24}\right)$ $\quad T_1 - T_2 = 1$

S = 30 Km $\quad T_2 = \frac{D}{30}$ $\quad \frac{D}{24} - \frac{D}{30} = 1 \Rightarrow D = \boxed{120 \text{ Km}}$

IInd Method

D

S = 24 ⟶ t.

S = 30 Km/Hr ⟶ t − 1

Here Distance is constant

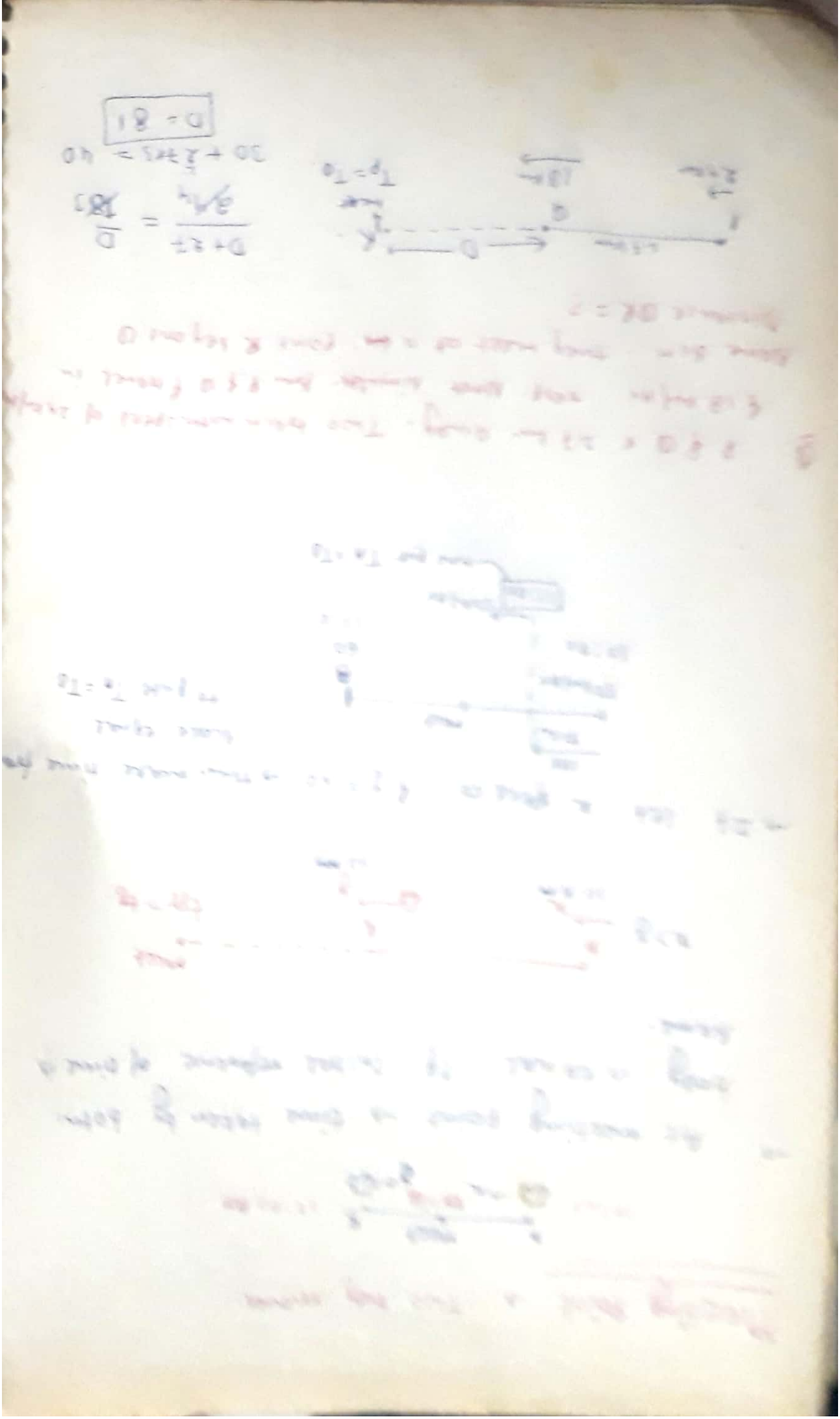
$D = 24t$.

$D = 30(t-1)$

$24t = 30t - 30$

$6t = 30 \Rightarrow \boxed{t = 5}$

$\boxed{D = 120 \text{ Km.}}$



① Concept of Relative

② Speed & Crossing time

Case 1 — When two body move in same dir^n

→ A

→ B

⇓

Relative speed $= |A \sim B|$

→ $B > A$ → meeting ①

→ $A > B$ → separation ①

Case 2 → when moves in opp.

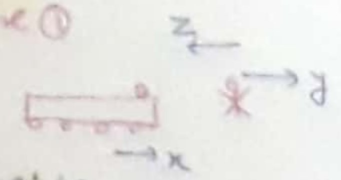
→ A ← B

⇓

Relative speed $= (A + B)$

→ Crossing time $= \frac{D}{S} = \frac{\text{Sum of lengths of two body}}{\text{Relative speed.}}$

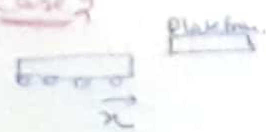
Case ①



~~Speed of~~ tie.

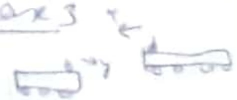
$\frac{(\text{length of train} + 0)}{\text{Relative sped } (x \,|\, x-y \,|\, (z+x))}$

Case 2



⇒ $\frac{\text{length of train} + \text{length of Platf.}}{(\text{speed of train})}$

Case 3



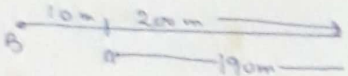
$\frac{(\text{length of Train } (A+B))}{\text{R. speed}}$

→ Km/Hr ⟶ m/s

$x \text{ km/Hr} \times \frac{5}{18} = \text{m/s}$

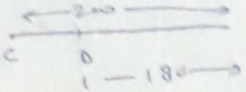
$x \text{ m/s} \times \frac{18}{5} = \text{km/Hr}$

In a race of 200 m, B can give a start of 10 m to A. If C can give start of 20 m to B. The start that C gives to A in same race is



$S \propto D$

$$\frac{S_B}{S_A} = \frac{200}{190} \quad -(1)$$



$$\frac{S_C}{S_B} = \frac{200}{180} \quad -(2)$$

$$\frac{S_C}{S_A} = \frac{200}{190} \times \frac{200}{180}$$

$$\frac{S_C}{S_A} = \frac{200}{171}$$

$S_A \propto 171$

In a 5 km race, A beats B by 30 sec., B beats C by 15 sec., If A beats C by 180 m the time taken by A to run 1 km in —

$S \propto \frac{1}{T}$

$$\frac{S_A}{S_B} \propto \frac{T_B}{T_A} = \frac{t+30}{t}$$

$$\frac{S_B}{S_C} = \frac{t+30+15}{t+30} = \frac{t+45}{t+30}$$

$$\frac{S_A}{S_C} = \frac{1000}{820} \frac{50}{41}$$

$$\frac{S_A}{S_B} \times \frac{S_B}{S_C} = \frac{t+30}{t} \times \frac{t+45}{t+30} = \frac{t+45}{t} = \frac{50}{41}$$

$$41t + 41 \times 45 = 50t$$

$t = 205$ sec

→ Race (Circula

T_A = time taken by

Case I: When (TA, TB

when they will meet 1st time at the starting pt.

10 → 20 m/s
10 → 30 m/s
C → 40 m/s
600 m

$T_A = 30s, 60s, 9$
$T_A = 20s, 40s,$
$T_C = 15s, 30s,$

A has 60 sec

LCM (T_A

LCM (3

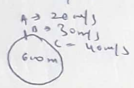
$D_A = 20$
$D_B = 30$

fixed
Net fixe
L
L

→ Race (Circular track) :-

T_A → time taken by Runner A to complete 1 round

Case I: LCM (T_A, T_B ...) — when they will meet 1st time at the starting pt.



T_A = 30s, 60s, 90s, 120s

T_B = 20s, 40s, 60s, 80s

T_C = 15s, 30s, 45s, 60s

After 60 sec.

LCM (T_A, T_B, T_C).

LCM (30, 20, 15) = 60s.

D_A = 20 × 60 = 1200 m

D_B = 30 × 60 = 1800 m

Fixed a reference any one.

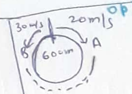
Let fixed A

LCM (T_{AB}, T_{AC})

LCM $\left(\frac{600}{30}, \frac{600}{20}\right) = (20, 30) = \boxed{60s}$

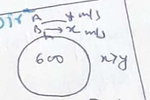
Case II: when they will meet for the 1st time.

Opp. dir

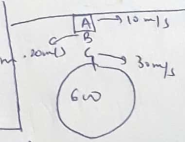


$T_{\text{first meet}} = \left(\frac{D}{x+y}\right)$

Same Dir



$T_{\text{first meet}} = \left(\frac{D}{x-y}\right)$ — Relative speed.



Case III: How many time's they will meet (conditional)

Case IV: How many different pt on track they will meet.

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Ex This water / is superior & / more expensive than that.
to

—ior + to — e.g. (inferior, junior, senior + to)

Rule 10 - when comparing, adjective ending in 'ior' Ex inferior, superior, junior, senior. + followed by 'To'

My brother / has ordered / (for) a new book

answers (who / what) → ← Transitive verb. direct obj follow. (does not have Prep.)

Intransitive. → direct object do not follow.

Ex He loves his house follows
Ex I promptly answered his question.

He arrived
He died.

Rule 11 Transitive verbs do not use a preposition when the direct object is stated.

Ex admire, maintained, loved, evaluated.

Ex They decided arrange a grand party on the eve of her retirement (as) / especially as she had been working for the firm / since almost twenty years.

Rule 12 → (for + period of time)
Since + point of time.

Ex He was sleeping / in his room when a thief / entered into his house / & took away a lot of things /.
(T.V)
i.e to go / come into

Rule 13 → watch out for superfluous words.

[2 action in the past → ① simple past - 2nd action.
1st action. had been → past perfect cont.

Ex The merit / of these books / r known / to every one /
Singular sub. is ⇒ Subject

Rule 14 - subject-verb agreement Rules.

Ex I am sure / neither the house / nor its contents / (is) for sale /
are. plural.
→ Verb followed the last term

Ex If I had / a lot of money / I will not stay here.
would.
If conditions.
→ If + simple past, condition I + would + infinitive verb.

1st condition.
→ If I study, I would have pass the exam.

3rd condn
→ If I had studied, I ~~would~~ would have passed the exam.

Rule 15 → familiar with, "If conditionals.

Ex The cruel lady made her step daughters / (to) do all the household chores. Causitive verb + Main verb (1st)

Ex My sister asked / me that / how long I / would stay

get
Made + V. (1st)
Let +
have +

(3) The Teacher (s) | as well as the students | (have) gone on an excursion during | his summer vacation \ Has

S^{I} as well as S^{II} [H.V]

(4) The (poors) | is not allowed | to join | the seminar.

Poors → Adj → Positive Degree
The + Noun (The Poor).

Ex: Brave people (Adj Noun) ≠ The brave (Noun)

(5) I never expected | him to talk | in a cowardly | manner | No error

Article + Noun

Adj → (adv + ly)

Adj + ly = Adv.

Noun + ly = Adj.

(6) She told | me her | name after | he (Had) left.
P.I — P.P

→ Past Ind. + after + Past Perfect
(बाद में)

→ Past Perfect + before + Past Ind.

(7) She asked | supposing if she fails | what she | would do. (Past Ind) ← conjunction
(Past Ind) ⟶ Past. i.e (fails → failed.)
Remove supposing.

(8) If I had had | money | I would have | given it to you. No error

Past perfect ⇒ Sub. + Had + M.V III + obj.

If → would have + V(III)

(9) Her father | prevented her | (to go) to the cinema | with me

[Prevented + from] + M.V(ing)

Do you | enjoy (to watch) the comedy show | of Kapil Sharma? |
watching.

Rule: enjoy + Gerund (M.V(ing))

(11) The captain (singular) along with | his team | (are) practising very hard for | the forthcoming match |.
is

S^{I} + along with + S^{II} + (H.V)

(12) Ravi would | have told you | the truth if you (Had) asked him.

Past Perfect + would have + M.V(III)
(S + had + M.V III)

(13) Most of my friends | (heard) the earthquake | but I was totally unaware of it. (felt)

(14) In these days of inflation | a ten rupees note | will not buy you | even an ordinary meal |.

Explain: 0, 1, 2... + adj + Noun
2 handsome boys.

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