Aptitude

Zero's at the end :-

#) 50! ki no. of 2's & 8's

2's = Prime = 25+12+6+3+1 = 47

8's = Composite = 2^3 = 47/3 = 15

3's = Prime = 16+5+1 = 22

6's = Composite = 2×3 = $2^{47} \times 3^{22} = 6^{22}$ = 22 sixes

Zero's at end) 10's = 0's = 5's = 10+2 = 12

Note: $50!^{27}$ ki no. of 0's = 5's = (12)×27

#) Unit Digit Value :-

No.	Power cycle	UDV
2	4	6
3	4	1
4	2	6
5	1	5
6	1	6
7	4	1
8	4	6
9	2	1

*) Unit digit ⇒ 2

$2^{23} = (2^4)^5 \times 2^3 = 6^5 \times 8 = 8$

$2^{1234[89]}$ 89%4 = 1 ⇒ $(2^4)^* \cdot 2^1$

= 6 · 2

= 2

Note:) $6^n \times abc\underline{4} = xyz\underline{4}$

Note:) In N! if N≥4, ⇒ N! is div. by 4

⇒ $2^{N!} = (2^4)^* = 6$

Note:) $4^{odd} = 4$; $4^{even} = 6$

$9^{odd} = 9$; $9^{even} = 1$

#) No. divisible by : N = abc

*) 3 : a+b+c div. by 3

12 3 4 5 6 7 8 9 ✓

9 : a+b+c div. by 9

Ex: N = 1!+2!+...20!

N%20 = ?

20 = $2^2 \times 5$ = 5×4

= 1!%20 + 2!%20 + 3!%4 + 4!%5 + 0+0...

= 33%20 = 13 or -7

#) Last 2 digit :

*) when UDV = 2

Ex: 23861 (999)

= 41

Note:) N! = ...0; when N≥5

*) when UDV = 3/9/7

UDV 1 banaane ki Power cycle se

Ex: 3^{43}

= $(3^4)^{10} \times 3^3$

= $(81)^{10} \times 27$

= 01 × 27

= 27

$3^9 = 81$

$9^2 = 81$

$7^4 = 2401$

*) UDV = 2/4/6/8

2^{10} ka cycle me nikalo; $2^{10} = 1024$ ⟨ 24 odd = 24, 24 even = 76

Ex: $2^{41} = (2^{10})^4 \times 2^1 = (2^{10})^{even} \times 2$

= 76×2 = 52

Ex: $4^{41} = 2^{2^{41}} = 2^{82}$ ...

Ex: $6^{41} = 2^{41} \times 3^{41}$ ...

Ex: $8^{41} = 2^{3^{41}} = 2^{123}$ ...

#) Factorization :

*) $N = a^p \times b^q \times c^r$

① $n = (p+1)(q+1)(r+1)$

② $S_n = \frac{(a^{p+1}-1)(b^{q+1}-1)(c^{r+1}-1)}{(a-1)(b-1)(c-1)}$

③ $P_n = N^{n/2}$

N = no.

a, b, c → Prime factors

n = no. of factors

S_n = Sum of factors

P_n = Product of factors

*) Perfect square or cube

162 × y ; y = ? if it's perfect cube

162 = 2×3^4 ⇒ ×(2^2 × 3^2) ⇒ y = 36

*) How many factors of N are div. by given no.

= $\frac{a^p \times b^q \times c^r}{x}$; x → Prime factor form of given no.

= $a^j b^k c^l$ = (j+1)(k+1)(l+1) factors

#) P&C :

combination (Selection)

^nC_r

permutation (selection followed by arrangement)

$^nP_r = {}^nC_r \times r!$

Note:) $^nC_r = {}^nC_{n-r}$

Ex:) No 2 vowels together in GANESHPURI

(AEIOU) (GNSHPR) → 6 सारी पार्टी को पहले बिठा लो

X G X N X S X H X P X R X ⇒ 6! ($^7C_4 \times 4!$)

Ex:) ⟨Subgroup formation⟩

A (Q-1, Q-3)

B (Q-1, Q-2)

i) no cond.n ($^3C_0+^3C_1+^3C_2+^3C_3$)·($^2C_0+^2C_1+^2C_2$)

or $2^3 \times 2^2$

#) Straight Lines = Diagonals + Sides

$^nC_2 = D + n$; n = no. of non-collinear points

*) triangles = $^nC_3$

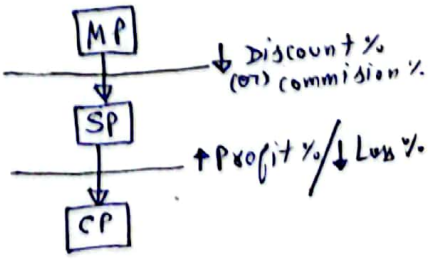
#) % change = $\frac{FV-IV}{IV} \times 100$ %

Profit/Gain % = $\frac{SP-CP}{CP} \times 100$

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

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

Profitability = $\frac{Profit}{sales}$



1

#) $E = P \times C$

P	C
↑ 25%	↓ 1/5 = 20%

2/3 = 66.67%	7/8 = 87.50%
3/8 = 37.50%	5/6 = 83.33%
5/8 = 62.50%	

P	C
↑ 66.67	↓ 2/2+3 = 2/5 = 40%
↓ 37.50	↑ 3/8·3 = 3/5 = 60%

#) Geometry/Handshakes/Tournaments/Gift exchanges —

$A \to B$: $1 \times {}^{n}C_2$ — 1 gift Exchange

$A \leftrightarrow B$: $2 \times {}^{n}C_2$ — 2 gift Exchange

$A \leftrightarrow B$: ${}^{100}C_2$ — 100 gift Exchange

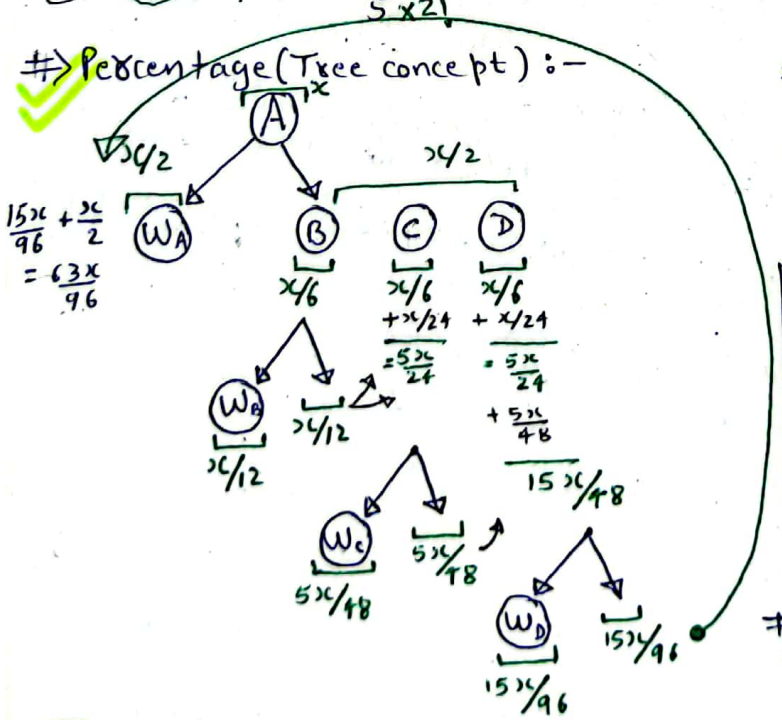
#) Number Sum — using digits

1/2/3/···/n, exactly once, total sum of n-digit numbers that can be formed is $\frac{n!}{n}(1+2+3+\cdots n)(10^{n-1}+10^{n-2}+\cdots 10+10^{0})$

Ex: 1/6/8 $\Rightarrow 3!/3\,(1+6+8)(111)$

Ex: 1/1/2/3/4 $\Rightarrow \frac{5!}{5\times 2!}(1+1+2+3+4)(11111)$

#) Percentage (Tree concept) :—



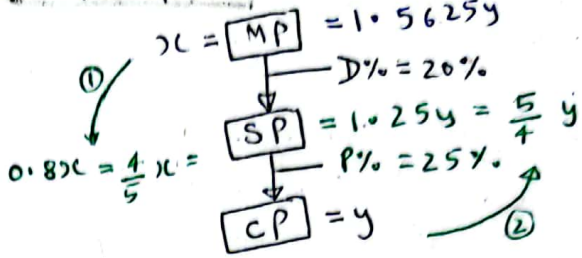
#) Reasoning :

I) Deductive [LN] (logical necessity) (unique sol.n)

II) Induc tive [LP] (logical possibility) (no unique sol.n)

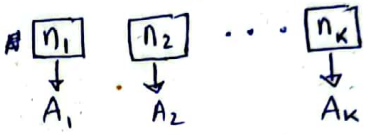
LPt maybe = LN

#) Shopkeeper - markup goods :



⇒ Shopkeeper raised up goods 56.25% more than CP

#) Mixture alligation :

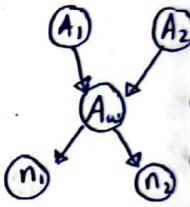


} sets of items (ratios) (मिलाइए)

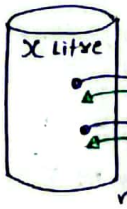
} Averages (Price or anything) like 5 ₹/kg

•) $A_w = \frac{A_1n_1 + A_2n_2 + \cdots A_Kn_K}{n_1+n_2+\cdots n_K}$

•) $\frac{n_1}{n_2} = \frac{A_2 - A_w}{A_w - A_1}$



#) Pure Liquid takenout & other liquid replenished :



Pure liquid = x L (before alligation)

Pure liquid (after alligation) $= x\left(1-\frac{y}{x}\right)^n$

#) SI/CI :

Amount = Principle + Interest

In SI ; SInterest $= \frac{P \times t \times r}{100}$

In CI ; Amount $= P\left(1+\frac{r}{100}\right)^n$

If r = 20% n = 2 — CInterest = A − P

Semi annual compounding

$r = \frac{20\%}{2} = 10\%$ 1 साल में 2 बार & we've 2 years

$\Rightarrow P(1.1)^4$

Quarterly compounding

$r = \frac{20}{4} = 5\%$ 1 साल में 4 बार & we've 2 years

$\Rightarrow P(1.05)^8$

#) word in dictionary :—

Ex: DELHI

Total = 5! = 120

Ordered = D/E/H/I/L

$\frac{}{24}$ $\frac{E}{24}$ $\frac{H}{24}$ $\frac{I}{24}$ $\frac{L}{24}$

101th word :—

D → E/H/I ⇒ 3! = 6

L

EHI
EIH
HEI
HIE
IEH
IHE

LDIEH

$\begin{array}{r} 101 \\ -24\times4 \\ \hline \text{i.e. } 101 \\ -96 \\ \hline 5 \end{array}$

Ex:) AGAIN

Total = 5!/2! = 60

Ordered = A/A/G/I/N

A: $4! = 24$; G: $\frac{4!}{2!} = 12$; I: 12; N: 12

60 − 24 − 12 = 24 · 60 − 36 = 09

45th word :—

Ⓘ Ⓐ → A/G/N ⇒ 3! = 6

Ⓘ Ⓖ → A/A/N ⇒ $\frac{3!}{2!}$ = 3

AAN
ANA
NAA

IGNAA

Note:) Prime no.s :—

1—100 ⇒ 25 1—50 ⇒ 15

1—75 ⇒ 21 1—25 ⇒ 09

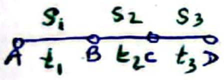
Leap year :—

366 Days ; 52 week & 2 Days

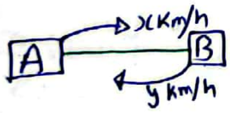
① S/M
② M/T
③ T/W
④ W/T
⑤ T/F
⑥ F/S
⑦ S/S

#) Speed, Distance, Time :

- $D = S \times T$
- 1 km/h = 5/18 m/s
- Avg. speed = $\frac{\text{Total } D}{\text{Total } T} = \frac{D_T}{T_T} = \frac{S_1t_1 + S_2t_2 + \cdots S_nt_n}{t_1 + t_2 + \cdots t_n}$



$= \frac{D_1 + D_2 + \cdots D_n}{\frac{D_1}{S_1} + \frac{D_2}{S_2} + \cdots \frac{D_n}{S_n}}$

- 

Avg. speed = $\frac{2xy}{x+y}$

- 9am — D/S/T → 9am
  - $S_1 > S / T_1 < T$ / 10 min. early → 8:50 am
  - $S_2 < S / T_2 > T$ / 15 min late → 9:15 am

Actual ~ S_1 ⇒ 9 ~ 8:50 = 10/60

$D/S \sim D/S_1$ = 10/60

Actual ~ S_2 ⇒ 9:15 ~ 9 = 15/60

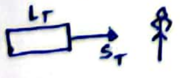
$D/S_2 \sim D/S$ = 15/60

$S_1 \sim S_2$ ⇒ 9:15 ~ 8:50 = 25/60

$D/S_2 \sim D/S_1$ = 25/60

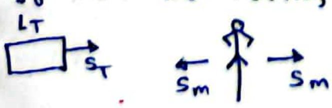
- Ⓐ → x, Ⓑ → y: x ~ y | Ⓐ → x ← y Ⓑ: (x + y)

- Pole/man standing :



Time taken to cross man = $\frac{L_T}{S_T}$

- If man also moving :

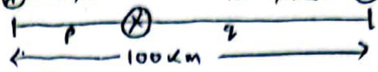


$T = \frac{L_T}{S_T + S_m}$ $= \frac{L_T}{S_T \sim S_m}$

- Time to cross platform = $\frac{L_T + L_P}{S_T}$

- Runners meeting :—

Ex-1) 7am Ⓐ → 10 km/h 15 km/h ← Ⓑ 7am

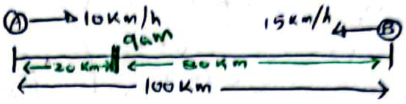


Relative speed, S = 25 km/h

Time taken to meet, $T = \frac{100}{25} = 4$ h ⇒ 11 am

Distance from A (P), D = 10 × 4 = 40 km

Ex-2) 7am Ⓐ → 10 km/h 15 km/h ← Ⓑ 9am



A Travels from 7am – 9am, D' = 10 × 2 = 20 km

S = 25 km/h

$T = \frac{80}{25}$ = 3h : 12m = 3.2 h ↳ 12:12 pm

D = 10 × 3.2 = 32 km

but actually = 32 + 20 = 52 km

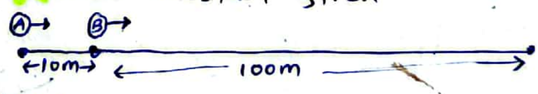
- when one train travels some extra distance than the other one, while they started at same time from different places —

Distance b/w two trains = $\frac{(x+y)}{(x-y)} \times$ Extra distance

- Races :— T = constant, D ∝ S ie $\frac{S_A}{D_A} = \frac{S_B}{D_B} = \frac{S_C}{D_C}$

$S_A/S_B = D_A/D_B = 100/90 = 10/9$

★ when headstart given



Ⓐ → 110 m
Ⓑ → 100 m

D ∝ S

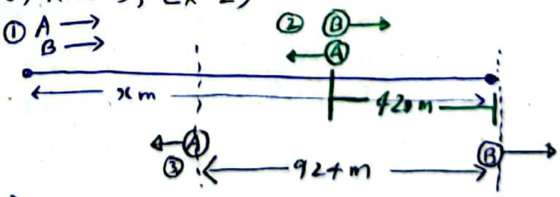
$D_A = (S_A/S_B) \times D_B$ $D_B = (S_B/S_A) \times D_A$

= 10/9 × 100 = 9/10 × 110

= 111.1 m = 99 m

⇒ A win by 1.1 m ⇒ B lost by 1m

- Races, Ex-2)



$S_A/S_B = D_A/D_B = \frac{x+420}{x-420} = \frac{x+924}{x}$ ⇒ x = 4620m & S_A/S_B = 6/5

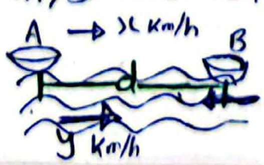
#) HCF/LCM :—

- HCF $\frac{p}{q}, \frac{r}{s} = \frac{HCF(p, r)}{LCM(q, s)}$
- 48, 144, 400 → HCF = common [illegible] का highest power = 2^4

$2^4 \times 3$, $2^4 \times 3^2$, $2^4 \times 5^2$ → LCM = सभी factor की highest powers = $2^4 \times 3^2 \times 5^2$

- HCF × LCM = Product of two no.s

#) Boats & Streams :-



Total time = T = $t_{\text{down stream}} + t_{\text{up stream}}$

$= \frac{d}{(x+y)} + \frac{d}{(x-y)}$

x = man's speed in still water
y = speed of stream

#) Work & time :—

	Days	one day work
(A) →	x	1/x
(B) →	y	1/y
(A)+(B) →		1/x + 1/y

One day work = $\frac{x+y}{x \cdot y}$ Days to complete = $\frac{xy}{x+y}$

•) Ex:)

A = 10 D	B = 20 D	C = 15 D
Day 1	2	3 ...
A+B	A+C	A+B ...

(10%, 5%, 4%)

1 pattern (2 days) → 29% WD

X 3 X 3

6 days → 87% WD, 13% WL

7th day — A+B — $\frac{13\%}{15\%} = \frac{13}{15}$ day

⇒ $6\frac{13}{15}$ Days

•) Distribution of wages —

Ex:) ₹ 45

A → 15D ⇒ 1/15 = 6.67% | 5/15 × 45 = 15 ₹

B → 20D ⇒ 1/20 = 5% | 5/20 × 45 = 11.25 ₹

C → 12D ⇒ 1/12 = 8.33% | 5/12 × 45 = 18.75 ₹

A+B+C = 20% = 1/5 ⇒ 5 Days

•) Pipes & cistern —

Ex:) 15h, 12h, 20h, 50h

1/15 = 6.67 %
1/12 = 8.33 %
1/20 = 5 %
1/50 = 2 %

+6.67 + 8.33 − 5 − 2 = ⊕8% ⇒ $\frac{100\%}{8\%}$ = 12.5h

•) W = D M T E ; W = work or wage or working hours

$\frac{D_1 M_1 T_1 E_1}{W_1} = \frac{D_2 M_2 T_2 E_2}{W_2}$

D = No. of Days
M = No. of Men
T = No. of hours per day
E = Efficiency
W = Amt. of work

#) Logarithms —

•) $\log_a m = \frac{1}{\log_m a}$ •) $a^{\log_a n} = n$

•) $\log_{10}$ 2 = 0.30, 3 = 0.50, 4 = 0.60, 5 = 0.70, 6 = 0.80, 7 = 0.85, 8 = 0.90, 9 = 0.95, 10 = 1.00

•) $\log_{a^b} m = \frac{1}{b} \cdot \log_a m$

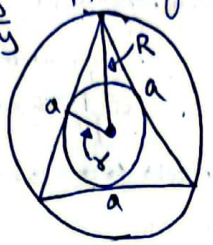
•) $\log_x m = p \Rightarrow m = x^p$

#) Geometry : —

•) interior angle = $\left(\frac{n-2}{n}\right) \times 180°$

Sum of interior angles = $(n-2) \times 180°$

•) Area of Δ = $\frac{1}{2} \times B \times H = \frac{1}{2} \times a \times b \times \sin C$

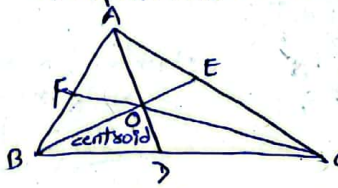


$= \sqrt{S(S-a)(S-b)(S-c)}$; $S = \frac{a+b+c}{2}$

$= \frac{abc}{4R} = \gamma \cdot S$; R = Circumradius, γ = Inradius

$\frac{R}{\gamma} = \frac{2}{1}$ $R = a/\sqrt{3}$ $\gamma = a/2\sqrt{3}$

•) Apollonius theorem —



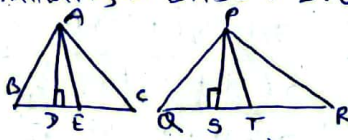
$\frac{AO}{OD} = \frac{BO}{OE} = \frac{CO}{OF} = \frac{2}{1}$

$AB^2 + AC^2 = 2[AD^2 + BD^2]$

$BA^2 + BC^2 = 2[BE^2 + CE^2]$

$CA^2 + CB^2 = 2[CF^2 + AF^2]$

•) Similarity — ΔABC ~ ΔPQR



$\frac{AB}{PQ} = \frac{BC}{QR} = \frac{CA}{RP} = \left(\frac{AD}{PS}\right) = \left(\frac{AE}{PT}\right)$

$\frac{\text{Area of } \Delta ABC}{\text{Area of } \Delta PQR} = \frac{AB^2}{PQ^2} = \frac{BC^2}{QR^2} = \frac{CA^2}{PR^2}$

•) Area of sector:

Area = $\frac{\theta}{360} \times \pi r^2$

α = x + y

Exterior = Sum of two opposite interior

#) Verbal reasoning : —

•) Logical connectives —

I) Either-Or / Or :

- Either P or q
- P, otherwise q
- unless P, q
- q, unless P

p	q
1	0
0	1
1	1

$\bar{P} \rightarrow q$ or $\bar{q} \rightarrow P$

only then the compound statement is true

II) If-then :

If P, then q

$P \rightarrow q$ or $\bar{q} \rightarrow \bar{P}$

III) Only if P, then q

If P then Q को ही reverse में लिख दो

$q \rightarrow P$ $\bar{P} \rightarrow \bar{q}$

IV) P AND q = P | q = 1 | 1

$\overline{P \text{ or } q} = \bar{P} \text{ AND } \bar{q}$

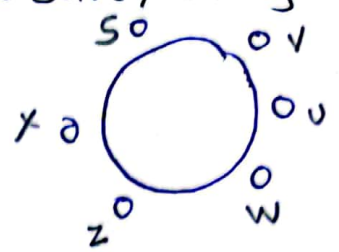
$\overline{P \text{ AND } q} = \bar{P} \text{ or } \bar{q}$

#) Time & work:

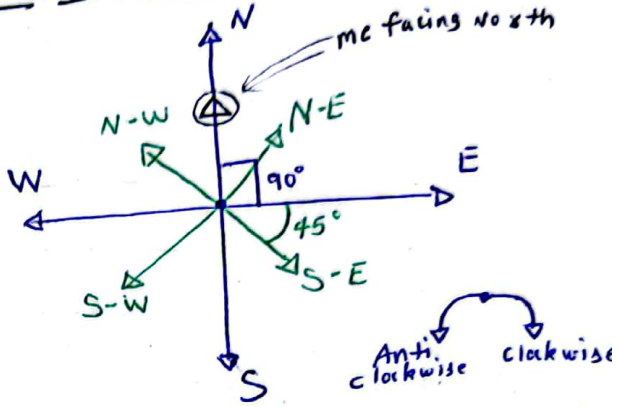
- Days → work } Just by inversion
  work → Days
- Ex: Total work in 30 days
  Then, one day work = $1/30$ amt. of work
- ex: One day work = $1/40$ amt. of work
  Then, Total work in 40 days
- ↑work ⇒ ↓ time ⇒ ↓ days
  ↑men ⇒ ↑ work ⇒ ↓ days

Note: To Solve Seating arrangement in circular

5



Note:) Direction sense



Q:) A transporter recieves same no. of orders each day. Currently he has some pending orders to be shipped. If he uses 7 trucks, then at the end of 4th day he can clear all the orders. Alternatively if he uses only 3 trucks, then all the orders are cleared at the end of 10th day. What is min.m no. of trucks required so that there will be no pending order at the end of 5th day.

7T → 4d
3T → 10d
tT → 5d

Daily I get → x orders
Pending I've → y orders
1 Truck carries → z orders each day

$\Rightarrow 7 \times z \times 4 = 4x + y$ — i

$3 \times z \times 10 = 10x + y$ — ii

ii − i ⇒ $2z = 6x$

$z = 3x$

$\Rightarrow y = 80x$

Now,

$t \times z \times 5 = 5x + y$

$t \times 3x \times 5 = 5x + 80x$

$\Rightarrow t = 6$ Trucks

Note: Revenue = Profit + Expense

Note:

- Sunrise ⇒ Morning ⇒ Shadow on the west line
- Sunset ⇒ Evening ⇒ Shadow on the east line
- 12 noon ⇒ No Shadow ⇒ Sun over head

Note: If clock time in mirror is 1:30 then actual time is

11:60
− 01:30
10:30

Note: Vol. & SA: −

Vol → cyl = $\pi r^2 h$ → Sphere = $\frac{4}{3}\pi r^3$

→ cone = $\frac{1}{3}\pi r^2 h$

CSA → Cyl. = $2\pi rh$ = Lateral SA → Sphere = $4\pi r^2$

→ cone = $\pi r l$

Note: 1 hectare = $100 \times 100\ m^2$

1 dm = 10 cm

Note: No. of zeros at end of 25×25!

for 25! ⇒ 5 + 1 ⇒ 6

for 25 or 5^2 we have 2 more # of 5's

So, Total = 8

Q) constr.n cost is 13,200 ₹.

Now, Labour wages per day inc. by 1/5

working hours per day dec. by 1/24

New constr.n cost?

cost	wages	working hours
13,200	1	1
	$1 + \frac{1}{5}$	$1 - \frac{1}{24}$
$\Rightarrow 13200 \times \frac{6}{5} \times \frac{23}{24}$	$= \frac{6}{5}$	$= \frac{23}{24}$

$= 15,180$ ₹

*) Work & time Questions :—

Q-1) A can work 5 times faster than B and takes 60 days less than B to complete the work. In how many days does A & B individually can complete the work?

Alone

A → n-60 days

B → n days

Also, A = 5B

$\Rightarrow (n-60) = \frac{1}{5} \times n$

$n = 75$ days

$\Rightarrow$ A → 15 days Individually

B → 75 days

Together $\frac{xy}{x+y}$

$= \frac{15 \times 75}{15+75}$

$= \frac{15 \times 75}{90}$

$= 12.5$ days

Q-2) If 24 men can finish a work in 10 days, then find the no. of days required to complete the same work by 30 men.

		1 day work
24 men	→ 10 days	1/10
30 men	→ ? days	?

24 — 1/10

30 — ?

$\Rightarrow 24 \times ? = 30 \times \frac{1}{10}$

$? = \frac{3}{24}$

$? = \frac{1}{8}$

$\Rightarrow$ 8 days

Q-3) A can do a work in 3 days. 6

B can do the same work in 6 days

C can do " " " " 7 days

If they work together, in how many days will they complete the work.

	Alone	one day work
A →	3	1/3
B →	6	1/6
C →	7	1/7

A+B+C → $\frac{1}{3}+\frac{1}{6}+\frac{1}{7}$

$= \frac{14+7+6}{42}$

$= \frac{27}{42} = \frac{9}{14}$

$\Rightarrow$ Days to finish $= \frac{14}{9} = 1\frac{5}{9}$

Q-4) P & Q can do a work in 12 days. Q & R can do the same work in 16 days & R and P can do it in 24 days. Find the time in which P, Q and R can finish the work together.

	one day work
P + Q → 12 days	1/12
Q + R → 16 days	1/16
R + P → 24 days	1/24

$\Rightarrow (P+Q+R) \times 2 = \frac{1}{12} + \frac{1}{16} + \frac{1}{24}$

$= \frac{4+3+2}{48} = \frac{9}{48} = \frac{3}{16}$

$\Rightarrow P+Q+R = \frac{3}{32}$ ← one day work

$\Rightarrow$ Days to finish $= \frac{32}{3}$

Q5) P can do a work in 30 days. Q is 25% more efficient than P in completing the same work. In how many days will Q complete the work.

		1 day work
P →	30 days	1/30

Q is 25% more efficient than P

P	Q
100%	125%
1/30	1.25 × 1/30

⇒ Q one day work = $\frac{1.25}{30}$

⇒ days to finish = $\frac{30}{1.25}$

= 24 days

Q6) If 3 men can do a work in 2 days & 4 boys can do the same work in 6 days. Then, in how many days will the same work be completed by 8 men & 8 boys.

		one day work
3M →	2 d	1/2
4B →	6 d	1/6

(3 times)

⇒ 3M = 3 × (4B)

1M = 4B

now, 8M + 8B ⇒ 32B + 8B = 40B

4B → 1/6

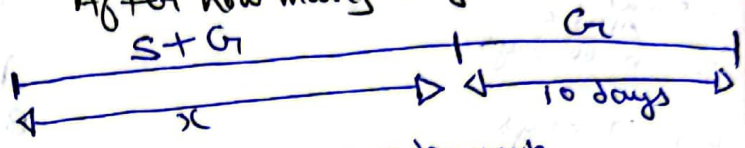
40B → ?

⇒ ? = $\frac{40}{6 \times 4}$

? = $\frac{10}{6}$

⇒ Days to complete = $\frac{6}{10}$

Q7) Sita & Gita can do a work in 20 days & 25 days. Both begin together but after few days Sita leaves. Then Geeta finished the remaining work in 10 days. After how many days did Sita leave?



		one day work
S →	20 d	1/20
G →	25 d	1/25

now, 10 days work of G :-

= 10 × 1/25 = $\frac{2}{5}$ of the work

⇒ S+G together did $\frac{3}{5}$ of the work in x days

S+G together $\frac{1}{20} + \frac{1}{25}$

= $\frac{25+20}{20 \times 25}$

= $\frac{45}{20 \times 25} = \frac{9}{100}$

⇒ one day work of S+G = $\frac{9}{100}$

So, x days work of S+G = $x \times \frac{9}{100}$

w.k.t $x \times \frac{9}{100} = \frac{3}{5}$

$x = \frac{20}{3}$ days

Q8) When P alone does a work, he takes 25 days more than the time taken by P & Q working together to complete the work. But Q alone takes 9 days more than the time taken by P & Q working together to complete the work. In what time P & Q together finish this work?

P+Q → N days

Q → N+9 days

P → N+25 days

$N = \sqrt{\text{Extra of P} \times \text{Extra of Q}}$

$= \sqrt{9 \times 25}$

= 15 days

Q-9 A can complete a work in 12 days and B can complete in 8 days. A works for 8 hours everyday, while B works for 10 hours everyday. If A & B together start working 8 hours per day, in how many days will they complete the work?

		1 hr work
A →	12 d or 96 hrs	1/96
B →	8 d or 80 hrs	1/80

$A+B \rightarrow \frac{1}{96}+\frac{1}{80} = \frac{80+96}{96\times80}$

$= \frac{176}{96\times80}$

$\Rightarrow$ 1 hr work of A+B $= \frac{176}{96\times80}$

$\Rightarrow$ hrs to complete $= \frac{96\times80}{176}$

$\Rightarrow$ Days to complete $= \frac{96\times80^{10}}{176\times8}$

$= \frac{60}{11}$

Q-10) Raj can build a house alone in 16 days but Suraj alone can build it in 12 days. Raj & Suraj work on alternate days. If Raj works on first day, house will be built in how many days?

R →	16 d	1/16
S →	12 d	1/12

1 pattern = R, S $= \frac{1}{16}+\frac{1}{12}$ (2 days)

$= \frac{3+4}{48}$

6 × 1 pattern (2 days) $= \frac{7}{48}$ work done ×6

12 days → $\frac{42}{48}$ work done

but $\frac{6}{48}$ work left

or $\frac{1}{8}$ work left

On 13th day Raj works

$\Rightarrow$ 1 day work $= \frac{1}{16}$ work done

$\Rightarrow$ work left $= \frac{1}{8}-\frac{1}{16} = \frac{1}{16}$ work left

On 14th day Suraj works

1 day → 1/12 work done

$\frac{1\times3}{1}\times\frac{1}{4} = \frac{3}{4}$ day ← 1/16 work done

$\frac{3}{4}$ day ← 1/16 work done

So, Ans: $13\frac{3}{4}$