



GENERAL APTITUDE

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Profit & Loss

- **Basics**

Profit (Gain) = (S.P – C.P)

Loss =(C.P – S.P)

% gain = (Gain / C.P) x 100

% loss = (Loss / C.P) x 100

- **Multipliers to find S.P**

In Case of Profit : S.P. = C.P. x **(100 +%gain)/100**

In Case of Loss : S.P. = C.P. x **(100 - %loss)/100**

i.e For sale at 25% profit S.P. = 125 % of C.P.

For sale at 25% loss S.P. = 75% of C.P.



Profit & Loss

Q. A man bought certain no of oranges at the rate of 5 for Rs 4 and sold them at the rate of 4 for Rs 5. Find his overall profit/loss percentage?

A. 25.5% Pr

B. 36.5% Pr

C. 56.2% Pr

D. 64.5% Pr

Soln

Cost Price

Oranges →	Rs	Oranges →	Rs
5 →	4	4 →	5
20 →	16	20 →	25

SP > CP, so profit

$$\begin{aligned} P\% &= (SP - CP) / CP \times 100 \\ &= (25 - 16) / 16 \times 100 \\ &= 225 / 4 = 56.20\% \end{aligned}$$

Ans: C

Cost Price

Oranges →	Rs
5 →	4
1 →	$\frac{4}{5}$

Selling Price

Oranges →	Rs
4 →	5
1 →	$\frac{5}{4}$

SP > CP, so profit

$$\begin{aligned} P\% &= (SP - CP) / CP \times 100 \\ &= \frac{\left(\frac{5}{4} - \frac{4}{5}\right)}{\frac{4}{5}} \times 100 = \frac{\left(\frac{9}{20}\right)}{\frac{4}{5}} \times 100 \\ &= 225 / 4 = 56.20\% \end{aligned}$$



Profit & Loss

Q. If selling price is doubled, the profit triples. Find the profit %.

A. $66\frac{2}{3}\%$

B. 100%

C. $105\frac{1}{3}\%$

D. 120%

Soln:

Let, CP = C , SP=S

As they ask profit % , we know profit = SP – CP

As per given,

$$3(S-C) = 2S-C$$

$$3S - 3C = 2S - C$$

$$S = 2C$$

$$\text{But, Profit} = S - C = 2C - C = C$$

$$\text{Profit \%} = \frac{\text{profit}}{\text{CP}} \times 100 = \frac{C}{C} \times 100 = 100\%$$

Ans : B



Profit & Loss

Q. A shopkeeper sells his goods at 20% profit and to make an extra profit he gives only 800 gm per kg. Find his profit %

A. 25% Pr B. 33.33% Pr C. 50% Pr D. 25% Ls

Soln

CP	SP	Profit
100	120	20
80	120	40
% Profit	$= 40/80 \times 100$ $= 1/2 \times 100$ $= 50\%$	

Ans: C



Profit & Loss

Q. If the cost price of 6 pencils is equal to the selling price of 5 pencils, then the gain per cent is

- A. 10% B. 20% C. 15% D. 25%

Soln:

Let the cost price of one pencil be Rs.1.

CP of 5 pencils =Rs. 5

CP of 6 pencils =Rs. 6

as, SP of 5 pencils = CP of 6 pencils

SP of 5 pencils = Rs.6

if, $SP > CP$ so it's a profit

profit = $SP - CP$

= $6 - 5$

= 1

Profit % = $\text{profit}/\text{cp} \times 100$

= $1/5 \times 100$

= 20%

Ans: B



Alligation

Q. A person blends two varieties of tea , one cost Rs. 160/kg and other cost Rs. 200/kg in the ratio 5 : 4. He sells the blended variety at Rs.192/kg. Find the profit %.

Soln :

$$\frac{x}{y} = \frac{d-m}{m-c}$$
$$\frac{5}{4} = \frac{200-m}{m-160}$$

$$5m - 800 = 800 - 4m$$

$$9m = 1600$$

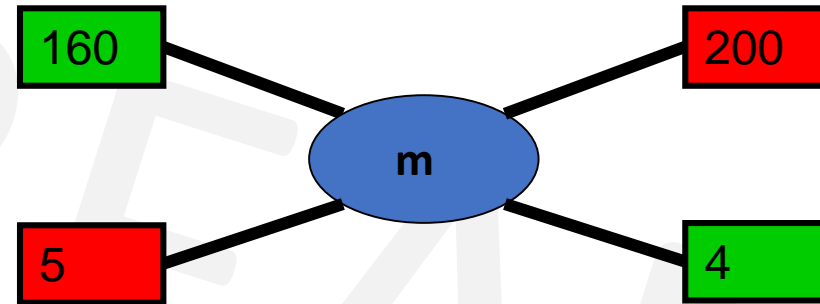
$$m = \frac{1600}{9}$$

SP=Rs.192(given) , CP =mean price

$$\text{Profit\%} = \frac{\text{SP}-\text{CP}}{\text{CP}} \times 100$$
$$= \frac{192 - \frac{1600}{9}}{\frac{1600}{9}} = \frac{1728 - 1600}{1600} = \frac{128}{16} = 8\%$$

cheaper price

dearer price



Combination

Q. A merchant has 1000 kg of sugar, part of which he sells at 8% profit and rest at 18% profit. he gains 14% on the whole. What is the quantity sold at 18% profit ?

A. 300 kg

B. 700 kg

C. 600 kg

D. 400 kg

Ans : C



Profit & Loss(Assignment)

If gain is half of SP, the gain percentage is ____?

A. 50%

B. 33.33%

C. 25%

D. 100%

Soln:

we know profit = SP – CP

As per given,

$$1/2SP = SP - CP$$

$$CP = SP - 1/2SP$$

$$SP = 2CP$$

$$\text{But, Profit} = SP - CP = 2CP - CP = CP$$

$$\text{Profit \%} = \frac{\text{profit}}{CP} \times 100 = \frac{CP}{CP} \times 100 = 100\%$$

Ans : D



Profit & Loss(Assignment)

Q. A bookseller sells 84 books at the cost of 72 books. Find his profit or loss%

A. 14.28%

B. 28.24%

C. 20.4%

D. 12.86%

Ans : A



Profit & Loss(Assignment)

Q. By selling 100 pencils, a shopkeeper gains the selling price of 20 pencils. His gain per cent is

A) 25

B) 20

C) 15

D) 12

Ans: A

SP – CP = gain here gain = SP of 20 pencils

S.P. of 100 pencils – C.P. of 100 pencils = S.P. of 20 pencils

S.P. of 80 pencils = C.P. of 100 pencils

Let C.P. of 1 pencil = Rs. 1

S.P. of 80 pencils = Rs. 100

C.P. of 80 pencils = Rs. 80

$$\text{Profit \%} = \frac{100-80}{80} \times 100 = 25\%$$



Profit & Loss(Assignment)

Q. A man bought a horse & carriage together for Rs 15600 & sold them together, the horse at 36% profit & the carriage at 15% loss. If selling price of both is equal. Find the cost of the carriage?

A.Rs.6000

B. Rs.7600

C. Rs.3600

D. Rs.9600

- **Soln**

- Let CP of horse be H & Carriage be C $\rightarrow H+C= 15600$

- SP of both is equal

- So, comparing the CPs

- $136H/100 = 85C/100$

- $H = 5C/8$

- $5C/8 + C = 15600$

- $13C/8 = 15600$

- $C = 1200 \times 8$

- $C = 9600$

Ans: D



Profit & Loss(Assignment)

Q. A vendor bought 6 oranges for Re 10 and sold them at 4 for Re 6. Find his loss or gain percent.

A. 8% gain

B. 10% gain

C. 8% loss

D. 10% loss

Ans: D



Profit & Loss(Assignment)

Q. A shopkeeper sells his goods at 10% loss but uses a weight of 750gms instead of 1kg. Find profit %

A. 20% Pr

B. 14.28% Pr

C. 30% Pr

D. 25% Ls

Ans: A



Profit & Loss(Assignment)

Q. A fruit seller buys oranges at 4 for Rs. 3 and sells them at 3 for Rs. 4. Find its profit percent.

A. 43.75% Pr B. 77.7% Pr C. 75% Pr D. 65.7% Ls

Ans: B



Profit & Loss(Assignment)

Q. A man buys a cycle for Rs. 1400 and sells it at a loss of 15%. What is the selling price of the cycle?

A. Rs. 1090

B. Rs. 1160

C. Rs. 1190

D. Rs. 1202

Ans: C



Profit & Loss(Assignment)

Q. 100 oranges are bought at the rate of Rs. 350 and sold at the rate of Rs. 48 per dozen. The percentage of profit or loss is:

- A. $14 \frac{2}{7}\%$ gain B. 15% gain C. $14 \frac{2}{7}\%$ loss D. 15 % loss

Ans: A



Interest

If P = Principal, R = Rate of interest, N = Time in years, I = Interest, A = Amount

Then **$A = P + I$**

Simple Interest

$$\text{S.I.} = (P \times R \times N) / 100$$

Basic principal remains constant.

S.I. is good example of AP(Arithmetic Progression)

Compound Interest

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

T = periods of compounding,

$$\text{C.I.} = A - P$$

R = rate for compounding period

Basic principal keeps on increasing as we get interest on interest.

C.I. is good example of GP(Geometric Progression)



Interest

Q. What is the difference between the simple interest on a principal of Rs. 500 being calculated at 5% per annum for 3 years and 4% per annum for 4 years?

A.Rs. 5 B.Rs. 10 C.Rs. 20 D.Rs. 40 E. None of these

$$\begin{aligned} SI_1 &= P N_1 R_1 / 100 \\ &= \frac{500 \times 3 \times 5}{100} = \text{Rs. } 75 \end{aligned}$$

$$\begin{aligned} SI_2 &= P N_2 R_2 / 100 \\ &= \frac{500 \times 4 \times 4}{100} = \text{Rs. } 80 \end{aligned}$$

$$\text{Difference} = 80 - 75 = \text{Rs. } 5$$

OR

$$500 \Rightarrow 15\% \uparrow \Rightarrow 575 \text{ (1st case)}$$

$$500 \Rightarrow 16\% \uparrow \Rightarrow 580 \text{ (2nd case)}$$

$$\text{difference} = 580 - 575 = \text{Rs. } 5$$

Ans : A



Interest

Q. A sum of money at simple interest amounts to Rs. 815 in 3 years and to Rs. 854 in 4 years. The sum is:

A. Rs. 650

B. Rs. 690

C. Rs. 698

D. Rs. 700

Soln:-

amount after 4 years = amount after 3 years + simple interest in one year

S.I. in one year = Rs. $(854 - 815) = \text{Rs. } 39$.

S.I. for 3 years = Rs. $(39 \times 3) = \text{Rs. } 117$.

Principal = amount - interest

Principal = $815 - 117$
= Rs. 698.

Ans: C



Interest

Q. P =Rs. 2000, R =10%, N =2yrs , Find A and CI

Soln:

$$\begin{aligned}A &= 2000\left(1 + \frac{10}{100}\right)^2 \\&= 2000\left(\frac{110}{100}\right)^2 \\&= 2000\left(\frac{121}{100}\right) \\&= \text{Rs. } 2420\end{aligned}$$

$$\text{CI} = 2420 - 2000 = \text{Rs. } 420$$

$$2000 \rightarrow 10\% = 200$$

$$10\% \quad 10\%$$

$$2000 \longrightarrow 2200 \longrightarrow 2420$$

$$\text{CI} = 2420 - 2000 = 420$$



Interest

Q. Simple interest on a certain sum of money for 3 years at 8% per annum is half the compound interest on Rs. 4000 for 2 years at 10% per annum. The sum placed on simple interest is:

A. Rs. 1550

B. Rs. 1650

C. Rs. 1750

D. Rs. 2000

Soln:

$$A = P \left(1 + \frac{R}{100} \right)^N = 4000 \left(1 + \frac{10}{100} \right)^2 = 4000 \times \left(\frac{11}{10} \right)^2 = 4000 \times \frac{11}{10} \times \frac{11}{10} = \text{Rs. } 4840$$

OR

$$\begin{array}{ccccc} 4000 & \xrightarrow[1^{\text{st}} \text{ yr}]{10\%} & 4400 & \xrightarrow[2^{\text{nd}} \text{ yr}]{10\%} & 4840 \end{array}$$

$$CI = A - I$$

$$CI = 4840 - 4000 = \text{Rs. } 840$$

Ans: C

$$SI = \frac{1}{2} CI$$

$$\frac{PNR}{100} = \frac{1}{2} \times 840$$

$$\frac{P \times 3 \times 8}{100} = 420$$

$$\begin{aligned} P(\text{sum}) &= \frac{420 \times 100}{3 \times 8} \\ &= \text{Rs. } 1750 \end{aligned}$$



Interest

Q. P =Rs. 4000, R =20% per annum, N =6months.Find CI computed quarterly for given period.

Soln:

N =6months(2 quarterly)

rate(R) = 20 % per annum = 5 % quarterly

After every 3 months CI will be calculated.

	by <u>5%=200</u>		by <u>5%=210</u>	
4000		4200		4410

$$\begin{aligned} I &= 4410 - 4000 \\ &= \text{Rs. } 410 \end{aligned}$$



Interest

Q. A sum of money placed at compound interest doubles in 7 years. In how many years the principal becomes-

- a. 4 times of itself
- b. 8 times of itself

Soln:

Let initial value be 100



- a. In 14yrs
- b. In 21 yrs

OR

100----->200 in 7 years
200----->400 in again 7 years then,
400----->800 in 7 years again, thus
the time becomes= $7+7+7= 21$ years.



Interest

Q. Difference between Compound interest & simple interest on a sum placed at 8% p.a. compounded annually for 2 years is Rs 128. Find the Principal

- A. 20000
- B. 24000
- C. 26000
- D. 15000

- **Soln:**

- Let the principal be $P = \text{Rs. } 100$.
- time $N = 2$ years, rate of interest $R = 8\%$ per annum
- simple interest = $\frac{PNR}{100} = \frac{100 \times 8 \times 2}{100} = \text{Rs. } 16$

- CI (for 2 years)

- 8% 8%
- $100 \xrightarrow{\quad} 108 \xrightarrow{\quad} 116.64$

	16.64		
P	SI	CI	Diff
100	16	16.64	0.64

- $0.64 \rightarrow 100$
- $128 \rightarrow ?$
- $\frac{12800}{0.64} = \text{Rs. } 20000$



Interest

Q. Difference between Compound interest & simple interest on a sum placed at 8% p.a. compounded annually for 2 years is Rs 128. Find the principal

- A. 20000
- B. 24000
- C. 26000
- D. 15000

• **Soln:**

- Let the principal be $P = \text{Rs. } 100$.
- time $N = 2$ years, rate of interest $R = 8\%$ per annum
- simple interest = $\frac{PNR}{100} = \frac{100 \times 8 \times 2}{100} = \text{Rs. } 16$
- compound amount = $P(1 + \frac{R}{100})^N$
- $= 100 \times (1 + \frac{8}{100})^2 = 100 \times (\frac{108}{100})^2 = 100 \times (\frac{11664}{10000}) = \frac{11664}{100} = 116.64$
- compound interest = compound amount – principal
- $C.I = A - P$
 $= 116.64 - 100 = \text{Rs. } 16.64$
- the difference between the compound interest and simple interest = $16.64 - 16.00 = \text{Rs. } 0.64$
- $0.64 \rightarrow 100$
- $128 \rightarrow ?$
- $= \frac{128 \times 100}{0.64} = 20000$
- Thus, the principal is Rs. 20000.

Interest

- If the difference between compound and simple interest is of **two years** than,
Difference = $P(R)^2/(100)^2$
Where P = principal amount, R = rate of interest
- If the difference between compound and simple interest is of **three years** than,
Difference = $3 \times P(R)^2/(100)^2 + P (R/100)^3$.
Here also, P = principal amount, R = rate of interest



Interest

Q.A started business with Rs. 45,000 and B joined afterwards with 30,000. If the profit at the end of a year was divided in the ratio 2 : 1 respectively, then B would have joined A for business after.

A. 1 month

B. 2 months

C. 3 months

D. 4 months

Soln:

- Capital of A = Rs. 45,000 Capital of B = Rs. 30,000
- Ratio of P1:P2=2:1
- using formula,
- $\frac{C_1T_1}{C_2T_2} = \frac{P_1}{P_2}$
- In this type , the time period is 12 months i.e. one year
- $\frac{45000 \times 12}{30000 \times T_2} = \frac{2}{1}$
- $T_2=9$
- B would join business after $(12 - 9) = 3$ months
- **Ans: C**



Partnership

Q. A, B & C enter into a partnership with total of Rs 8,200. A's capital is Rs 1000 more than B's & Rs 2000 less than C's. What is B's share of annual profit of Rs 2,460?

A. Rs 1320

B. Rs 720

C. Rs 420

D. Rs 520

Ans: C



Interest(Assignment)

Q. A started a business by investing Rs. 32000. After 2 months B joined him with some investments. At the end of the year the total profit was divided in the ratio 8:5. How much capital was invested by B?

A. Rs. 30,000 B. Rs. 28000 C. Rs. 24000 D. Rs. 19000

- Soln:
- using formula,
- $\frac{C_1 T_1}{C_2 T_2} = \frac{P_1}{P_2}$
- $\frac{32000 \times 12}{C_2 \times 10} = \frac{8}{5}$
- $C_2 = \text{Rs. } 24000$

Ans: C



Interest(Assignment)

Q. When annual compounding is done, a sum amounts to Rs 5000 in 6 years and 7200 in 8 years.
What is the int rate?

A. 10%

B. 15%

C. 20%

D. 25%

Soln

Let P be the principal & R the int rate

$$\rightarrow 5000 = P(1+R/100)^6 \dots\dots(1)$$

$$\rightarrow 7200 = P(1+R/100)^8 \dots\dots(2)$$

$$\rightarrow 36/25 = (1+R/100)^2$$

\rightarrow Taking square roots of both sides

$$\rightarrow 1+R/100 = 6/5$$

$$\rightarrow R/100 = 1/5$$

$$\rightarrow R = 20\%$$

Ans: C



Interest(Assignment)

Q. A sum fetched a total simple interest of Rs.7056 at the rate of 8 percent per year in 7 years. What is the sum?

A. Rs 12600

B) Rs 15120

C) Rs 10080

D) Rs 7560

Ans : A



Interest(Assignment)

Q. Find the compound interest on Rs. 15,625 for 9 months at 16% per annum compounded quarterly.

A. Rs. 1851

B. Rs. 1941

C. Rs. 1951

D. Rs. 1961

Ans: C



Interest(Assignment)

Q. A sum of money placed at compound interest doubles itself in 4 years. In how many years will it amount to 8 times?

A. 9 years

B. 8 years

C. 27 years

D. 12 years

Ans: D



Interest(Assignment)

Q. Difference between Compound interest & simple interest on a sum placed at 20% per annum compounded annually for 2 years is Rs. 72. Find the sum.

A. Rs. 2400

B. Rs. 8400

C. Rs. 1800

D. Rs. 900

Ans : C



Interest(Assignment)

Q. What is the simple interest on a sum of Rs. 700 if the rate of interest for the first 3 years is 8% per annum and for the last 2 years is 7.5% per annum?

A.Rs. 269.5 B.Rs. 283 C.Rs. 273 D.Rs. 280 E. None of these

Ans: C



Interest(Assignment)

Q. Rs.2100 is lent at compound interest of 5% per annum for 2 years. Find the amount after two years.

- A.Rs. 2300 B.Rs. 2315.25 C.Rs. 2310 D.Rs. 2320 E. None of these

• **Soln:**

• $A = P (1 + R/100)^T$

• $A = 2100(1+5/100)^2$

• $A = 2100 \times [105/100]^2$

• $A = \frac{2100 \times 11025}{10000}$

• Amount, A=Rs.2315.25

• **Ans : B**



Interest(Assignment)

Q. A man borrowed total Rs 2500 at Simple interest from two money lenders. He paid interest at 12% p.a. to one and 14% p.a. to the other. The total interest paid for the year was Rs.326. How much did he borrow at 14%?

A. Rs 1000

B. Rs 1200

C. Rs 1300

D. Rs 1500

Soln:

Let, x = Principal at 12%

&

$2500 - x$ = Principal at 14%

$$\text{SI at Rs. } x = \frac{x \times 1 \times 12}{100} = \frac{12x}{100} = \frac{3x}{25}$$

$$\text{SI at Rs. } 2500 - x = \frac{2500 - x \times 1 \times 14}{100} = \frac{(2500 - x) \times 7}{50} = \frac{17500 - 7x}{50}$$

$$\text{SI at } x + \text{SI at } 2500 - x = 326$$

Substitute and solving the equation gives $x = \text{Rs. } 1200$

We need Principal at $2500 - x = 2500 - 1200 = \text{Rs. } 1300$

Ans: C



Interest(Assignment)

Q.A certain sum of money amounts to Rs. 704 in two years and Rs 800 in 5 years. Find the Principal.

- A. Rs. 640 B. Rs. 600 C. Rs. 550 D. Rs.450
- **Ans: A**



Interest(Assignment)

Q. A started a business by investing Rs. 32000. After 4 months B joined him with some investments. At the end of the year the total profit was divided in the ratio 6:5. How much capital was invested by B?

A. Rs. 30,000

B. Rs. 28000

C. Rs. 40000

D. Rs. 19000

Ans: C



Interest(Assignment)

Q. Three persons started a placement business with a capital of Rs. 3000. B invests Rs. 600 less than A and C invests Rs. 300 less than B. What is B's share in a profit of Rs. 886 ?

- A. Rs. 443
- B. Rs. 354.40
- C. Rs. 265.80
- D. Rs. 177.20

Ans: C



Interest(Assignment)

Q. What should be the simple interest obtained on an amount of Rs 5,760 at the rate of 6% p.a. after 3 years?

- A. Rs 1036.80
- B. Rs 1666.80
- C. Rs 1336.80
- D. Rs 1063.80
- E. None of these

Ans : A



Interest(Assignment)

Q. Anand and Deepak started a business investing Rs.22,500 and Rs.35,000 respectively. Out of a total profit of Rs. 13,800. Deepak's share is

A. Rs 9600

B. Rs 8500

C. Rs 8450

D. Rs 8400

Ans: D

Ratio of their shares-

= 22500 : 35000

= 9 : 14

Deepak's share = Rs.(13800×14/23)

= Rs. 8400



Interest(Assignment)

Q. A started a business with Rs. 21,000 and is joined afterwards by B with Rs. 36,000. After how many months did B join if the profits at the end of the year are divided equally?

- A. 4 B. 5 C. 6 D. 7

Ans: B

- Capital of A = Rs. 21000 Capital of B = Rs. 36000
- Ratio of P1:P2=1:1
- using formula,
- $\frac{C_1T_1}{C_2T_2} = \frac{P_1}{P_2}$
- In this type , the time period is 12 months i.e. one year
- $\frac{21000 \times 12}{36000 \times T_2} = \frac{1}{1}$
- $T_2 = 7$
- B would join business after $(12 - 7) = 5$ months



Time & Work

- Work (Effort) = Manpower x time.
- If A can do a piece of work in x days then work done by A in one day is equal to $1/x$ of the entire work.
- If A is twice as good a workman as B then A will take half the time taken by B to do a same piece of work.
- If number of people to do a certain work is increased (or decreased) the time taken to do the same work will decrease (or increase)
- Total work = LCM
- Efficiency = (Total work)/(Total time)
- OR
- Total work = Efficiency x Total time



Time & Work

Q. A, B & C can complete a certain work in 10, 12 & 15 days respectively. If all of them work together in how many days will the work get completed?

SUNBEAM



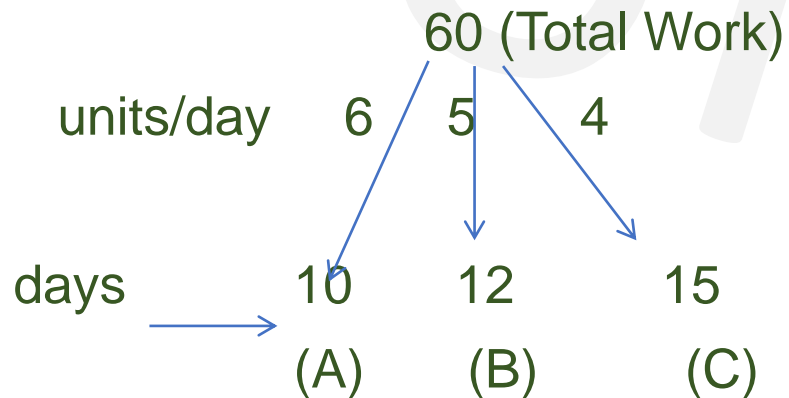
Time & Work

Q. A, B & C can complete a certain work in 10, 12 & 15 days respectively. If all of them work together in how many days will the work get completed?

Soln:

We know, Total work = Days x units/day

$$\text{LCM}(10, 12, 15) = 60$$



In one day, $A+B+C = 6+5+4 = 15$ units

So to complete TW = 60 units, days = ?

$$\text{days} = \frac{60}{15} = 4. \text{ So 4 days are needed to complete the work.}$$



Time & Work

Q. Two persons A & B can complete a work in 20 & 30 days respectively. If both of them start together but A stops after 10 days then how many days will the work last?

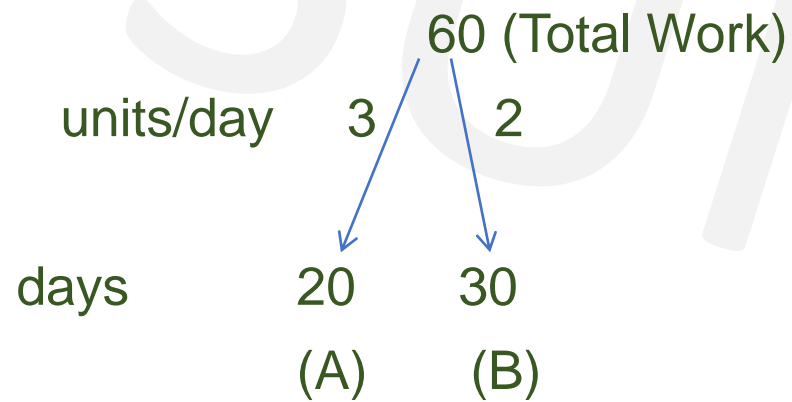
A. 7 days

B. 8 days

C. 15 days

D. 10 days

Soln: LCM(20,30) = 60



A after 10 days, $3 \times 10 = 30$ units & B after 10 days $= 2 \times 10 = 20$ units

Total units = 60, Remaining units = total – A + B(after 10 days)
 $= 60 - 50 = 10$ units

Days needed to do 10 units work $= \frac{10}{2} = 5$ days

So Total Duration $= 10 + 5 = 15$ days

Ans: C



Time & Work

Q. Two persons A & B can complete a work in 20 days , B & C can complete it in 24 days & C and A can complete it in 40 days. Find in how many days will B complete the work alone?

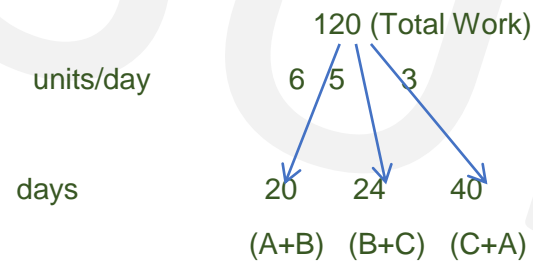
A. 30 days

B. 40 days

C. 50 days

D. 60 days

• **Soln:** $\text{LCM}(20, 24, 40) = 120$



No of workers

$2 \times (A+B+C) = 6+5+3 = 14$ i.e. $2(A+B+C)$'s 1 day work

$A + B + C = 14/2 = 7$

$B = 7 - (A+C)$

$B \text{ alone} = 7 - 3 = 4 \text{ units/day}$

To find days needed by B = $\frac{\text{Total work}}{\text{units/day}} = \frac{120}{4} = 30 \text{ days}$

So , 30 days are needed by B to complete the work alone.

Ans :A



Time & Work

Q. A & B can do a piece of work in 20 & 16 days respectively. If they work on alternate days each starting with A in how many days was the work completed?

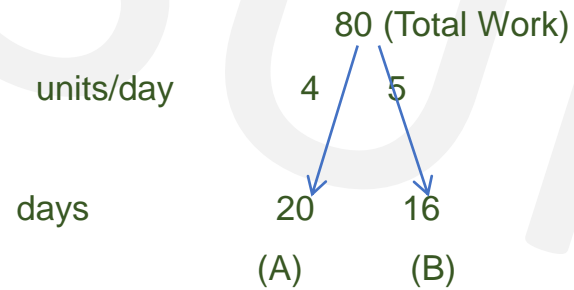
A. 19 days

B. 18 days

C. 16 days

D. 30 days

• **Soln:** $\text{LCM}(20,16) = 80$



• Day 1, A = 4 units

• Day2, day 1 work added

• $B = 5 + 4 = 9\text{units}$

• 9 units --- 2 days

• 80 units --- ?

• $\text{Days} = \frac{80 \times 2}{9} = \frac{160}{9} = 17.7777 = 17.78 \text{ days}$

• **Ans B**



Time & Work

- Efficiency = capacity to do work
- Efficiency and time are inversely proportional
- Efficiency $\propto \frac{1}{T}$
- Efficiency and work are directly proportional
- Efficiency $\propto W$



Time & Work

Q. A is twice as efficient as B and completes a certain work in 12 days less than B. In how many days will both of them complete the same work?

A. 6 days

B. 8 days

C. 7 days

D. 3 days

Soln:

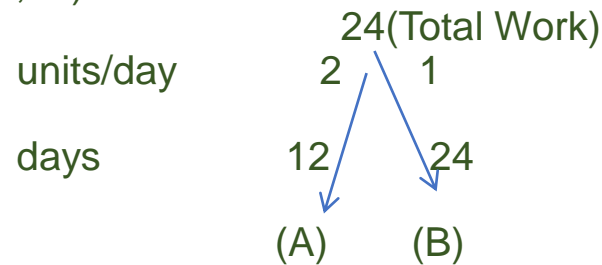
$$\begin{array}{ccc} \text{A} & & \text{B} \\ 2x & - & x \\ & & = 12 \end{array}$$

$$x = 12$$

As, Efficiency $\propto \frac{1}{T}$

A = 12 days and B = $2x = 2 \times 12 = 24$ days

- LCM(12,24) = 24



$$A + B = 2 + 1 = 3 \text{ units/day}$$

$$\text{Days} = \frac{\text{TW}}{\text{units/day}} = \frac{24}{3} = 8 \text{ days}$$

Ans B

or

Days ratio is inversely proportional to efficiency ratio.

	A	B
Eff (Ratio)	2	1
Days (Ratio)	1	2
Days	$x-12$	x

$\rightarrow 2(x-12) = x$
 $\rightarrow x = 24 \text{ days}$
 $\rightarrow x - 12$
 $\rightarrow 24 - 12 = 12 \text{ days}$



Time & Work

Q. A, B & C can complete a work in 10, 12 & 15 days respectively. All three together completed the work & they are paid Rs 6000. Find the share of C

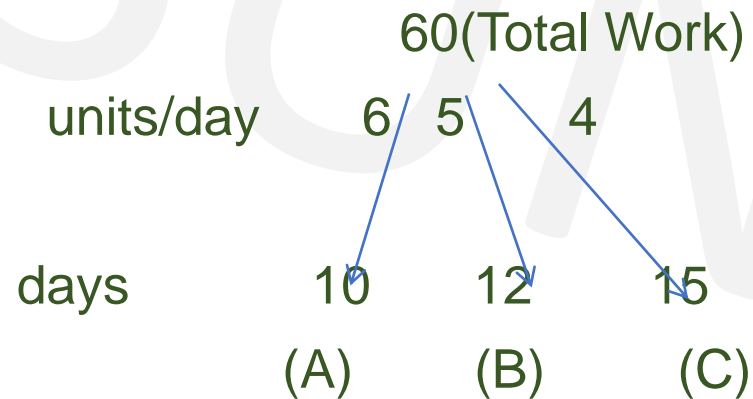
A. 3000

B. 2400

C. 2000

D. 1600

• **Soln:** LCM(10,12,15) = 60



Together,

$$(A+B+C) = 6+5+4 = 15 \text{ units/day}$$

Total paid amount to (A+B+C) = 6000

$$C = \frac{4}{15} \times 6000$$

$$= \text{Rs. } 1600$$

Ans: D



Time & Work(Assignment)

Q. Two persons A & B can complete a work in 24 & 30 days respectively. If both of them start together .After how many days should B stop working so that A completes the remaining work in 6 days?

A. 7 days

B. 8 days

C. 9 days

D. 10 days

Ans D



Time & Work(Assignment)

Q. Two persons A & B can complete a work in 20 days , B & C can complete it in 30 days while C & A can complete it in 24 days. Find in how many days will B complete the work alone?

A. 36 days

B. 48 days

C. 56 days

D. 64 days

Ans B



Time & Work(Assignment)

Q. A is thrice as good a workman as B and can finish a piece of work in 60 days less than B. Find the time to complete the work if both of them work together

A. 20 days B. 22.5 days C. 24.5 days D. 22 days

Ans: B



Time & Work(Assignment)

Q. 2 workers A & B can finish a job in 8 days and 12 days respectively ,after the completion of work they were paid Rs.200. Find share of B.

A. Rs. 120 B. Rs. 80 C. Rs. 40 D. Rs. 60

Ans: B



Work & Time(Assignment)

Q. A, B & C can do a piece of work in 12, 20, & 30 days respectively. If A is assisted everyday alternately by B & C in how many days was the work completed?

A. 6 days

B. 8 days

C. 7 days

D. 3 days

Ans: B



Work & Time(Assignment)

Q. A can do a piece of work in 10 days, B in 12 days and C in 15 days. They all start work together, but A leaves 2 days later and B leaves 3 days before completion of the work. In how many days was the work completed?

A. 7 days

B. 5 days

C. 8 days

D. 10 days

Ans: A



Work & Time(Assignment)

Q. Apurva can do a job in 12 days. She and Amit completed the work together and were paid Rs.54 and Rs.81 respectively. How many days are needed to complete the job together?

A. 4.8 days

B.4.2 days

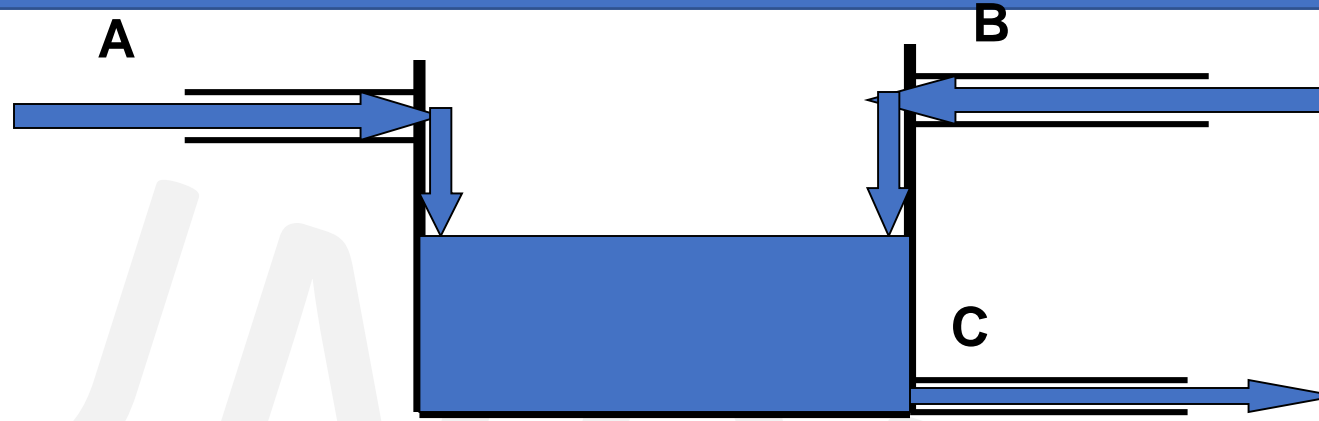
C. 4 days

D. 3.6 days

Ans: A



Pipes & Cisterns



- A cistern may have inlet pipe or outlet pipe.
- Conventionally filling a tank is treated as positive work and emptying a tank as negative work.
- Net work done = (Sum of work done by inlets) – (sum of work done by outlets)

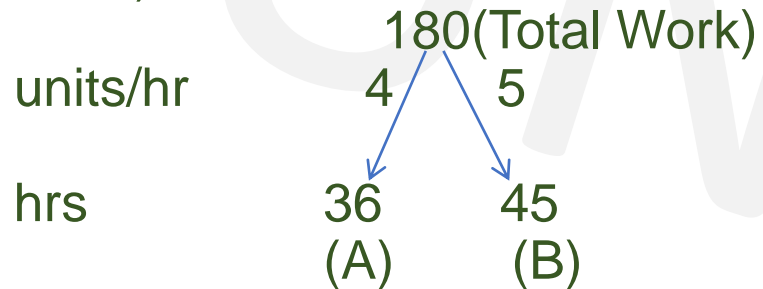


Pipes & Cisterns

Q. Two pipes A and B can fill a tank in 36 hours and 45 hours. If both pipes are opened simultaneously. How much time will it take to fill the tank?

Soln:

- $\text{LCM}(36, 45) = 180$



As both are opened, together, $A+B = 4+5 = 9$ units/hr
For tank to fill = $\frac{180}{9} = 20$ hours.

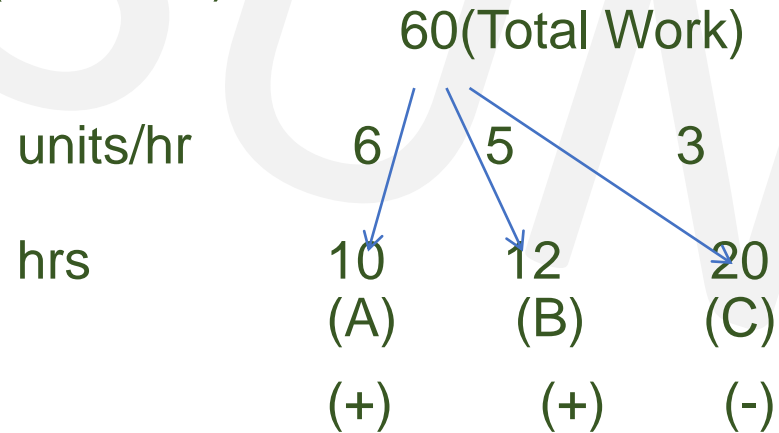


Pipes & Cisterns

Q. Two pipes can fill the reservoir in 10 hours and 12 hours respectively. While third pipe empties full tank in 20 hours. If all the three pipes operate simultaneously , how much time will the tank be filled?

Soln:

- $\text{LCM}(10, 12, 20) = 60$



$$A+B = 6 + 5 = 11$$

As, C empties the tank so, $11 - 3 = 8$ units/hr

Quantity filled in 1 hour if all the pipes are opened together

$$\text{Time to fill} = \frac{\text{TW}}{\text{units/hr}} = \frac{60}{8} = 15/2 \text{ hrs}$$



Pipes & Cisterns

Q. Two pipes A and B can fill a tank in 24 minutes and 32 minutes respectively. If both the pipes are opened simultaneously, after how much time should B be closed so that the tank is full in 18 minutes

A . 2 min

B. 4 min

C. 6 min

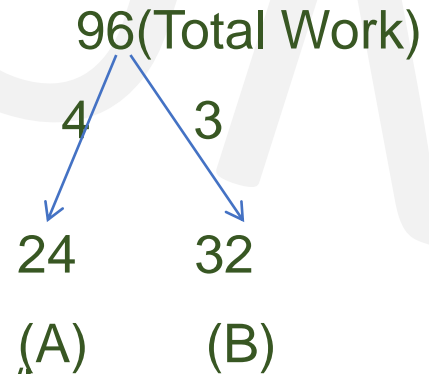
D.8 min

Soln:

$$\text{LCM}(24,32) = 96$$

units/hr

hrs



$$\text{WD} = \text{time} \times \text{units/hr}$$

Work done by A alone = $18 \times 4 = 72$ units

Remaining work = Total units – work done by A = $96 - 72 = 24$ units

B should be closed after $= \frac{24}{3} = 8$ mins.

Ans : D



Pipes & Cisterns

Q. A pump can fill a tank with water in 2 hours. Because of a leak, it took $2\frac{1}{3}$ hours to fill the tank. The leak can drain all the water of the tank in:

A. $4\frac{1}{3}$ hours

B. 7 hours

C. 8 hours

D. 14 hours

• Soln :

• Work done = $\frac{XY}{Y-X}$ where, X = number of hrs to fill tank, Y = number of hrs to fill tank with leakage

$$\bullet 2\frac{1}{3} = \frac{7}{3}$$

$$\bullet \text{Work done} = \frac{2 \times \frac{7}{3}}{\frac{7}{3} - 2} = \frac{\frac{14}{3}}{\frac{1}{3}} = 14$$

• Leak will empty the tank in 14 hours

• **Ans: D**



Pipes & Cisterns(Assignment)

Q. 12 buckets of water fill a tank when the capacity of each bucket is 13.5 litres. How many buckets will be needed to fill the same tank, if the capacity of each bucket is 9 litres?

A. 8

B. 15

C. 16

D. 18

Ans: D

Capacity of the tank = (12×13.5) litre
= 162 litres

Capacity of each bucket = 9 litres

Number of buckets needed = $162 / 9$
= 18 buckets



Pipes & Cisterns(Assignment)

Q. There are 3 pipes attached to a tank A, B & C. A alone can fill the tank in 60 min, B can fill the tank in 45 min & C can empty the full tank in 30 min. If all three pipes are opened together in how much time will the tank be full?

A. 5 hrs

B. 4 hrs

C. 3 hrs

D. 2 hrs

Ans: C



Pipes & Cisterns(Assignment)

Q. Two pipes A and B can fill a cistern in $37\frac{1}{2}$ minutes and 45 minutes respectively. Both pipes are opened. The cistern will be filled in just half an hour, if B is turned off after:

A. 5 mins

B. 9 mins

C. 10 mins

D. 15 mins

Ans : B



Pipes and Cisterns(Assignment)

Q. Two pipes A & B can fill the cistern in 20 min & 25 min respectively. Both are opened together but at the end of 5 min B is turned off. How much total time will the cistern take to fill up?

- A. 5 min B. 10 min C. 12 min D. 16 min

Ans: D



Pipes and Cisterns(Assignment)

Q. Two pipes A and B can fill a tank in 36 minutes and 45 minutes respectively. Another pipe C can empty the tank in 30 minutes. First A and B are opened. After 7 minutes, C is also opened. The tank is filled up in

- A. 39 minutes B. 46 minutes C. 40 minutes D. 45 minutes

Ans: B



Pipes and Cisterns(Assignment)

Q. Two pipes A and B can fill a tank in 15 minutes and 20 minutes respectively. Both the pipes are opened together but after 4 minutes, pipe A is turned off. What is the total time required to fill the tank?

- A. 10 min. 20 sec.
- B. 11 min. 45 sec.
- C. 12 min. 30 sec.
- D. 14 min. 40 sec.

Ans: D



Chain Rule

- In earlier problems the rate of doing work of each person or pipe varied.
- In chain rule problems all entities are of the same efficiency or work capacity.
- The entities may be men, women, tractors, engines, pumps, horses, lawn mowers etc.
- Work Done = No. of Men x Days x Hrs/day
- $W = M \times D \times H$
- $W_1 = M_1 \times D_1 \times H_1$, $W_2 = M_2 \times D_2 \times H_2$
- $$\frac{W_1}{W_2} = \frac{M_1 \times D_1 \times H_1}{M_2 \times D_2 \times H_2}$$



Chain Rule

Q. 18 men working for 5 hours per day can complete a job in 8 days. How many men working for 8 hours a day for 6 days will be required?

A. 24

B. 15

C. 16

D. 17

Men x Days x Hrs/day = Work Done

Case 1

$18 \times 8 \times 5 = 720 \text{ man-hrs}$

Case 2

$M \times 6 \times 8 = 720 \text{ man-hrs}$

$M \times 6 \times 8 = 18 \times 8 \times 5$

$M = 15$

Ans B



Chain Rule

Q. 36 men working for 12 hours a day can build a wall 45 mt long, 52 mt high & 63 mt broad in 91 days. In how many days will 80 men working for 9 hours a day build a wall 50 mt long, 72 mt high & 30 mt broad ?

A. 24 days

B. 35 days

C. 40 days

D. 47 days

Men x Days x Hrs/day

= Work Done (Volume of Wall)

Case 1

$$36 \times 91 \times 12$$

$$= 45 \times 52 \times 63$$

Case 2

$$80 \times D \times 9$$

$$36 \times 91 \times 12$$

$$= \frac{50 \times 72 \times 30}{45 \times 52 \times 63}$$

$$45 \times 52 \times 63$$

$$\text{Ans C} \quad D = 40 \text{ days}$$



Chain Rule

Q. 20 men or 40 women working for 9 hours a day can finish a work in 80 days. In how many days will 10 men & 10 women working together for 12 hours a day finish the work?

A. 60 days B. 70 days C. 80 days D. 90 days

Men x Days x Hrs/day = Work Done

Also 20 Men = 40 Women \rightarrow 1M = 2 W (convert to one unit i.e. women or children)

20 men ---- 40 women

1men ----- ? (2women)

Case 1

40W x 80 x 9 = work

Case 2

(20W + 10W) x D x 12 = work

30W x D x 12 = 40W x 80 x 9

D = 80 days

Ans C



Chain Rule

Q. 8 men or 12 women or 16 children working for 8 hours a day can finish a work in 52 days. In how many days will 1 man & 1 woman & 1 child working together for 8 hours a day finish the work?

- A. 180 days B. 192 days C. 216 days D. 164 days

- **Men x Days x Hrs/day = Work Done**

- Also 8 Men = 16 children $\rightarrow 1M = 2C$

- And 12 Women = 16 children $\rightarrow 1W = \frac{4}{3}C$

- **Case 1**

- $16C \times 52 \times 8 = \text{work}$

- **Case 2**

- $(2C + \frac{4}{3}C + C) \times D \times 8 = \text{work}$

- $(2C + \frac{4}{3}C + C) \times D \times 8 = 16C \times 52 \times 8$

- $\frac{13C}{3} \times D \times 8 = 16C \times 52 \times 8$

- $D = 192 \text{ days}$

Ans: B



Chain Rule

Q. 12 men and 16 boys can do a piece of work in 5 days. 13 men and 24 boys can do it in 4 days. The ratio of the daily work done by a man and a boy is –

A. 2 : 1

B. 3 : 1

C. 3 : 2

D. 5 : 4

Soln:

$$W = M \times D$$

and

$$W = M \times D$$

$$\begin{aligned} W &= (12m + 16b) \times 5 \\ &= 60m + 80b \end{aligned}$$

$$\begin{aligned} W &= (13m + 24b) \times 4 \\ &= 52m + 96b \end{aligned}$$

As , work done is same, equating both sides ,we get,

$$60m + 80b = 52m + 96b$$

$$60m - 52m = 96b - 80b$$

$$8m = 16b$$

$$m = 2b$$

$$m : b = 2 : 1$$

Ans: A



Chain Rule(Assignment)

Q. 12 men & 18 women working together for 9 hours a day finish the work in 150 days.
30 men & 15 women working together for 10 hours a day finish the work in 81 days. In how many days will 12 men & 12 women working together for 12 hours a day finish the work?

- A. 115 days B. 120 days C. 130 days D. 135 days

Ans: D



Chain Rule(Assignment)

Q. 24 workers working 8 hours a day can construct a wall in 5 days. In how many days can 45 workers working 4 hours a day construct 3 such walls?

A. 18 days

B. 16 days

C. 4 days

D. 7 days

Ans : B



Chain Rule(Assignment)

Q. 24 workers working 5 hours a day can construct a bungalow in 8 days. In how many days can 40 workers working 8 hours a day construct 2 such bungalows?

A. 3 days

B. 6 days

C. 4 days

D. 8 days

Ans : B



Chain Rule(Assignment)

Q. 32 painters working 5 hours a day can paint a building in 10 days. In how many days can 40 workers working 6 hours a day paint 3 such buildings?

A. 10 days

B. 16 days

C. 20 days

D. 28 days

Ans : C



Chain Rule(Assignment)

Q. 8 men or 12 women can construct a wall in 33 days . In how many days can 10men and 21 women construct the wall.

A. 10 days

B. 11 days

C. 22 days

D. 15 days

Ans : B



Chain Rule(Assignment)

Q. 12 men or 18 women can construct a wall in 33 days . In how many days can 20men and 24 women construct the wall.

A. 10 days

B. 11 days

C. 22 days

D. 15 days

Ans : B



Chain Rule(Assignment)

Q. 12 men can do a piece of work in 24 days. How many days are needed to complete the work, if 8 men do this work ?

- A. 28 days
- B. 36 days
- C. 48 days
- D. 52 days

Ans: B



