



## GENERAL APTITUDE

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## 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 =  $(\text{Total work}) / (\text{Total time})$
- 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?



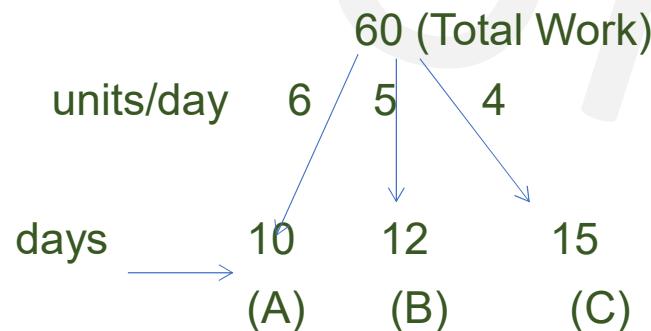
## Time & Work

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?

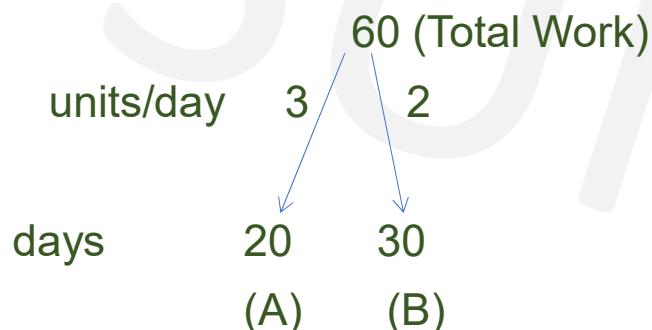
A. 7 days

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)

$$= 60 - 50 = 10 \text{ units}$$

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

So Total Duration =  $10 + 5 = 15 \text{ days}$

**Ans: C**

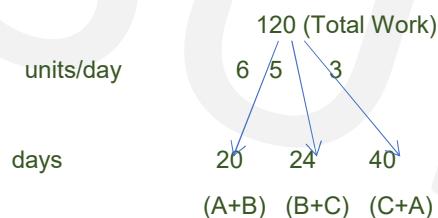


# Time & Work

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

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

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

$$B = 7 - (A+C)$$

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

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

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

**Ans :A**

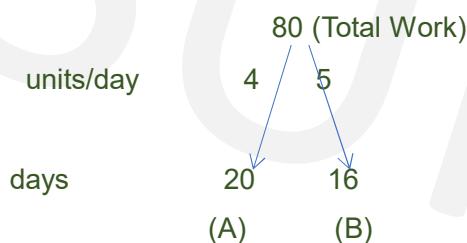


# Time & Work

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

- $B = 5 + 4 = 9$  units
- 9 units  2 days

- 80 units --- ?

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

• Ans B



## Time & Work(Assignment)

Q. A and B together can do a piece of work in 12 days which B and C together can do in 16 days. After A has been working at it for 5 days and B for 7 days, C finishes it in 13 days. In how many days C alone will do the work ?

- A. 16 days
- B. 24 days
- C. 36 days
- D. 48 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

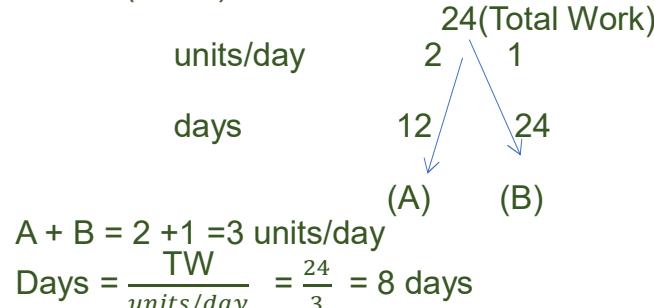
D. 3 days

Soln:

$$\begin{array}{r} \text{A} \quad \text{B} \\ 2x - x = 12 \\ x = 12 \end{array}$$

As , Efficiency  $\propto \frac{1}{T}$   
 $A = 12 \text{ days and } B = 2x = 2 \times 12 = 24 \text{ days}$

• LCM(12,24) = 24



**Ans B**

or

Days ratio is inversely proportional to efficiency ratio.

Eff (Ratio)  
Days (Ratio)  
**Days**

$$\begin{array}{r} \text{A} \quad \text{B} \\ \frac{2}{1} \quad \frac{1}{2} \\ 1 \quad 2 \\ x-12 \quad x \end{array}$$
$$\begin{aligned} \rightarrow 2(x-12) &= x \\ \rightarrow x &= 24 \text{ days} \\ \rightarrow x - 12 &= 12 \\ \rightarrow 24 - 12 &= 12 \text{ days} \end{aligned}$$



## Time & Work

Q. A can do a piece of work in 10 days working 8 hours per day. If B is two-third as efficient as A, then in how many days can B alone do the same piece of work, working 5 hours per day?

- A. 15days      B. 18days      C. 20days      D. 24days

**Ans: D**

Eff (Ratio)

A	B
1	2/3
2/3	1
<b>Time</b>	<b>x</b>
$\frac{2/3}{80}$	$= 1/x$

$$x = 120 \text{ hrs}$$

$$1 \text{ day} = 5 \text{ hrs}$$

$$? = 120 \text{ hrs}$$

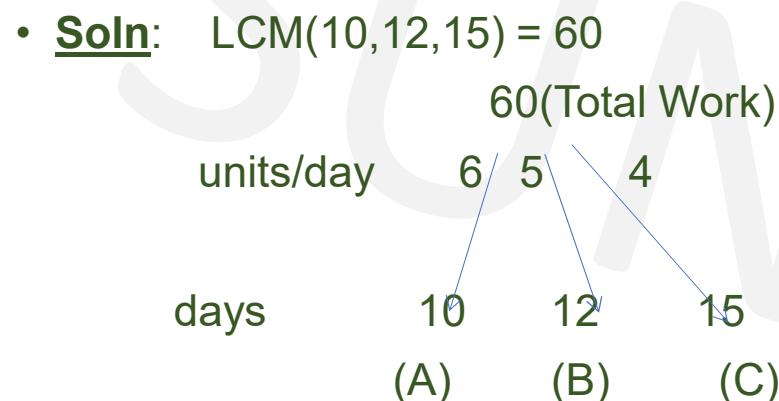
**24days**



## 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



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**



## **Work & Time(Assignment)**

Q. A and B together can do a piece of work in 12 days, while A alone can complete the same work in 18 days. How long will B alone take to complete the work?

- A. 6 days
- B. 12 days
- C. 24 days
- D. 36 days

**Ans: D**



## **Work & Time(Assignment)**

Q. A can finish a job in 16 days and B in 20 days. If both work together for 4 days and A suddenly leaves, then how many more days does B need to complete the job?

- A. 12 days
- B. 9 days
- C. 11 days
- D. 10 days

**Ans: C**



## **Work & Time(Assignment)**

Q. A and B can do a piece of work in 72 days; B and C can do it in 120 days; A and C can do it in 90 days. In what time can A alone do it?

- A. 80 days
- B. 100 days
- C. 120 days
- D. 150 days

**Ans: C**

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## Pipes & Cisterns



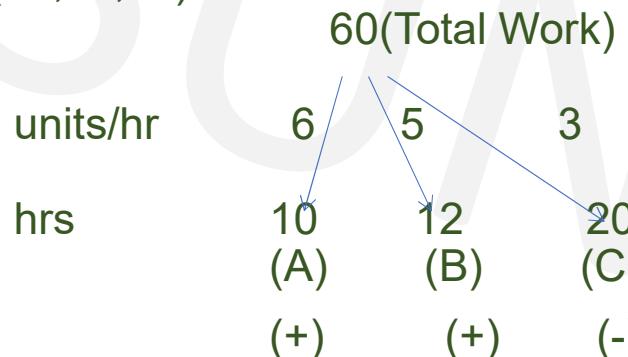
- A cistern may have inlet pipe or outlet pipe.
- Conventionally filling a tank is treated as positive work and emptying a tank as negative work.
- Net work done = (Sum of work done by inlets) – (sum of work done by outlets)

# Pipes & Cisterns

Q. Two pipes 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:

- LCM(10,12,20) = 60



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

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

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

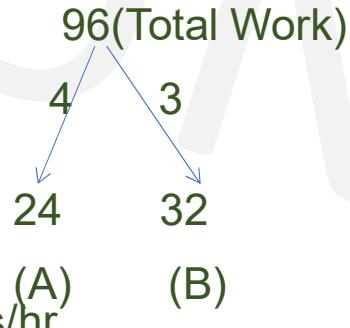
D. 8 min

Soln:

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

units/hr

hrs



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

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

$$\text{Remaining work} = \text{Total units} - \text{work done by A} = 96 - 72 = 24 \text{ units}$$

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

**Ans : D**

$$\begin{aligned}\text{Time} &= 1 - \frac{\text{full tank time}}{\text{1st pipe time}} \\ &= (1 - 18/24) \times 32 \\ &= 8 \text{ mins}\end{aligned}$$



## Pipes & Cisterns

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**

$$\begin{aligned}\text{Capacity of the tank} &= (12 \times 13.5) \text{ litre} \\ &= 162 \text{ litres}\end{aligned}$$

$$\text{Capacity of each bucket} = 9 \text{ litres}$$

$$\begin{aligned}\text{Number of buckets needed} &= 162 / 9 \\ &= 18 \text{ buckets}\end{aligned}$$



## Pipes & Cisterns

Q. Bucket P has thrice the capacity as bucket Q. It takes 60 turns for bucket P to fill the empty tank. How many turns it will take for both P and Q, having each turn together to fill the tank?

- A. 30      B. 40      C. 45      D. 90

**Soln-**

$$P = 3Q$$

60 turns of P = capacity of tank

$$60P = \text{capacity of tank}$$

$$60(3Q) = \text{capacity of tank}$$

$$180Q = \text{capacity of tank}$$

P+Q work together.

$$\begin{aligned}\text{Amount of water poured together} &= P + Q \\ &= 3Q + Q = 4Q\end{aligned}$$

$$\text{Number of turns} = 180Q/4Q = 45 \text{ turns}$$

**Ans: C**



## Pipes & Cisterns(Assignment)

Q. A leak in the bottom of a tank can empty the full tank in 6 hours. An inlet pipe fills water at the rate of 4 litres per minute. When the tank is full, the inlet is opened and due to the leak, the tank is empty in 8 hours, then the capacity of the tank is:

- A. 5260 L
- B. 5760 L
- C. 5846 L
- D. 6970 L

**Ans: B**



## Pipes & Cisterns(Assignment)

Q. An inlet pipe alone can fill a tank in 6 hrs. But due to a leak of 20 lt/min in the tank it requires 8 hrs to fill. Find the capacity of the full tank?

- A. 24000 lt
- B. 28800 lt
- C. 28000 lt
- D. 1200 lt

**Ans B**



## Pipes & Cisterns(Assignment)

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

- A. 4 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
- $2 \frac{1}{3} = \frac{7}{3}$
- 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. 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. 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

$$40W \times 80 \times 9 = \text{work}$$

### Case 2

$$(20W + 10W) \times D \times 12 = \text{work}$$

$$30W \times D \times 12 = 40W \times 80 \times 9$$

$$D = 80 \text{ days}$$

**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 = 2 C

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

- Case 1

- 16C x 52 x 8

- Case 2

$$\bullet \quad (2C + 4/3C + C) \times D \times 8 = \text{work}$$

$$\bullet (2C + 4/3C + C) \times D \times 8 = 16C \times 52 \times 8$$

- 13C/3 x D x 8 = 16C x 52 x 8

•  $D = 192$  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:**

$$W = M \times D \quad \text{and}$$

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

$$W = M \times D$$

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

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

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

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

$$8m = 16b$$

$$m = 2b \quad m : b = 2 : 1$$

**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. 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

$$\frac{80 \times D \times 9}{36 \times 91 \times 12} = \frac{50 \times 72 \times 30}{45 \times 52 \times 63}$$

$$D = 40 \text{ days}$$

**Ans C**



## **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**



# 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

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

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

T = periods of compounding,

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. A shopkeeper with an OD facility at 18% with a bank borrowed Rs. 15000 on Jan 8, 2011 and returned the money on June 3, 2011 so as to clear the debt. The amount that he paid was -

- A. Rs. 16080      B. Rs. 16280      C. Rs. 16400      D. None of these

**Soln:**

- $P = 15000, r= 18\%,$
- $T = 23(\text{jan})+28(\text{febNonleap})+31(\text{march})+30(\text{April})+31(\text{may})+3(\text{june}) = 146 \text{ days}$
- $146/365 \text{ days} = 2/5 \text{ years.}$
- $SI = 15000 \times 18 \times 2/5 \times 1/100 = 30 \times 18 \times 2 = 1080$

$$\text{Amount} = P + SI$$

$$= 15000 + 1080$$

$$=\text{Rs. } 16080$$

**Ans: A**

