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 = (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?
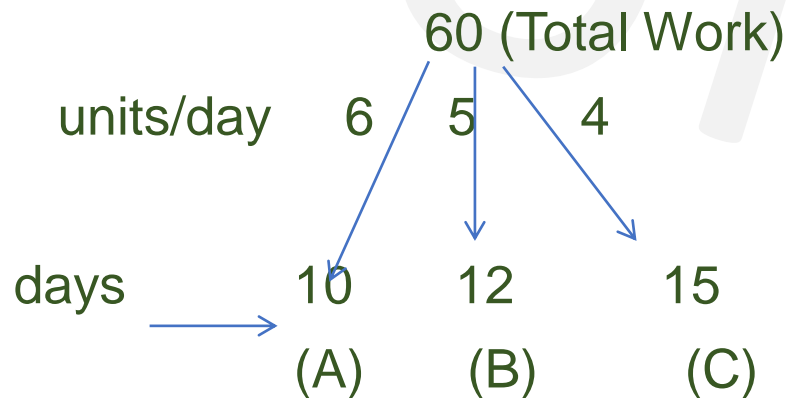
Time & Work

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

LCM(10,12,15) = 60

60 (Total Work)

units/day   6   5   4

days   10   12   15

       (A)   (B)   (C)

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

So to complete TW = 60 units, days = ?

days = $\frac{60}{15}$ = 4.   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?
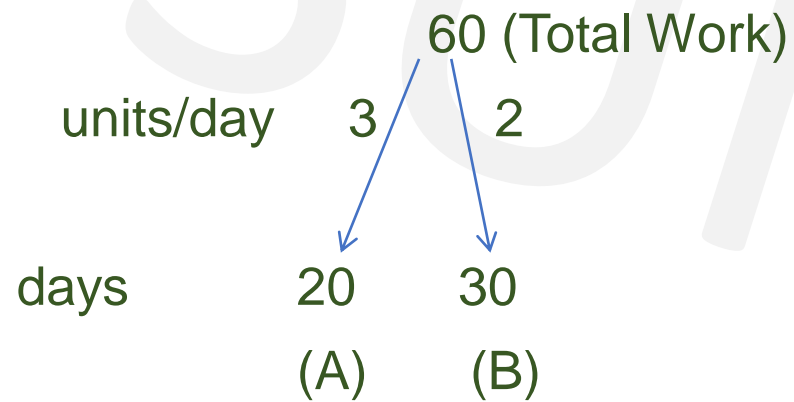
A. 7 days   B. 8 days   C. 15 days   D. 10 days

Soln: LCM(20,30) = 60

60 (Total Work)

units/day   3   2

days   20   30

(A)   (B)

A after 10 days, 3 x 10 = 30 units & B after 10 days = 2 x 10 = 20units

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

= 60-50=10units

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?
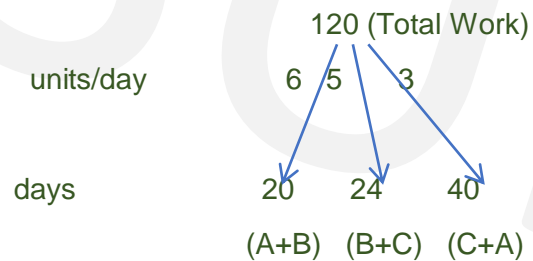
A. 30 days   B. 40 days   C. 50 days   D. 60 days

- **Soln**:   LCM(20,24,40) = 120

120 (Total Work)

units/day   6   5   3

days   20   24   40

(A+B)   (B+C)   (C+A)

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 alone = 7 − 3 = 4 units/day

To find days needed by B = $\dfrac{\text{Total work}}{\text{units/day}}$ = $\dfrac{120}{4}$ = 30 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?
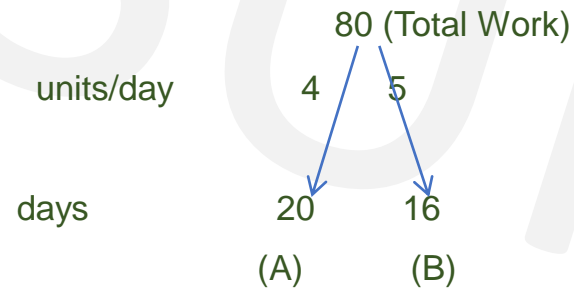
A. 19 days   B. 18 days   C. 16 days   D. 30 days

- **Soln**:   LCM(20,16) = 80

80 (Total Work)

units/day   4   5

days   20   16

          (A)   (B)

- Day 1, A = 4 units
- Day2,   day 1 work added
- B = 5 + 4 = 9units
- 9 units ---   2 days
- 80 units ---   ?
- Days = $\frac{80 \times 2}{9}$ = $\frac{160}{9}$ = 17.7777 = 17.78 days
- **Ans B**

Time & Work

- Efficiency = capacity to do work

- Efficiency and time are inversely proportional

- Efficiency $\propto \dfrac{1}{T}$

- 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
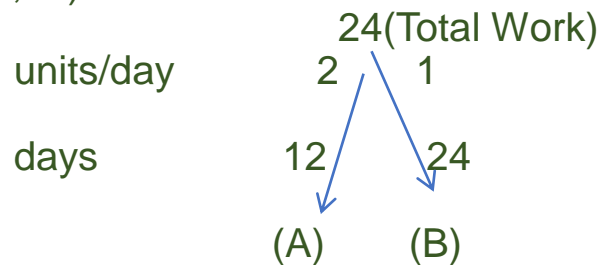
Soln:

A   B

2x   -   x   = 12

x = 12

As , Efficiency $\propto \frac{1}{T}$ **or**   D*ays ratio is inversely proportional to efficiency ratio.*

A = 12 days and B = 2x = 2 x 12 = 24 days

	$\frac{A}{2}$	$\frac{B}{1}$
Eff (Ratio)	2	1
Days (Ratio)	1	2
Days	**x-12**	**x**

- LCM(12,24) = 24

24(Total Work)

units/day   2 / 1

days   12 / 24

(A)   (B)

A + B = 2 +1 =3 units/day

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

→ 2(x-12) =x
→ x =24 days
→ x – 12
→24 -12 = 12 days

Ans B

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

60(Total Work)

units/day   6   5   4

days   10   12   15

(A)   (B)   (C)
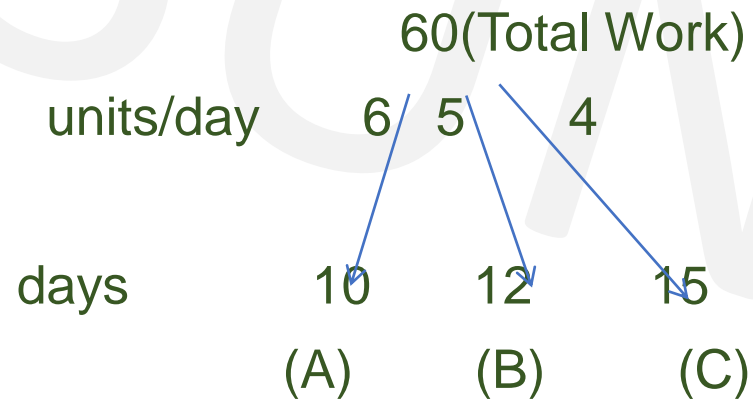
Together,

(A+B+C) = 6+5+4 = 15 units/day

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

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

= 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

Time & Work(Assignment)

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

	A	**B**
Eff (Ratio)	1	2/3
Time (Ratio)	2/3	1
Time	**80**	**x**

$$\frac{2/3}{80} = 1/x$$

x= 120hrs
1 day = 5hrs
  ?   = 120hrs   **24days**

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?

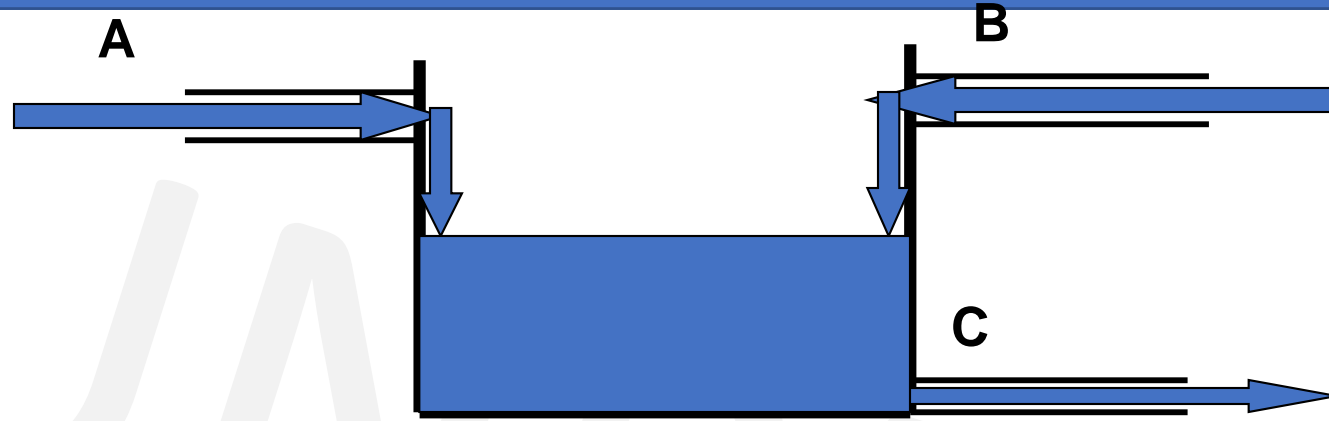A. 80 days   B. 100 days   C. 120 days   D. 150 days

Ans: C

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)
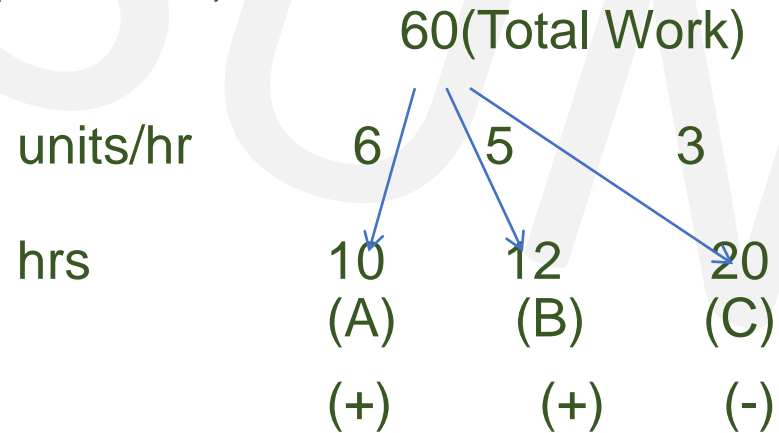
Pipes & Cisterns

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

60(Total Work)

units/hr	6	5	3
hrs	10	12	20
	(A)	(B)	(C)
	(+)	(+)	(-)

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

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

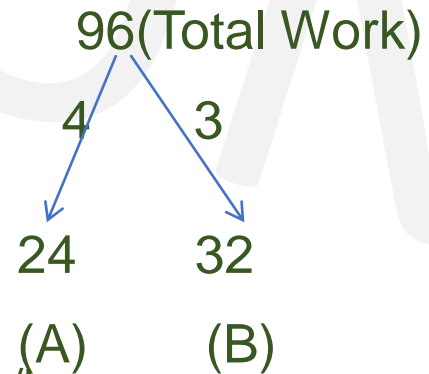A . 2 min   B. 4 min   C. 6 min   D.8 min

Soln:

LCM(24,32) = 96

96(Total Work)

units/hr

4   3

hrs

24   32

(A)   (B)

$$\text{Time} = (1 - \frac{\text{full tank time}}{\text{1st pipe time}}) \quad \text{x 2nd pipe time}$$
$$= (1 - 18/24) \text{ x } 32$$
$$= 8 \text{ mins}$$

WD = time x units/hr

Work done by A alone = 18 x 4=72units

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

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

Ans : D

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

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

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   = capacity of tank

   60(3Q)   = capacity of tank

    180Q   = capacity of tank

P+Q work together.

Amount of water poured together = P + Q

                                   = 3Q + Q = 4Q

Number of turns = 180Q/4Q = 45 turns

Ans: C

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 $= \dfrac{XY}{Y-X}$ where, X = number of hrs to fill tank , Y = number of hrs to fill tank with leakage

- $2\dfrac{1}{3} = \dfrac{7}{3}$

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

- 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 = MxDxH

- W1 = M1xD1xH1, W2=M2xD2xH2

- $\dfrac{W1}{W2} = \dfrac{M1xD1xH1}{M2xD2xH2}$

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 x 8 x 5   = 720 man-hrs

Case 2

M x 6 x 8   = 720 man-hrs

M x 6 x 8   = 18 x 8 x 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 → 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 → 1M = 2 C

- And 12 Women = 16 children → 1W = 4/3 C

- **Case 1**

- 16C x 52 x 8   = work

- **Case 2**

- (2C +4/3C+C) x D x 8   = work

- (2C +4/3C+C) x D x 8   = 16C x 52 x 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 x D   and   W = M x D

W= (12m+16b) x 5   W = (13m+24b) x 4

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

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

60m + 80b = 52m + 96b

60m – 52m = 96b – 80 b

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.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 x 91 x 12   = 45 x 52 x 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 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

Permutation & Combination

- What is permutation?

- It is the number of ways a group of things can be arranged.

E.g: Consider 3 letters A,B,C . In how many ways they can be arranged?

- A B C
- A C B
- B A C   6 ways to arrange these 3 letters
- B C A
- C A B
- C B A

- For 3 letter / 4 letter words its possible but for more number of letters we need a formula-

- $nPr = \dfrac{n!}{(n-r)!}$

Permutation & Combination

Q. Consider 4 letters A,B,C,D and arrange them in 3 spaces

- - - 3 spaces

No . Of letters = 4

No of spaces = 3

nPr = $4P_3$ = $\frac{4!}{(4-3)!}$ = $\frac{4!}{1!}$ = 4! = 4 x 3 x 2 x 1 = 24 ways it can be arranged

Q. Arrange 7 letters A,B,C,D,E,F,G in 4 spaces

- - - - 4 spaces

nPr = $7P_4$ = $\frac{7!}{(7-4)!}$ = $\frac{7!}{3!}$ = $\frac{5040}{6}$ = 840

Permutation & Combination - Remember

0! = 1

1 ! = 1

2! = 2 x 1 = 2

3! = 3 x 2 x 1 = 6

4! = 4 x 3 x 2 x 1 = 24

5! = 5 x 4 x 3 x 2 x 1 = 120

6! = 6 x 5 x 4 x 3 x 2 x 1 = 720

7! = 7 x 6 x 5 x 4 x 3 x 2 x 1 = 5040

Permutation & Combination

Q. In how many ways can the letters of the word 'LEADER' be arranged?

A. 72   B. 144   C. 360   D. 720   E. None of these

Soln:

The word LEADER has 6 letters. So I can be arranged in 6! ways.

Out of these 6 letters , 2 letters are repeated (letter E repeated twice)

So we write it as - $\dfrac{6!}{2!}$ → 6! ways to arrange letters in the word LEADER

2! In the denominator as letter E is repeated twice

$$= \frac{6 \times 5 \times 4 \times 3 \times 2 \times 1}{2 \times 1}$$

= 360 ways

Ans : C

Permutation & Combination

Q. Out of 7 consonants and 4 vowels, how many words of 3 consonants and 2 vowels can be formed?

A. 210　　　　　　　　B. 1050　　　　C. 25200　　　　　　D. 21400　　E. None of these

Soln:

we need to form a 5letter word with 3consonants & 2vowels = $\underline{C}\ \underline{C}\ \underline{C}\ \underline{V}\ \underline{V}$

Ways to select, (3 consonants out of 7) AND (2 vowels out of 4)

$\qquad\qquad = 7C_3\ X\ 4C_2\ X\ 5!$　←————————　each group has 5 letters and they can be arranged in 5! ways

$\qquad\qquad = \frac{7\times6\times5}{3\times2\times1}\ X\ \frac{4\times3}{2\times1}\ X\ 5!$

$\qquad\qquad = 35\ \ X\ \ 6\ X\ 120$

$\qquad\qquad = 25200$ ways

Ans : C

Permutation & Combination

Q. From a group of 7 men and 6 women, five persons are to be selected to form a committee so that at least 3 men are there on the committee. In how many ways can it be done?

A. 564   B. 645   C. 735   D. 756   E. None of these

Soln:

We may have (3 men and 2 women) or (4 men and 1 woman) or (5 men only).

Required number of ways= (7C3 x 6C2) + (7C4 x 6C1) + (7C5)

$$= (\frac{7 \times 6 \times 5}{3 \times 2 \times 1} \times \frac{6 \times 5}{2 \times 1}) + (7C3 \times 6C1) + (7C2) \rightarrow \text{[using } {}^nC_r = {}^nC_{(n-r)} \text{]}$$

$$= 525 + (\frac{7 \times 6 \times 5}{3 \times 2 \times 1} \times \frac{6}{1}) + (\frac{7 \times 6}{2 \times 1})$$

$$= 525 + 210 + 21$$

$$= 756$$

Ans: D

Difference between permutation and combination

Combination (order does not matter)

"My fruit salad is a combination of apples, grapes and bananas" We don't care what order the fruits are in, they could also be "bananas, grapes and apples" or "grapes, apples and bananas", its the same fruit salad.

Permutation (When the order does matter)

"The combination to the safe is 472". Now we **do** care about the order. "724" won't work, nor will "247". It has to be exactly **4-7-2**.

Difference between permutation and combination

What is permutation?

Permutation: The various ways of arranging a given number of things by taking some or all at a time are all called as permutations.
Permutation includes word formation, number formation, circular permutation, etc. **In permutation, objects are to be arranged in particular order.** It is denoted by ^nP_r or P(n, r).

Example: Arrange the given 3 numbers 1, 2, 3 by taking two at a time.
Now these numbers can be arranged in 6 different ways: **(12, 21, 13, 31, 23, 32).**

Here,

12 and 21, 13 and 31 or 23 and 32 do not mean the same, because here order of numbers is important.

Difference between permutation and combination

- **What is combination?**

  Combination: Each of different groups or selections formed by taking some or all number of objects is called a combination.

  Combination is used in different cases which include team/group/committee.

  In combination, objects are selected randomly and here order of objects doesn't matter. It is denoted by ^nC_r or $C(n, r)$ or $^nC_r = {}^nC_{(n-r)}$.

  Example: If we have to select two girls out of 3 girls X, Y, Z, then find the number of combinations possible.

  Now only two girls are to be selected and arranged. Hence, this is possible in 3 different ways: **(XY, YZ, XZ,).**

  Here,
  You cannot make a combination as XY and YX, because these combinations mean the same.

Permutation & Combination(Assignment)

Q. In a group of 6 boys and 4 girls, four children are to be selected. In how many different ways can they be selected such that at least one boy should be there?

A. 159   B. 194   C. 205   D. 209   E. None of these

Soln:

(1 boy and 3 girls) or (2 boys and 2 girls) or (3 boys and 1 girl) or (4 boys).

= (6C1 x 4C3) + (6C2 x 4C2) + (6C3 x 4C1) + (6C4)

= (6C1 x 4C1) + (6C2 x 4C2) + (6C3 x 4C1) + (6C2)   → using $^nC_r = \ ^nC_{(n-r)}$(to reduce calculation)

$$= (6 \times 4) + \left(\frac{6 \times 5}{2 \times 1} \times \frac{4 \times 3}{2 \times 1} \right) + \left(\frac{6 \times 5 \times 4}{3 \times 2 \times 1} \times 4 \right) + \frac{6 \times 5}{2 \times 1}$$

= (24 + 90 + 80 + 15)

= 209

Ans: D

Q. In a group of 6 boys are 4 girls, four children are to be selected. In how many different ways can they be selected such that at least one boy should be there

A. 109   B. 128   C. 138   D. 209

Ans: D

Q. How many 4-letter words with or without meaning, can be formed out of the letters of the word, 'LOGARITHMS', if repetition of letters is not allowed?

A. 40

B. 400

C. 5040

D. 2520

Ans: C

Permutation & Combination(Assignment)

Q. In how many different ways can the letters of the word 'MATHEMATICS' be arranged so that the vowels always come together?

A. 10080

B. 4989600

C. 120960

D. None of these

Ans: C

Q. In how many different ways can the letters of the word 'OPTICAL' be arranged so that the vowels always come together?

A. 120

B. 720

C. 4320

D. 2160

E. None of these

Ans: B

Permutation & Combination(Assignment)

Q. How many Permutations of the letters of the word APPLE are there?

A.600   B.120   C.240   D.60

Ans: D

Q. How many different words can be formed using all the letters of the word ALLAHABAD?

A.7560

B.7890

C.7650

D. None of these

Ans: A

Permutation & Combination(Assignment)

Q. Find the value of $^{50}P_2$

A. 4500
B. 3260
C. 2450
D. 1470

Ans : C

Permutation & Combination(Assignment)

Q. How many words can be formed by using letters of the word 'DELHI'?

a. 50
b. 72
c. 85
d. 120

Ans : D

Permutation & Combination(Assignment)

Q. Find the number of ways the letters of the word 'RUBBER' can be arranged?
A. 450
B. 362
C. 250
D. 180

Ans: D

Permutation & Combination(Assignment)

Q. Out of 5 consonants and 4 vowels, how many words of 3 consonants and 2 vowels can be formed?

A. 60
B. 200
C. 5230
D. 7200

Ans : D

Permutation & Combination(Assignment)

Q. In how many ways can a group of 5 men and 2 women be made out of a total of 7 men and 3 women?

A. 63

B. 90

C. 126

D. 45

E. 135

Ans: A

Q. In how many different ways can the letters of the word 'LEADING' be arranged in such a way that the vowels always come together?

A. 360   B. 480   C. 720   D. 5040   E. None of these

Soln:

L   E   A   D   I   N   G ⟶ vowels in this word are E,A I

Remaining letters(consonants) are - L D N G

 now we can arrange the vowels together in the remaining spaces as

 _ L _ D _ N _ G_   in 5! ways and vowels be rearranged in those spaces in 3! ways

5!   X 3! = 720 ways

Ans : C

Permutation & Combination(Assignment)

Q. In how many different ways can the letters of the word 'CORPORATION' be arranged so that the vowels always come together?

A. 810   B. 1440   C. 2880   D. 50400   E. 5760

Soln:

C O R P O R A T I O N------- vowels in this word are O,O,A,I,O

Remaining letters(consonants) are - C R P R T N

 now we can arrange the vowels together in the remaining spaces as

 _C_R_P_R_T_N_   in 7! ways and vowels be rearranged in those spaces in 5! Ways

But the repeated letters are 2R in consonants   and 3O in vowels

$$\frac{7!}{2!} \; X \; \frac{5!}{3!} = 50400 \text{ ways}$$

Ans : D

Interest

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

Then **A = P + I**

Simple Interest

S.I. = (P x R x 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,

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. 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(jan)+28(febNonleap)+31(march)+30(April)+31(may)+3(june) = 146 days
- 146/365 days = 2/5 years.
- SI = 15000 x 18 x 2/5 x 1/100 = 30x18x2 = 1080

Amount = P + SI

       =15000+1080

       =Rs. 16080

Ans: A

Interest

Q. A farmer borrowed Rs.3600 at 15% simple interest per annum. At the end of 4 years, he cleared this account by paying Rs.4000 and a donkey. The cost of the donkey is -

A. Rs. 1000   B. Rs. 1200   C. Rs. 1550   D. Rs. 1760

Soln:

SI for 4 years = Rs.(3600×0.15×4)=Rs.2160

Amount after 4 years = Rs. (3600+2160)= Rs. 5760

Cost of donkey = Rs. (5760-4000)= Rs. 1760

Ans: D

Interest

Q. In 4 years, Rs. 6500 amounts to Rs. 8840 at a certain rate of interest. In what time will Rs.1600 amounts to Rs.1816 at the same rate?

A. 3years   B. 1.5years   C. 2years   D. 2.5years

Ans: B

Interest

Q. Beena invests an amount of Rs.9,534 at 4% p.a. to obtain a total amount of Rs.11,442 on simple interest after a certain period. For how many years did she invest the amount to obtain the total sum?

A. 5years   B. 9years   C. 6years   D. 8years

Ans: A

Interest

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

Soln:

$A = 2000(1 + \frac{10}{100})^2$

$\quad = 2000(\frac{110}{100})^2$

$\quad = 2000(\frac{121}{100})$

$\quad = $ Rs. 2420

CI = 2420 − 2000 = Rs. 420

2000 → 10% = 200

$\qquad$ 10% $\qquad$ 10%

2000 $\longrightarrow$ 2200 $\longrightarrow$ 2420

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(1+R/100)^N = 4000(1+ \frac{10}{100})^2 = 4000 \times (\frac{11}{10})^2 = 4000 \times \frac{11}{10} \times \frac{11}{10} = $ Rs. 4840

OR

$4000 \xrightarrow[\text{1st yr}]{10\%} 4400 \xrightarrow[\text{2nd yr}]{10\%} 4840$

CI = A – P

CI = 4840 – 4000 = Rs. 840

Ans: C

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

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

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

$P(\text{sum}) = \frac{420 \times 100}{3 \times 8}$

$= $ Rs. 1750

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.

$\qquad$ by 5%=200 $\qquad$ by 5%=210

4000 $\qquad$ 4200 $\qquad$ 4410

I = 4410 -4000

$\qquad$ = Rs. 410

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 = Rs. 100.

- time N = 2 years, rate of interest R = 8% per annum

- simple interest = PNR/100=$\frac{100*8*2}{100}$ =Rs. 16

- CI (for 2 years)

-         8%   8%

- 100 $\longrightarrow$ 108 $\longrightarrow$ 116.64

-             16.64

  P   SI   CI   Diff

100   16   16.64   0.64

- 0.64 - >   100

- 128   ->   ?

- $\frac{12800}{0.64}$ = 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 = Rs. 100.

- time N = 2 years, rate of interest R = 8% per annum

- simple interest = PNR/100 $= \frac{100*8*2}{100}$ =Rs. 16

- compound amount= P(1+R/ 100)^N

- $= 100*(1+\frac{8}{100})$ ^2 $= 100 * (\frac{108}{100})$^2 $= 100(\frac{11664}{10000}) = \frac{11664}{100}$ = 116.64

- compound interest = compound amount – principal

- C.I = A - P
      =116.64-100=Rs. 16.64

- the difference between the compound interest and simple interest = 16.64-16.00 = Rs. 0.64

-      0.64   - >   100

-      128   ->   ?

- = $\frac{128*100}{0.64}$ = 20000

- Thus, the principal is Rs. 20000.

- **Ans : A**

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 x P(R)²/(100)² + P (R/100)³.
  Here also, P = principal amount, R = rate of interest

Interest(Assignment)

Q. The difference between simple interest and compound interest on a certain sum of money for 2 years at 4% per annum is Rs 20. Find the sum.

A.12500   B. 25000   C. 12000   D. 17500
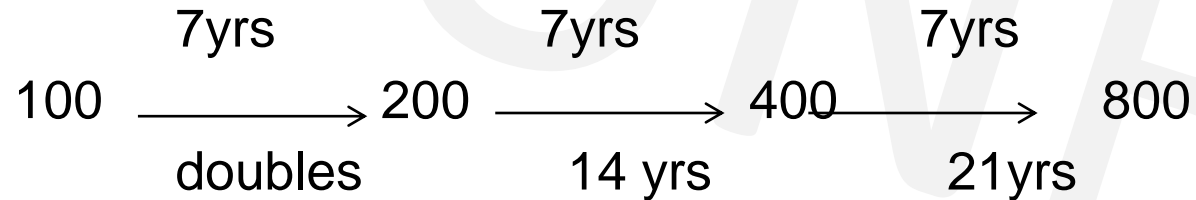
Ans: A

Interest(Assignment)

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

      7yrs   7yrs   7yrs

100 $\longrightarrow$ 200 $\longrightarrow$ 400 $\longrightarrow$ 800

      doubles   14 yrs   21yrs

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(Assignment)

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) = Rs. 39.

S.I. for 3 years = Rs.(39 x 3) = Rs. 117.

Principal = amount - interest

Principal = 815 - 117

          = Rs. 698.

Ans: C

Interest(Assignment)

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) = Rs. 39.

S.I. for 3 years = Rs.(39 x 3) = Rs. 117.

Principal = amount - interest

Principal = 815 - 117

        = Rs. 698.

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

→   5000   = $P(1+R/100)^6$……(1)
→   7200   = $P(1+R/100)^8$……(2)
→   36/25   = $(1+R/100)^2$
→   Taking square roots of both sides
→   1+R/100   = 6/5
→   R/100   =1/5
→   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

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. 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

$SI_1 = P\ N_1 R_1/100$

$$= \frac{500 \times 3 \times 5}{100} = \text{Rs. 75}$$

$SI_2 = P\ N_2 R_2/100$

$$= \frac{500 \times 4 \times 4}{100} = \text{Rs. 80}$$

Difference = 80 − 75 = Rs. 5

OR
500 == 15% ↑ ⇒ 575 (1st case)
500 == 16% ↑ ⇒ 580 (2nd case)
difference = 580 -575 = Rs. 5

Ans : A

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:**
- $A = P\left(1+ R/100\right)^T$
- $A = 2100(1+5/100)^2$
- $A = 2100 \times [105/100]2$
- $A = \dfrac{2100 \times 11025}{10000}$

- Amount, A=Rs.2315.25

- **Ans : B**

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%

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

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

SI at x + SI at 2500-x = 326

Substitute and solving the equation gives x =Rs. 1200

We need Principal at 2500-x = 2500 – 1200 =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. 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. The simple interest on Rs.1820 from March 9, 2012 to May 21, 2012 at 7.5% rate will be

A. Rs. 22.50

B. Rs. 27.30

C. Rs. 28.80

D. Rs. 29

Ans: B

THANK YOU!