GENERAL APTITUDE

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Mixtures & Alligation

- **Alligation** : It is the rule which enables us to find the ratio in which two or more ingredients at given prices must be mixed to produce a mixture of a desired price.(mixing / linking)
- **Mean Price** : The cost price of a unit quantity of mixture is called the mean price.
- **Dearer** : The more expensive ingredient

- Note :

Always maintain the order in which problem is given else answer gets changed

Mixtures & Alligation

Type 1 oranges at Rs.60 per kg and Type 2 oranges at Rs.120 per kg and when mixed cost is Rs.75 per kg. Find the ratio in which Type 1 and Type 2 oranges are mixed.

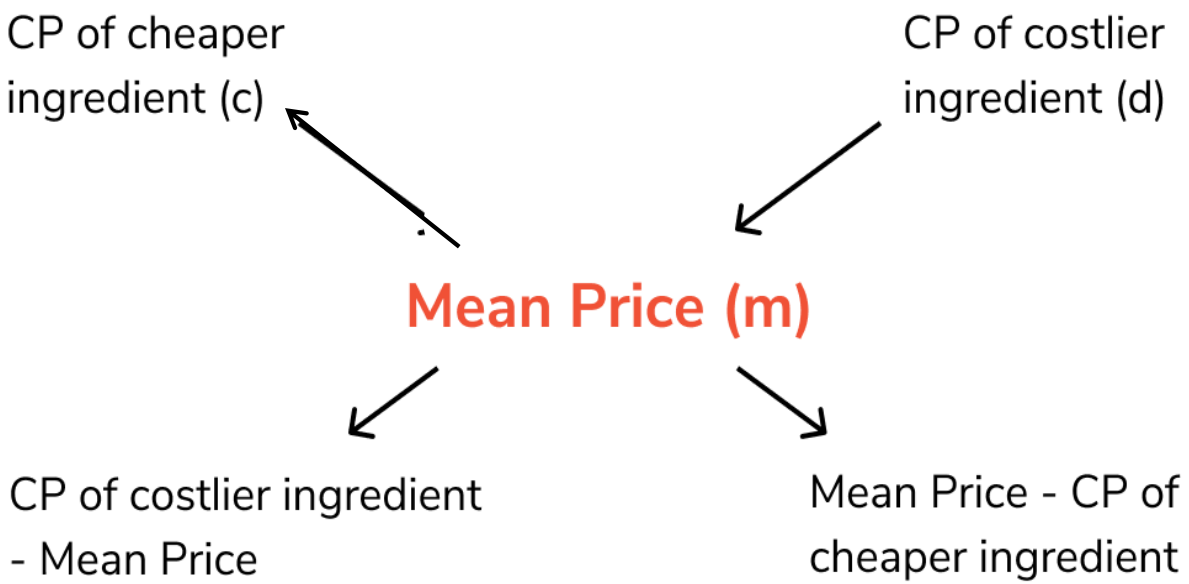
Soln:

Type 1 60 Type 2 120

75

x = d-m y =m-c

$$\frac{x}{y} = \frac{d-m}{m-c} = \frac{120-75}{75-60} = \frac{45}{15} = \frac{3}{1} = 3:1$$



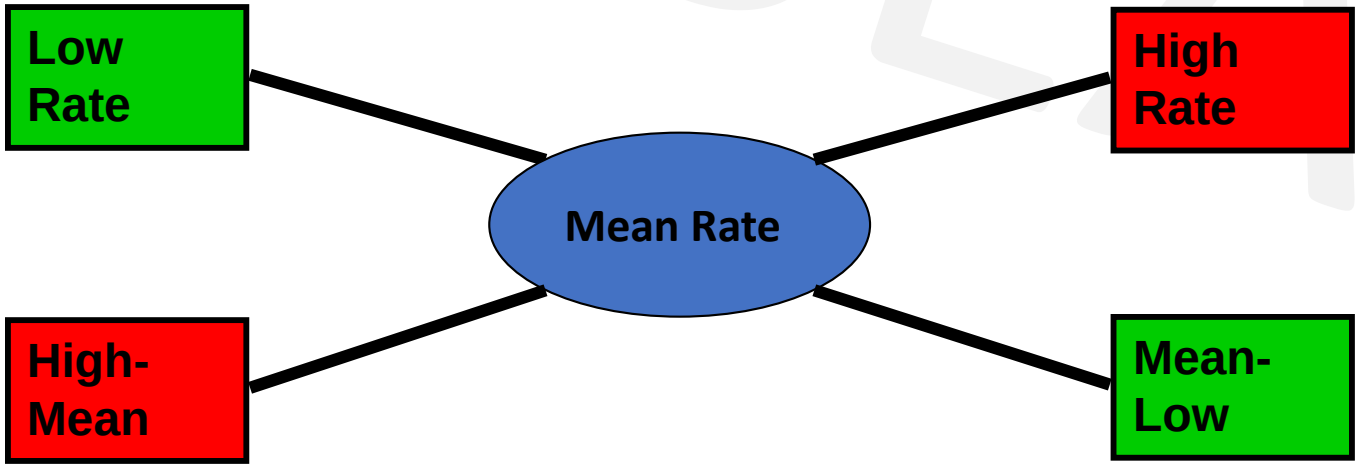
$$\frac{\text{Quantity of cheaper ingredient}}{\text{Quantity of costlier ingredient}} = \frac{d - m}{m - c}$$

Mixtures & Alligation

$$\frac{\text{Quantity of Lower}}{\text{Quantity of Higher}} = \frac{\text{(C.P. of Higher) – (Mean Price)}}{\text{(Mean Price) – (C.P. of Lower)}}$$

$$\frac{\mathbf{Q}l}{\mathbf{Q}h} = \frac{\mathbf{CP}h - \mathbf{CP}m}{\mathbf{CP}m - \mathbf{CP}l}$$

(**Qty** Low) : (**Qty** High) = (**CP**h-**CP**m) : (**CP**m-**CP**l)

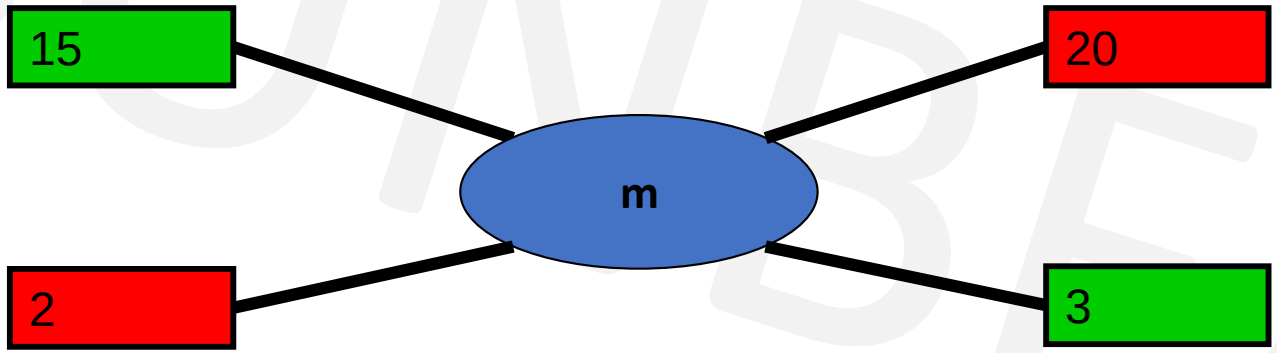


Mixtures & Alligation

Q. CP of rice A is Rs. 15/kg and CP of rice B is Rs.20/kg. If both A and B are mixed in the ratio 2:3. Then find the price per kg of the mixed rice.

A. Rs. 28 B. Rs. 17 C. Rs. 18 D. Rs. 48

Soln:



$\frac{x}{y} = \frac{d-m}{m-c}$

$\frac{2}{3} = \frac{20-m}{m-15}$

$m = \frac{90}{5}$ = Rs.18

Ans: C

Mixtures & Alligation

Q. In what ratio must a grocer mix two varieties of dal worth Rs. 60/kg & Rs. 65/kg, so that selling the mixture at 68.20/kg, he may gain 10%.

Soln:

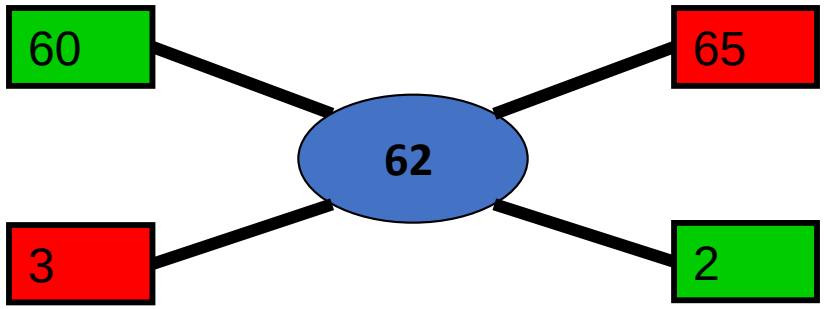
- Mean price is always CP
- Steps-
- 1. m=?
- 2. m = cost price(CP)
- 3. SP = given
- 4. find x/y=?

Mixtures & Alligation

In what ratio must a grocer mix two varieties of dal worth Rs. 60/kg & Rs. 65/kg, so that selling the mixture at 68.20/kg, he may gain 10%.

A. 3:2 B. 2:3 C. 3:4 D. 4:3

- SP of 1 kg of mixture = Rs. 68.20
- Gain =10%
- In case of profit, SP = $\frac{\text{C.P. x (100 +\%gain)}}{100}$
- CP of 1kg of mixture = Rs ($\frac{100}{100+10}$ x 68.2)
- $= \frac{682}{11}$
- Mean price =Rs. 62
- By the rule of alligation, we have :
- C.P. of 1kg dal of 1st kind C.P. of 1kg dal of 2nd kind



x/y = 3/2= 3:2

Ans: A

Mixtures & 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 %.

A. 6% B. 8% C. 7% D. 9%

Soln :

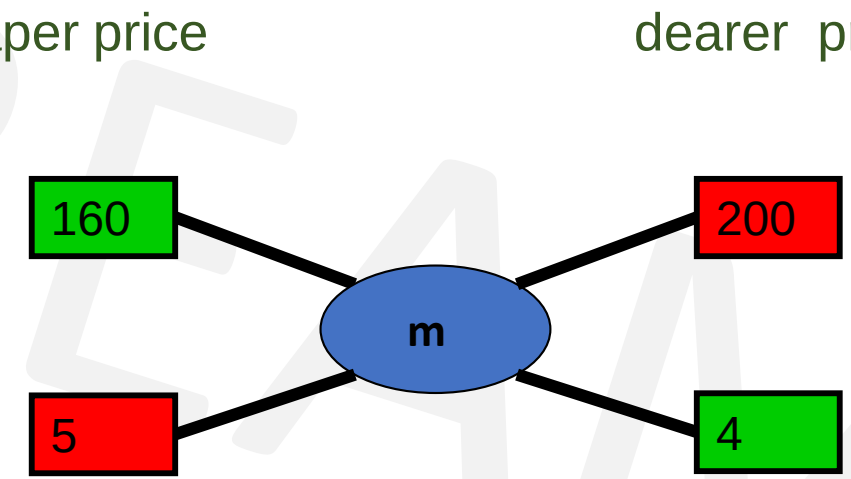
$\frac{x}{y} = \frac{d-m}{m-c}$

$\frac{5}{4} = \frac{200-m}{m-160}$

5m -800 = 800 -4m

9m = 1600

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



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

Profit% = $\frac{SP-CP}{CP}$ x 100

$= \frac{192 - \frac{1600}{9}}{\frac{1600}{9}} = \frac{1728 - 1600}{1600} = \frac{128}{16} = 8\%$ **Ans: B**

Mixtures & Alligation

Q. Two jars A and B contain milk and water in the ratio 7:5 and 17:7 respectively. In what ratio mixtures from two vessels should be mixed to get a new mixture containing milk and water in the ratio 5:3?

A. 2:1 B. 1:2 C. 2:3 D. 3:4

Soln:

For these type of questions consider 1 ingredient out of the two ingredients and represent as fraction of one.

A
m:w
7:5

B
m:w
17:7

C
m:w
5:3

We consider milk here, so fraction of milk,

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

B
$\frac{17}{17+7} = \frac{17}{24}$

C
$\frac{5}{5+3} = \frac{5}{8}$

To make calculations easier, convert all denominator into common one

So, find LCM(12,24,8) = 24

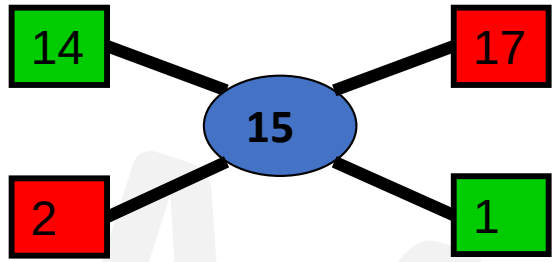
A
$\frac{7}{12} \times \frac{2}{2} = \frac{14}{24}$

B
$\frac{17}{24}$

C
$\frac{5}{8} \times \frac{3}{3} = \frac{15}{24}$

forget denominators,

By rule of Alligation,



2:1

Ans: A

Mixtures & Alligation

Q. Two vessels A and B contain spirit and water mixed in the ratio 5:2 and 7:6 respectively. Find the ratio in which these mixtures are mixed to obtain a new mixture in vessel C containing spirit and water in the ratio 8:5?

A. 4:3

B. 3:4

C. 5:6

D. 7:9

Ans: D

Mixtures & Alligation

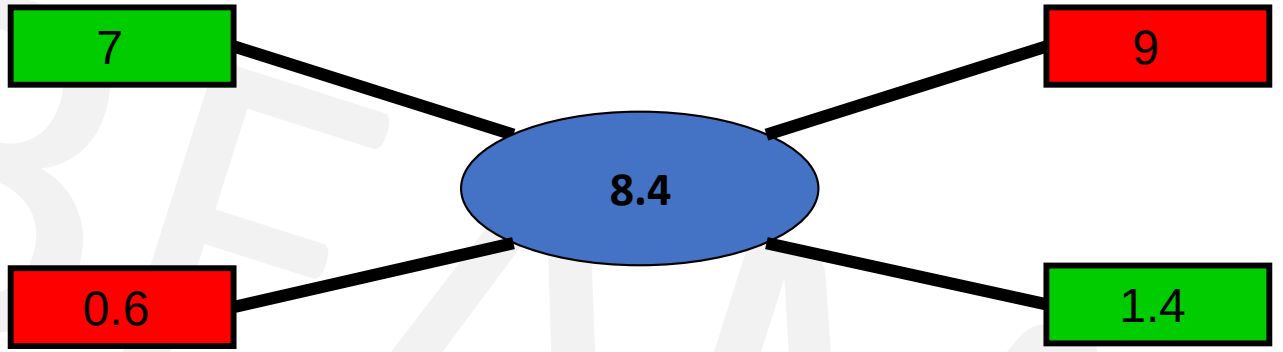
Q. How many kg of sugar costing Rs. 9 per kg must be mixed with 27kg of sugar costing Rs. 7 per kg, so that there maybe a gain of 10% by selling the mix at 9.24 per kg ?

A. 62kg B. 63kg C. 53kg D. 59kg

Soln:

$$SP = \frac{C.P. \times (100 + \%gain)}{100}$$

CP (Mean) = 9.24 x 100/110 = 8.4



- Qty of Low : Qty of High = 0.6/1.4 = 6/14 = 3/7
- 27 / Q_H = 3/7
- Q_H = 27 x 7/3 = 63 kg

Ans: B

Mixtures & Alligation

- **Final concentration = Initial $(1-\frac{R}{Initial})^n$**
- where,
- Final concentration is the amount of concentration remaining after the process
- n is the number of times the process is done and
- R is the replaced quantity.
- Initial is the initial concentration

Mixtures & Alligation

Q. A container contains 40 litres of milk. From this container 4 litres of milk was taken out and replaced by water. This process was repeated further two times. How much milk is now contained by the container?

A. 26.34 litres B. 27.36 litres C. 28 litres D. 29.16 litres

Ans: D

- The volume of milk remaining after the three processes is,
- $V=N(1-\frac{R}{N})^n$ where,

N is the original amount of milk,
n is the number of processes and
R is the replaced quantity.

$= 40(1-\frac{4}{40})^3$

$= 40(1-\frac{1}{10})^3$

$= 40(0.729)$

$=29.16$

Mixtures & Alligation(Assignment)

Q. A container contains 100 L of milk. From this container 10 L of milk was taken out and replaced by water. This process was further repeated three times. How much milk does the container have now?

A. 72.9 litres B. 65.61 litres C. 34.39 litres D. 81 litres

Ans: B

Final concentration = Initial concentration (1−Replaced/Initial)n

Mixtures & Alligation(Assignment)

Q. The ratio of milk to water in 80 litres of a mixture is 7 : 3. The water (in litres) to be added to it to make the ratio 2 : 1 is ?

A. 4 litres B. 5 litres C. 6 litres D. 8 litres

Soln:

Mixture = 80 litres

Milk : Water

7 : 3 = 7+3 = 10(total parts of mixture)

Quantity of Milk = $\frac{7}{10}$ x 80 = 56 litres

Quantity of Water = $\frac{3}{10}$ x 80 = 24 litres

Let quantity of water added be 'x' litres

$\frac{56}{24+x} = \frac{2}{1}$ 56 = 48 + 2x

x = 4 litres of water is to be added.

OR

Let, Milk = 7x and Water = 3x

7x + 3x = 80 litres

10x = 80

x = 8litres

Milk = 7x = 7x8 = 56 litres

Water = 3x =3x 8 = 24 litres

$\frac{56}{24+x} = \frac{2}{1}$ 56 = 48 + 2x

x = 4 litres of water is to be added.

Ans : A

Mixtures & Alligation(Assignment)

Q. What quantity of sugar costing Rs 21.20 per kg must be mixed with 144 kg of sugar priced at Rs 26.20 per kg so that 10% may be gained by selling mix at Rs 25.30/kg ?

A. 256 kg B. 265 kg C. 244 kg D. 144 kg

Ans: A

Mixtures & Alligation(Assignment)

Q. Find the ratio in which the contains of 2 jars A & B containing spirit & water in the ratio 1:3 & 3:2 respectively must be mixed so that resulting mixture contains 45% spirit?

A. 2:3 B. 3:5 C. 3:2 D. 3:4

Ans D

Mixtures & Alligation(Assignment)

Q. Two solutions have milk : water ratio of 2:3 and 4:5. In what ratio must they be mixed such that the resultant solution has milk : water ratio of 3:4?

A. 8:3 B. 3:8 C. 5:9 D. 9:5

Ans : C

Mixtures & Alligation(Assignment)

Q. In what ratio rice at Rs. 9.30/kg be mixed with rice at Rs. 10.80/kg. So that the mixture be worth Rs. 10/kg.

A. 6:5 B. 8:7 C. 3:7 D. 6:1

Ans : B

Mixtures & Alligation(Assignment)

Q. The ratio, in which tea costing Rs. 192 per kg is to be mixed with tea costing Rs. 150 per kg so that the mixed tea when sold for Rs. 194.40 per kg, gives a profit of 20%.

A. 2 : 5 B. 3 : 5 C. 5 : 3 D. 5 : 2

Ans : A

Mixtures & Alligation(Assignment)

Q. In what ratio must a mixture of 30% alcohol strength be mixed with that of 50% alcohol strength so as to get a mixture of 45% alcohol strength?

A. 1 : 2 B. 1 : 3 C. 2 : 1 D. 3 : 1

Ans : B

Mixtures & Alligation(Assignment)

Q. A mixture of 70 litres of alcohol and water contains 10% of water. How much water must be added to the above mixture to make the water 12.5% of the resulting mixture?

A. 1 litre B. 1.5 litres C. 2 litres D. 2.5 litres

Ans: C

- Water=10% of 70 lit=7 lit,
- alcohol=90% of 70 lit=63 lit.
- Let, x lit water must be added.
  $\frac{(7+x)}{63} = \frac{12.5\%}{87.5\%}$
- 7 +x = 787.5/87.5
  7 + x = 9
- x=2 litres

Mixtures & Alligation(Assignment)

Q. In what ratio should two qualities of coffee powder having the rates of ₹47 per kg and ₹32 per kg be mixed in order to get a mixture that would have a rate of ₹37 per kg?

A. 1 : 2 B. 4 : 1 C. 1 : 3 D. 3 : 1 E. 1 : 4

Ans: A

Mixtures & Alligation(Assignment)

Q. How many kilograms of tea worth Rs. 3. 60 per kg. must be mixed with 8 kg. of tea worth Rs. 4.20 per kg. so that by selling the mixture at Rs. 4.40 per kg. There may be a of 10%.

A) 4 kg B) 3 kg. C) 6 kg. D) 8 kg.

Ans: A

Mixtures & Alligation(Assignment)

Q. The ratio of milk to water in 20 litres of a mixture is 3 :1. The Milk (in litres) to be added to the mixture so as to have milk and water in the ratio 4 : 1 is ?

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

Ans: C

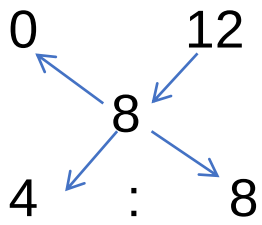
Mixtures & Alligation(Assignment)

Q. In what ratio must water be mixed with milk costing Rs. 12 per litre to obtain a mixture worth of Rs. 8 per litre?

A. 1 : 2 B. 2 : 1 C. 2 : 3 D. 3 : 2

Ans: A

By the rule of alligation :



Ratio of water to milk

= 4 : 8

= 1 : 2

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

SP>CP, so profit

P% = (SP –CP)/CP x 100

= (25-16)/16 x 100

= 225/4 = 56.20%

Ans: C

Cost Price			Selling Price		
Oranges→		Rs	Oranges→		Rs
5	→	4	4	→	5
1	→	$\frac{4}{5}$	1	→	$\frac{5}{4}$

SP>CP, so profit

P% = (SP –CP)/CP x 100

$= \frac{(\frac{5}{4} - \frac{4}{5})}{\frac{4}{5}} \times 100 = \frac{(\frac{9}{20})}{\frac{4}{5}} \times 100$

= 225/4 = 56.20%

Profit & Loss

Q. A man bought banana at the rate of 8 for Rs 34 and sold them at the rate of 12 for Rs 57 How many banana should be sold to earn a net profit of Rs. 45?

A. 90 B. 100 C. 135 D. 150

Soln:-

- Cost Price
- banana → Rs
  - 8 → 34
  - 1 → $\frac{34}{8} = \frac{17}{4}$

Selling Price

banana → Rs

12 → 57

1 → $\frac{57}{12} = \frac{19}{4}$

- SP>CP, so profit
- Profit = (SP –CP)
- $= \frac{19}{4} - \frac{17}{4} = \frac{1}{2}$

No. of banana to make a profit of Rs.45 $= \frac{\text{Profit total}}{\text{Pofit one}} = \frac{45}{1/2}$ = 90 banana

Ans: A

Profit & Loss

Q. A shopkeeper purchases 11 sword for Rs.10 and sells them at the rate of 10 sword for Rs. 11. He earns a profit % of?

A. 11% B. 15% C. 20% D. 21%

Ans: D

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

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. 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 % = profit/cp x 100

= 1/5 x100

= 20%

Ans: B

SP=CP + gain
6 times CP is equal to 5 times SP

6CP=5SP
6CP=5(CP + gain)
6CP=5CP+5gain
CP=5 gain

Gain % = gain/CP x100
= 1/5 x 100
= 20%

Mixtures & 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 %.

A. 6% B. 8% C. 7% D. 9%

Soln :

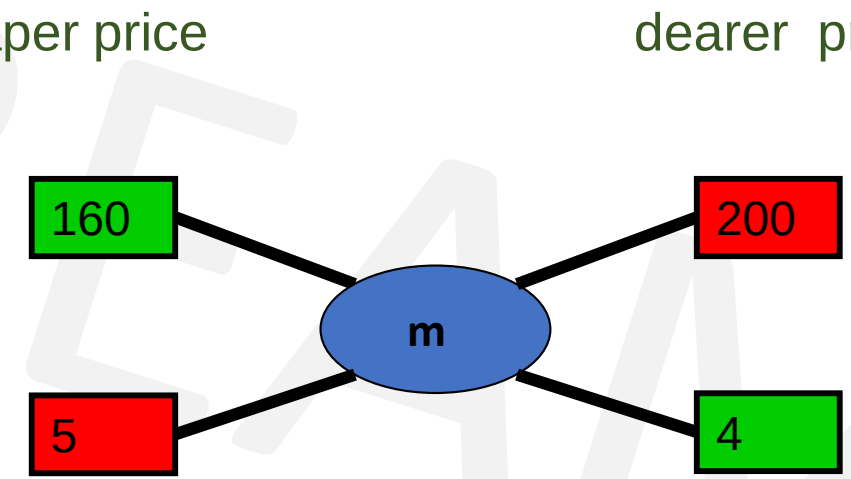
$\frac{x}{y} = \frac{d-m}{m-c}$

$\frac{5}{4} = \frac{200-m}{m-160}$

5m -800 = 800 -4m

9m = 1600

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



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

Profit% = $\frac{SP-CP}{CP}$ x 100

$= \frac{192 - \frac{1600}{9}}{\frac{1600}{9}} = \frac{1728 - 1600}{1600} = \frac{128}{16} = 8\%$ **Ans: B**

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

But, Profit = SP –CP = 2CP– CP= CP

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

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 → 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 x 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 2/7% gain B. 15% gain C. 14 2/7% loss D. 15 % loss

Ans: A

Profit & Loss(Assignment)

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 x 100

= 1/2 x 100

= 50%

Ans: C

Calendar

- In Non Leap year –
  - 365 days
  - 1 year = 52 weeks + 1 odd day(extra day)
  - 28th February
- In Leap year –
  - 366 days
  - 1 year = 52 weeks + 2 odd days
  - 29th February
- A **century leap year** is a **year** that is exactly divisible by 400
  - **years** 1600 and 2000 were **century leap years**; (400,800,1200,1600,2000 – century leap years till date)
  - **years** 1700, 1800, and 1900 were not **century leap years**.
- To find the day of a week on a given date we use the concept of "**odd days**".
- 01/01/0001 A.D(Anno Domini) was a Monday and 1st day of week so 1st January 0001 was a Monday.

Calendar

- In a century,
  - 24 leap year
  - 76 non leap years

100 years

Leap year → 24x2 = $\frac{48}{7}$ → 6

non leap year → 76 x 1 = $\frac{76}{7}$ → 6

remainder

6 + 6 = 12 ÷ 7 = 5 ← remainder

5 extra(odd) days in a century (100 years)

100 years = 5 odd days ← remainder

200 years = 10 ÷ 7 = 3 odd days

300 years = 15 ÷ 7 = 1 odd days

400 years = 0 odd days (as century leap year)

Calendar

Years	No. of odd
Ordinary year	1
Leap year	2
100 years	5
200 years	3
300 years	1
400 years	0

Calendar

Day of week	No. of odd
Sunday	0
Monday	1
Tuesday	2
Wednesday	3
Thursday	4
Friday	5
Saturday	6

Calendar

Month		Remainder
January	31 ÷ 7	3
February	28 ÷7 or 29 ÷ 7	0(non leap) or 1(leap)
March	31 ÷ 7	3
April	30 ÷ 7	2
May	31 ÷ 7	3
June	30 ÷ 7	2
July	31 ÷ 7	3
August	31 ÷ 7	3
September	30 ÷ 7	2
October	31 ÷ 7	3
November	30 ÷ 7	2
December	31 ÷ 7	3

Calendar

Q. What was the day of the week on 15th August, 1947?

Soln:

Completed till 1946

1946

$\frac{1900}{400}$ = 300 $\quad$ $\frac{46}{4}$ = 11(quotient)

1 odd day $\quad$ 46 + 11 = 57 $\quad$ $\frac{57}{7}$ = 1(remainder)

In 1946, odd days are,

1900 $\quad$ 46

1 + 1 = 2 odd days

1946 $\quad$ month $\quad$ date

Total odd days = 2 + 2 + 1 = 5 odd days

As per table for days of a week , 5 ⟷ Friday

As month is August, go till July as per table,

J F M A M J J

3 + 0 + 3 + 2 + 3 + 2 + 3 = 16

Now, $\frac{16}{7}$ = 2 (remainder)

For date ,

$\frac{15}{7}$ = 1 (remainder)

Calendar

For Months -

J	F	M	A	M	J	J	A	S	O	N	D
0	3	3	6	1	4	6	2	5	0	3	5

For years -

1600 – 1699	6
1700 – 1799	4
1800 – 1899	2
1900 – 1999	0
2000 – 2099	6

Calendar

Q. What was the day of the week on 26th January, 1947?

Soln:

1. Last 2 digits of the year → 47
2. Divide by 4 (47 ÷ 4) = 11(quotient)
3. Take the date → 26
4. Take the no. of month → 0 (from table)
5. Take the no. of year → 0 (from table)

84 (add)

6. Divide by 7 → $\frac{84}{7}$ = 0 (remainder)

Check table for day of the week

0 ⟷ Sunday

Calendar

Q. What was the day of the week on 29th February, 2012?

Soln:

1. Last 2 digits of the year → 12
2. Divide by 4 (12 ÷ 4) = 03(quotient)
3. Take the date → 29
4. Take the no. of month → 03 (from table)
5. Take the no. of year → 06 (from table)

   53 (add)

6. Divide by 7 → $\frac{53}{7}$ = 4 (remainder)

subtract 1 from remainder

In this case for all dates of **January & February** in a leap year , 4 -1 =3

Check table for day of the week

3 ⟷ Wednesday

Calendar

It was Sunday on Jan 1, 2006. What was the day of the week Jan 1, 2010?

A. Sunday B. Saturday C. Friday D. Wednesday

Ans: C

On 31st December, 2005 it was Saturday.

Number of odd days from the year 2006 to the year 2009 = (1 + 1 + 2 + 1) = 5 days.

On 31st December 2009, it was Thursday.

on 1st Jan, 2010 it is Friday.

Calendar

Q. If we have preserved the calendar of 2017. Find the next immediate year in which we can reuse.

A. 2027 B.2023 C. 2025 D. 2029

Soln:

x/4 (x = given year)

$\frac{2017}{4}$ = 1 (remainder)

For any year divide by 4, the possibility of remainder is 0,1,2,3

If remainder = 0 → x + 28

If remainder = 1 → x + 6

If remainder = 2/3 → x + 11

So, $\frac{2017}{4}$ = 1(remainder)

2017 + 6 = 2023 **Ans: B**

Calendar

Q. Which of the following days can never be the last day of a century?

A. Sunday B. Monday C. Tuesday D. Wednesday

- **Soln**:
- The last day of century can be only
- 1 odd day(Monday)
- 3 odd days (Wednesday)
- 5 odd days (Friday)
- 7 or 0 odd days (Sunday)
- So, century can never end in **Tuesday** , **Thursday** or **Saturday**.
- **Ans: C**

Calendar(Assignment)

- Q. The day on 5th April of a year will be the same day on 5th of which month of the same year?
- A. 5th July B. 5th August C. 5th June D. 5th October

- **Ans A**

- April & July for all years have the same calendar. So, a day on any date of April will be the same day on the corresponding date in July.
- The same day will fall on 5th July of the same year.

Calendar(Assignment)

Q. What was the day of the week on your birthdate?

Q. 13th October 2019 is a Sunday. Find the day on 13th October 1989?

A. Sunday B. Monday C. Friday D. Wednesday

Ans: C

Q. 1st March 2006 falls on a Wednesday .What day does 1st March 2010 fall on?

A. Tuesday B. Monday C. Friday D. Wednesday

Ans: B

Q. Today is Monday. Which day will be after 64 days?

A. Tuesday B. Monday C. Friday D. Wednesday

Ans: A

Q. Today is Monday. After 30 days it will be?

A. Tuesday B. Monday C. Friday D. Wednesday

B. Ans: D

Calendar(Assignment)

Q. 15th August 1947 was a Friday. Find the day on 15th August 1977?

- Soln:

  1977
- 1947
  ---
  30 years

Leap years between 1947 to 1977

1948	1964	8 years
1952	1968	
1956	1972	
1960	1976	

30 + 8 = 38

total years leap

$\frac{38}{7}$ = 3 (remainder)

As 15th August 1947 was a Friday ,

So, Friday + 3 days = **Monday**

Calendar(Assignment)

Q. 4th January 2016 falls on Monday. What day of the week does 4th January 2017 lies?

A. Wednesday B. Thursday C. Tuesday D. Monday

Soln:

Normal year = 1 odd day

Leap year = 2 odd days

Jan 4, 2016 → Monday

\+ 2 (as leap year)

Jan 4,2017 → Wednesday

Ans: A

Calendar(Assignment)

Q. Wednesday falls on 5th of a month .So which day will fall 5 days after 22nd of the same month?

A. Tuesday B. Friday C. Thursday D. Wednesday

Ans: B

5th = Wednesday

+7

12th = Wednesday

+7

19th = Wednesday

22nd = Saturday

+5

27th = Thursday

5 days after 22nd will be **Friday**

Calendar(Assignment)

Q. What dates of May 2002 did Monday fall on?

Soln:

Lets take date = 1st May 2002

1. Last 2 digits of the year → 02
2. Divide by 4 (02 ÷ 4) = 00(quotient)
3. Take the date → 01
4. Take the no. of month → 01 (from table)
5. Take the no. of year → 06 (from table)

   10 (add)

6. Divide by 7 → $\frac{10}{7}$ = 3 (remainder)

Check table for day of the week

3 ⟷ Wednesday

1st May 2002 falls on Wednesday

1	2	3	4	5	6
W	Th	F	Sa	Su	M

↑ first Monday

Now add 7 to it to find remaining Mondays

Dates on which Monday falls are -
6 , 13 , 20, 27

Calendar(Assignment)

Q. On what dates of April, 2001 did Wednesday fall?

A. 1^{st}, 8^{th}, 15^{th}, 22^{nd}, 29^{th}

B. 2^{nd}, 9^{th}, 16^{th}, 23^{rd}, 30^{th}

C. 3^{rd}, 10^{th}, 17^{th}, 24^{th}

D. 4^{th}, 11^{th}, 18^{th}, 25^{th}

Ans: D

Calendar(Assignment)

Q. What is the day on 22 April 2222?

A. Monday B. Tuesday C. Saturday D. Sunday

Ans: A

Calendar(Assignment)

Which of the following is not a leap year?

A. 700 B. 800 C. 1200 D. 2000

Ans: A

The century divisible by 400 is a leap year.
The year 700 is not a leap year.

Calendar(Assignment)

Q. Today is Monday. Which day will be on 61st day?

Soln:

1 week = 7 days. Taking the multiple of 7

56 - Monday	or	63 - Monday
57 – Tuesday		62 - Sunday
58 – Wednesday		61 - Saturday
59 – Thursday		
60 – Friday		
61 - Saturday		
56 + 5 = 61 days		63 – 61 = 2 days
(add 5 days)	or	(subtract 2 days)

Calendar(Assignment)

Q. January 1, 2007 was Monday. What day of the week lies on Jan. 1, 2008?

A. Monday

B. Tuesday

C. Wednesday

D. Sunday

Ans: B

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

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

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(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 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

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

Soln:

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

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

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

= Rs. 2420

CI = 2420 – 2000 = Rs. 420

2000 → 10% =200

10% 10%

2000 ⟶ 2200 ⟶ 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

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

CI = A – P

CI = 4840 – 4000 = Rs. 840

Ans: C

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

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

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

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

$= Rs.\ 1750$

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.

by 5%=200 by 5%=210

4000 4200 4410

I = 4410 -4000

= 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 → 108 → 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 = $3 \times P(R)^2/(100)^2 + P(R/100)^3$.
  Here also, P = principal amount, R = rate of interest

Partnership

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,
- $\frac{C1T1}{C2T2} = \frac{P1}{P2}$
- In this type , the time period is 12 months i.e. one year
- $\frac{45000 \times 12}{30000 \times T2} = \frac{2}{1}$
- T2=9
- B would join business after (12 - 9) = 3 months
- **Ans: C**

Partnership

Q. If 4 (A's capital) = 6 (B's capital) = 10 (C's capital), then out of a profit of Rs. 4650, C will receive ____

A) Rs.700 B) Rs.800 C) Rs.900 D) Rs.1000

Soln:

4A = 6B = 10C

A= 10/4C = 5/2C and B = 10/6C = 5/3C

A + B + C = 4650

5/2C + 5/3C + C = 4650

C = 900

Share of C or C will receive Rs.900

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)

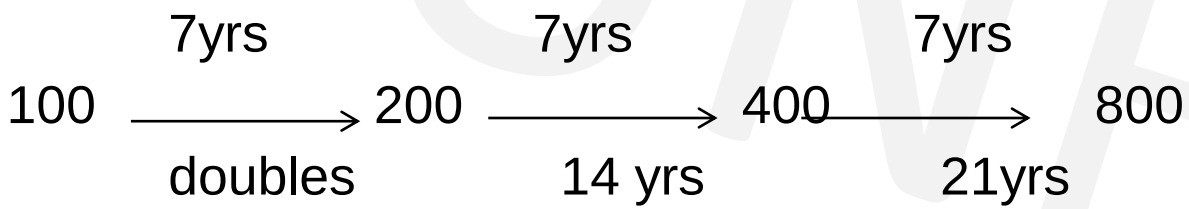
Q. A sum of money placed at compound interest doubles in 7 years. In how many years the principal becomes-

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(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

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. 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

$SI_1 = P\ N_1R_1/100$

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

$SI_2 = P\ N_2R_2/100$

$= \frac{500x\ 4\ x\ 4}{100}$ = 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:**
- $A = P (1+ R/100)^T$
- $A = 2100(1+5/100)^2$
- $A=2100\times[105/100]2$
- $A= \frac{2100 \text{ x } 11025}{10000}$
- 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%

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

Partnership(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

Partnership(Assignment)

Q. Three persons stared 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

Partnership(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

Partnership(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,
- $\frac{C1T1}{C2T2} = \frac{P1}{P2}$
- $\frac{32000 \times 12}{C2 \times 10} = \frac{8}{5}$
- C2 = Rs. 24000

Ans: C

Partnership(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,**
- $\frac{\mathbf{C1T1}}{\mathbf{C2T2}} = \frac{\mathbf{P1}}{\mathbf{P2}}$
- In this type , the time period is 12 months i.e. one year
- $\frac{21000\times12}{36000\times T2} = \frac{1}{1}$
- T2=7
- B would join business after (12 - 7) = 5 months

Partnership(Assignment)

Q. A,B,C subscribes Rs. 50000 for a buisness. A subscribes Rs. 4000 more than B and B Rs. 5000 more than C. Out of a total profit of Rs. 35000, A receives :

A. Rs. 8400

B. Rs. 11900

C. Rs. 13600

D. Rs. 14700

Ans: D

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!