

Quantitative Aptitude

Topic - Percentages

1. Price of item A was increased by 6% while that of item B was decreased by P%. After this the price of both the items together becomes 2% more than it was together earlier. If the price of the item A and B earlier was in ratio 15:8, find the value of P?

- a) 2.5
- b) 4
- c) 5.5
- d) 8

Correct Choice: c

Explanation:

Let initially the price of the items A and B were $15y$ and $8y$ respectively.

Price of A was increased by 6%, so final price of item A = $15y + 6\%$ of $15y$
 $= 15y + 0.06 \times 15y = 15y + 0.9y = 15.9y$

Let the price of item B was reduced by P%, then price of B after reduction =
 $8y - P\%$ of $8y$

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$$= 8y - \frac{P}{100} 8y = [1 - 0.01P] 8y$$

Final price of both the item together is 2% more than the price earlier, so
initial price = $15y + 8y = 23y$

$$\text{Final price} = 15.9y + [1 - 0.01P] 8y$$

$$\text{Increase in price} = \text{final price} - \text{initial price} = 15.9y + [1 - 0.01P] 8y - 23y = 0.9y - 0.08Py$$

Increase in price is 2%, so

$$\frac{(0.9y - 0.08Py)}{23y} \times 100 = 2$$

$$90 - 8P = 46$$

$$8P = 44$$

$$P = 5.5$$

Thus, the price of item B was reduced by 5.5%.

Hence, option C is correct.

Topic – Simple Interest – Compound Interest

2. A person deposited some amount in a Bank at 6.75% per annum simple interest rate. He withdrew all his money after 3 years and spent Rs. 310 from it and then deposited the entire remaining amount in another Bank at 5 (5/9)% per annum simple interest rate for 2 years. After 2 years, the total amount he got was Rs. 5000. What was the initial amount he deposited?

- a) Rs. 2500
- b) Rs. 3500
- c) Rs. 4000
- d) Rs. 3800

Correct Choice: c

Explanation:

Let the initial amount was Rs. P, then the SI he would get from first bank deposit would be

$$\frac{(P \times 6.75 \times 3)}{100} = 0.2025P$$

$$\text{Total} = P + 0.2025P = 1.2025P$$

He spent Rs. 310 from this, thus the amount he will deposit again would be
= (1.2025P – 310)

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SI he would get from another bank

$$= \frac{[(1.2025P - 310) \times 5(5/9) \times 2]}{100} = \frac{(1.2025P - 310)}{9}$$

$$\text{Final amount} = \frac{(1.2025P - 310)}{9} + (1.2025P - 310)$$

$$= (1.2025P - 310) \times \frac{10}{9}$$

This must be Rs. 5000, thus

$$(1.2025P - 310) \times \frac{10}{9} = 5000$$

$$(1.2025P - 310) = 4500$$

$$1.2025P = 4810$$

$$P = 4000$$

The initial amount was Rs. 4000.

Hence, option C is correct.

Topic – Mixtures & Allegations

3. A container had 180 litres of pure milk. 30 liters of water was added to it. Then 60 liters of the mixture was sold and 50 litres more mixture of water and milk in the ratio of 1 : 4 was added to it. Pure milk in the final mixture is what percentage of initial volume of pure milk?

- a) 98.65%
- b) 82.45%
- c) 93.65%
- d) 92.45%

Correct Choice: c

Explanation:

When 30 litre water was added, then volume becomes = $180 + 30 = 210$ litre

Ratio of milk to water = $180 : 30 = 6 : 1$

Now, 60 litre is sold, thus we have $210 - 60 = 150$ litre.

The 60 litre mixed milk that was sold would have

$$\frac{6}{6+1} \times 60 = \frac{360}{7} \text{ litre pure milk}$$

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1 + 6

7

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Pure milk left in the container

$$= 180 - \frac{360}{7} = \frac{900}{7} \text{ litre}$$

In 50 litre newly added mixed milk,

$$\frac{1}{1+4} \times 50 = 10 \text{ litre is water and}$$

$$\frac{4}{1+4} \times 50 = 40 \text{ litre is pure milk, thus}$$

Volume of pure milk after this addition

$$= \frac{900}{7} + 40 = \frac{1180}{7} \text{ litre}$$

Pure milk in the final mixture as percentage of initial volume of pure milk

$$= \frac{1180}{7 \times 180} \times 100 = 93.65\%.$$

Hence, option C is correct.

Topic - Boats & Streams

4. A boat starts from a point, goes upstream to some distance and returns back downstream at its initial position in 4 hours such that the time taken for the upstream journey was 2 hours more than the downstream journey. What was the total distance it travelled if speed of the boat in still water was 4kmph?

- a) 8 km
- b) 12 km
- c) 15 km
- d) 18 km

Correct Choice : b

Explanation:

Let the total distance was $2y$ km and the speed of the stream was v kmph.

If the time to go upstream was t hours then time to go downstream = $(4 - t)$ hours

It is given that time to go upstream was 2 hours more than time to go downstream, so

$$(4 - t) + 2 = t$$

$$t = 3 \text{ hours}$$

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Now, time to go upstream

$$= \frac{\text{upstream distance}}{(\text{boat speed} - \text{stream speed})}$$

$$3 = \frac{y}{(4 - v)}$$

$$12 - 3v = y \text{ ---(i)}$$

time to go downstream

$$= \frac{\text{downstream distance}}{(\text{boat speed} + \text{stream speed})}$$

$$1 = \frac{y}{(4 + v)}$$

$$4 + v = y \text{ ---(ii)}$$

Solving equation (i) & (ii) we get

$$y = 6$$

$$\text{Total distance} = 2y = 2 \times 6 = 12 \text{ km}$$

Hence, option B is correct.

Topic - Problems on Trains

5. A train crosses a platform 100 meter longer than its own length in 16 seconds while it crosses a pole in 5 seconds when running with 20% more speed than what it had while crossing the platform. Length of the train in meter is:

- a) 150
- b) 120
- c) 180
- d) 200

Correct Choice: a

Explanation:

Let the length of the train be y meter and the speed while crossing the platform is v m/s.

Then, time to cross

$$= \frac{(\text{length of the train} + \text{length of the platform})}{\text{speed}}$$

$$= \frac{(y + y + 100)}{v}$$

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$$16 = \frac{(2y + 100)}{v}$$

$$2y + 100 = 16v \text{ ---(i)}$$

When it crosses the pole its speed is 20% more, so

$$5 = \frac{y}{(v + 20\% \text{ of } v)} = \frac{y}{1.2v}$$

$$v = \frac{y}{6} \text{ ----(ii)}$$

Eliminate v from (ii) in (i), we get

$$2y + 100 = 16 \left(\frac{y}{6}\right)$$

$$y = 150$$

Hence, option A is correct.

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Topic - Ratios & Proportions

6. In a school, 40% students are in high school or above and rest are in junior high school or below. Of those who are in high school or above, ratio of boys to girls is 7 : 3, and those in junior high school or below have boys to girls in ratio 7 : 5. Ratio of boys in high school or above to junior high school or below:

- a) 2 : 3
- b) 4 : 3
- c) 3 : 4
- d) 4 : 5

Correct Choice: d

Explanation:

Let total 100 students be there, then

40% students are in or above high school = 40

Rest are in or below junior high school = $100 - 40 = 60$

In high school or above, ratio of boys to girls is 7 : 3, so

$$\text{Boys} = \frac{7}{7+3} \times 40 = 28$$

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$$\text{Girls} = \frac{3}{7+3} \times 40 = 12$$

In junior high school or below, ratio of boys to girls is 7 : 5, so

$$\text{Boys} = \frac{7}{7+5} \times 60 = 35$$

$$\text{Girls} = \frac{5}{7+5} \times 60 = 25$$

Ratio of boys in high school or above to junior high school or below = 28 : 35 = 4 : 5.

Hence, option D is correct.

Topic – Areas - Volumes

7. Two circles are drawn such that one of them has area 15400 sq cm and has its diameter as the length of a rectangle, and the other circle has area 2464 sq cm and its diameter as breadth of the same rectangle. Find the perimeter of the rectangle.

- e) 196 cm
- f) 1960 cm
- g) 542 cm
- h) 392 cm

Correct Choice: d

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Explanation:

Diameter of first circle would give the length of the rectangle and second would give the breadth of the rectangle. Let the radius of bigger circle be L cm and that of smaller circle be B cm.

Now, we have

$$\pi (L \times L) = \frac{22}{7} (L \times L) = 15400$$

$$L \times L = 700 \times 7$$

$$L = 70$$

For smaller circle

$$\pi (B \times B) = \frac{22}{7} (B \times B) = 2464$$

$$B \times B = 112 \times 7$$

$$B = 28$$

Diameter of bigger and smaller circle would be 2×70 cm and 2×28 cm respectively.

Length and breadth of rectangle is thus 140 cm and 56 cm respectively.

$$\text{Perimeter of the rectangle} = 2 (140 + 56) = 2 \times 196 = 392 \text{ cm}$$

Hence, option D is correct.

Topic - Percentages

8. In a business, Shyam invests 50% more than Rahim but for 40% less number of months than Rahim. If share of Shyam was Rs. 3357, then difference between their share would be:

- a) Rs. 3730
- b) Rs. 373
- c) Rs. 473
- d) Data insufficient

Correct Choice: b

Explanation:

Let Rahim had invested Rs. P for 'n' months, then Shyam's investment = Rs. (P + 50% of P) = Rs. 1.5P, number of months Shyam had invested = n – 40% of n = 0.6n

Ratio of share = Rahim : Shyam = (P)(n) : (1.5) (0.6n) = nP : 0.9Pn = 1 : 0.9 = 10 : 9

Share of Shyam has been given = Rs. 3357

Share of Rahim = $\frac{10}{9} \times 3357 = \text{Rs. } 3730$

Difference = Rs. (3730 – 3357) = Rs. 373

Hence, option B is correct.

Topic - Simple Interest – Compound Interest

9. A man puts Rs. 2000 on 10% compound interest rate to be compounded annually for 2 years and Rs. 5000 on R% compound interest rate to be compounded annually for 2 years such that interest earned on previous deposit is Rs. 12 more than the interest earned on deposit he made later. Find the value of R.

- i) 6
- j) 5
- k) 4
- l) 2

Correct Choice: c

Explanation:

We have

$$[2000 (1 + \frac{10}{100})^2 - 2000] - [5000 (1 + \frac{R}{100})^2 - 5000] = 12$$

$$[2000 (1.1 \times 1.1) - 2000] - 5000 [(1 + \frac{R}{100})^2 - 1] = 12$$

$$[2420 - 2000] - 5000 [(1 + \frac{R}{100})^2 - 1] = 12$$

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$$420 - 5000 \left[\left(1 + \frac{R}{100} \right)^2 - 1 \right] = 12$$

$$5000 \left[\left(1 + \frac{R}{100} \right)^2 - 1 \right] = 408$$

$$\left[\left(1 + \frac{R}{100} \right)^2 - 1 \right] = \frac{408}{5000}$$

$$\left(1 + \frac{R}{100} \right)^2 = \frac{408}{5000} + 1 = \frac{5408}{5000} = 1.0816$$

$$\left(1 + \frac{R}{100} \right) = (1.0816)^{1/2} = 1.04$$

$$R = 4$$

Hence, option C is correct.

Topic – Time & Distance

10. A, B, C and D are four corners of a square shaped jogging track of unknown area. Two friends Raman and Samarth, both start from A along ABCDA. In first round, when Raman arrives back at A, Samarth has covered 24% of DA. Ratio of speeds of Samarth and Raman:

- a) 100 : 81
- b) 81 : 100
- c) 94 : 100
- d) 100 : 94

Correct Choice: b

Explanation:

Let length of any of the side of the track = L then AB, BC, CD, or DA = L

Since, location of both the people has been given at same time after they started the race, running time for both of them is equal, let it be 't'.

Raman made complete round of the park starting from A, then AB, BC, CD, and DA. Length Raman covered = 4L

$$\text{Speed of Raman} = \frac{4L}{t}$$

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Samarth did cover AB, BC and CD, but 24% of DA, thus the length he covered = $L + L + L + 24\% \text{ of } L = 3L + 0.24L = 3.24L$

$$\text{Speed of Samarth} = \frac{3.24L}{t}$$

Ratio of speed of Samarth and Raman

$$= \frac{3.24L}{t} : \frac{4L}{t} = 81 : 100$$

Hence, option B is correct.

Topic – Problems on Ages

11. Age difference between A and C is 12 years, while age difference between B and D is also the same. A is older than C and B is younger than D. If the average age of B and C is 30 years, then find the average age of A and D.

- m) 42 years
- n) 40 years
- o) 38 years
- p) 44 years

Correct Choice: a

Explanation:

Let the ages of A, B, C, and D be a, b, c, and d years. Then, $a > c$ and $d > b$

It is given that

$$a = c + 12 \text{ ---- (i)}$$

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$$d = b + 12 \text{ ---- (ii)}$$

also,

$$\frac{(b + c)}{2} = 30$$

$$b + c = 60 \text{ ---- (iii)}$$

add (i) and (ii), we get

$$a + d = b + c + 24$$

eliminate $b + c = 60$ in it, we get

$$a + d = 60 + 24 = 84$$

$$\text{Average age A and D} = \frac{a + d}{2} = \frac{84}{2} = 42 \text{ years}$$

Hence, option A is correct.