Quantitative Aptitude

Topic - Pipes & Cisterns

1. **Pipe A can fill a tank in 18 hours and pipe B can fill it in 24 hours. Pipe A is opened for 6 hours then closed, then pipe B is opened for 4 hours and then closed. Tank is 125 litres full. What is the full volume of the tank?**

a) 180 litres
b) 250 litres
c) 275 litres
d) Data insufficient

Correct Choice: b

Explanation:

Pipe A can fill the tank in 18 hours, so in each hour it will fill (1/18) th part of the tank.

In 6 hours it will fill = $6 \times \frac{1}{18}$

= $\frac{1}{3}$ part of the tank.

Pipe B can fill in the tank in 24 hours, so in each hour it will fill (1/24) th part of the tank.

In 4 hours it will fill = $4 \times \frac{1}{24}$

= $\frac{1}{6}$ part of the tank.

Total part of the tank fill = $(\frac{1}{3} + \frac{1}{6}) = \frac{3}{6} = \frac{1}{2}$

Means, 1/2 part is filled and this is 125 litre, so

1/2 ----------> 125 litres

1_____> 250 litres

Tank's full volume is 250 litres.

Hence, option B is correct.

Tech Mahindra Aptitude Questions & Answers - Paper 3

Topic - Percentages

2. Rahim spent 10% of his yearly income on house rent, 14% on buying a new car, 12% on kids' school. He spent 15% and 10% of the remaining on groceries and vacation in Spain. If he saved Rs.518400in the entire year, then find his monthly salary?

a) Rs. 90000
b) Rs. 108000
c) Rs. 98000
d) Rs. 136000

Correct Choice: a

Explanation:

Let his yearly salary was Rs. y, then

10% of y = 0.10y was spent on house rent

14% of y = 0.14y was spent on car

12% of y = 0.12y was spent on school

Total = (0.1y + 0.14y + 0.12y) = 0.36y

Remaining amount = y – 0.36y = 0.64y

Now, 15% of 0.64y = 0.096y was spent on groceries

10% of 0.64y = 0.064y was spent on vacation

Total on these two things = (0.096y + 0.064y) = 0.16y

Total expenditure on all the five items = (0.36y + 0.16y) = 0.52y

Savings = y – 0.52y = 0.48y

So, we have

0.48y = 518400

y = 1080000

Monthly salary = Rs. $\frac{1080000}{12}$ = Rs. 90000

Hence, option A is correct.

Topic - Probability

3. There are few balls of red and black colour in a bag. Black colour balls are one less than twice the number of red balls. Probability of getting two balls of same colour is 35/68. Number of black balls in the bag are:

e) 6
f) 17
g) 11
h) 12

Correct Choice: c

Explanation:

Let there be total y red balls, then number of black balls = (2y – 1)

Total number of balls = y + 2y – 1 = (3y – 1)

Probability of getting a red ball

$$= \frac{\text{number of red balls}}{\text{total balls}} = \frac{y}{(3y-1)}$$

After removing one red ball, (y – 1) red balls are left and (3y – 2) total balls are left, so

$$\text{probability of removing one more red ball} = \frac{y-1}{3y-2}$$

Probability of removing 2 red balls = probability of removing first red ball × probability of removing second red ball

$$= \frac{y}{(3y-1)} \times \frac{(y-1)}{(3y-2)} = \frac{y\,(y-1)}{(3y-1)\,(3y-2)}$$

In the same way, we find the probability of removing two black colour balls

$$= \frac{(2y-1)\,(2y-2)}{(3y-1)\,(3y-2)}$$

Total probability = Probability of removing 2 red balls + Probability of removing 2 black balls

$$\frac{35}{68} = \frac{y\,(y-1)}{(3y-1)(3y-2)} + \frac{(2y-1)\,(2y-2)}{(3y-1)\,(3y-2)}$$

35 (3y – 1) (3y – 2) = 68 [y (y – 1) + (2y – 1) (2y – 2)]

35 [9yy – 9y + 2] = 68 [yy – y + 4yy – 6y + 2]

315yy – 315y + 70 = 340yy – 476y + 136

25yy – 161y + 66 = 0

25yy – 150y – 11y + 66 = 0
25y (y – 6) – 11 (y – 6) = 0

(y – 6) (25y – 11) = 0

$y = 6 \text{ or } \frac{11}{25}$

Since y is number of balls, it can't be in fraction, we use y = 6.

Number of black balls = (2y – 1) = 11

Alternate Solution:

Let there be total y red balls, then number of black balls = (2y – 1)

Total number of balls = y + 2y – 1 = (3y – 1)

$$\text{Red} = \frac{(\text{Black} + 1)}{2}$$

As Black = (2y – 1) it can't be even, so option A and D are ruled out.

If we consider Black balls = 17,

$$\text{Red balls} = \frac{(\text{Black} + 1)}{2} \rightarrow \text{Red balls} = 9$$

Total balls = 17 + 9 = 26

$$\text{Probability} = \frac{{}^{9}C_2 + {}^{17}C_2}{{}^{26}C_2} = \frac{172}{325}$$

If we consider Black balls = 11,

$$\text{Red balls} = \frac{(\text{Black} + 1)}{2} \rightarrow \text{Red balls} = 6$$

Total balls = 11 + 6 = 17

$$\text{Probability} = \frac{{}^{6}C_2 + {}^{11}C_2}{{}^{7}C_2} = \frac{35}{68}$$

Hence, option C is correct.

Topic- Profit & Loss

4. A seller had some burgers for sale. Selling price of each was 20% above the cost price. If every burger is sold he would earn a profit of Rs. 1650. He could not sell 18 burgers and earned Rs. 1452. How many burgers he had for the sale?

a) 120
b) 125
c) 132
d) 150

Correct Choice: d

Explanation:

He earned Rs. (1650 – 1452) = Rs. 198 less on selling 18 burgers less.

If price of each burger was Rs. P, then profit on each would be 20% of P = Rs. 0.2P

Profit on 18 burgers = 18 × 0.2P = Rs. 3.6P

Therefore, we have

3.6P = 198

P = 55

Profit on each burger = 0.2P = 0.2 × 55 = Rs. 11

If each burger had been sold, his total profit would have been Rs. 1650, so

$$\text{Number of burgers} = \frac{1650}{11} = 150$$

Hence, option D is correct

Topic - Mixtures & Allegations

5. Three containers A, B, and C have pure solution of unknown chemicals p, q, and r respectively with volume 12 litre, 18 litre and 36 litres respectively. All the three are non-reactive. They are poured in a big container and mixed thoroughly. 11 litre sample of that mixture will have chemical p what percent less than chemical r?

a) 66.67%
b) 33.33%
c) 75%
d) 55.55%

Correct Choice: a

Explanation:

When the three chemicals are mixed, total volume = 12 + 18 + 36 = 66 litres

Parts of chemical p = $\frac{12}{66} = \frac{2}{11}$

Parts of chemical q = $\frac{18}{66} = \frac{3}{11}$

Parts of chemical r = $\frac{36}{66} = \frac{6}{11}$

In the 11 litre sample, we have

volume of p = $\frac{2}{11} \times 11 = 2$ litre

volume of r = $\frac{6}{11} \times 11 = 6$ litre

chemical p is 6 – 2 = 4 litre less than r, and

in percent = $\frac{4}{6} \times 100 = \frac{200}{3}\ \% = 66.67\%$

Hence, option A is correct,

Topic - Boats & Streams

6. Boat A in still water with speed of 12 kmph starts from a fixed point in a river. After 12 minutes, boat B left the same point to catch boat-A. Both are moving in upstream direction and speed of stream is2 kmph. Boat-B catches boat-A after chasing for 6 km. What is the Speed of boat-B?

i) 14 kmph
j) 17 kmph
k) 20 kmph
l) 21 kmph

Correct Choice: b

Explanation:

Time taken by boat A to cover distance 6 km

= $\frac{6}{\quad}$ = 0.6 hour

$12 - 2$

Boat B starts chasing boat-A after 12 minutes

$= \frac{12}{60}$ hours = 0.2 hours,

means, boat-B has travelled 0.2 hours less than boat-A, therefore

if speed of boat-B is v kmph, then

Time taken by boat B to cover distance 6 km

$= \frac{6}{v - 2} = (0.6 - 0.2)$ hour = 0.4 hour

0.4 (v – 2) = 6

0.4v = 6.8

v = 17

Speed of boat B is 17 kmph.

Hence, option B is correct.

Topic - Simple Interest & Compound Interest

7. What is the proportion of simple interest from three principals, where second principal is one-third of the first principal and one- fourth of third principal and interest rate per annum on first principle is 3%, second principle is 7% and third principle is 2%. Each principle was put for same number of years.

a) 3 : 4 : 2
b) 2 : 4 : 3

c) 7 : 5 : 3
d) 9 : 7 : 8

Correct Choice: d

Explanation:

Let the second principal be Rs. P, then first principal = Rs. 3P and third principal = Rs. 4P.

Also, assume the number of years were ‘n’.

SI on first = $\frac{(3P \times 3 \times n)}{100} = \frac{9nP}{100}$

SI on second = $\frac{(P \times 7 \times n)}{100} = \frac{7nP}{100}$

SI on third = $\frac{(4P \times 2 \times n)}{100} = \frac{8nP}{100}$

Proportion = $\frac{9nP}{100} : \frac{7nP}{100} : \frac{8nP}{100} = 9 : 7 : 8$

Hence, option D is correct.

Topic – Problems on Trains

8. First train with length 200 m and speed 72 kmph is crossed by a second train running at 86.4 kmph in the same direction in 110 seconds. The first train would cross a platform 150% longer than the second train in how many seconds?

m) 30
n) 25
o) 40
p) 15

Correct Choice: c

Explanation:

Speed of first train = 72 kmph = 20 m/s

Speed of second train = 86.4 kmph = 24 m/s

Let the length of the second train be y metres.

$$110 = \frac{200 + y}{24 - 20}$$

$4 \times 110 = 200 + y$

$y = 240$

Length of the platform = 240 + 150% of 240 = 240 + 360 = 600 metre

Time to cross the platform by the first train

$$= \frac{600 + 200}{20} = 40 \text{ seconds}$$

Hence, option C is correct.

Topic - Partnership

9. Raman and Tapan started a business with Rs. 45000 and 64000. After 8 months, Raman added Rs. 11000 more and Tapan withdrew Rs. 14000. What was the profit share of Tapan if total profit at the end of the year was Rs. 210600?

a) Rs. 114700
b) Rs. 94900
c) Rs. 125700
d) Rs. 115700

Correct Choice: d

Explanation:

Ratio of investment by Raman and Tapan = [45000 × 8 + (45000 + 11000) × 4] : [64000 × 8 + (64000 – 14000) × 4] = [45 × 8 + 56 × 4] : [64 × 8 + 50 × 4] = 584 : 712 = 73 : 89

Profit share of Tapan = $\frac{89}{73 + 89}$ × 210600 = Rs. 115700

Hence, option D is correct.

Topic - Problems on Ages

10. Present age of Karan is 16 years. Ratio of age of Karan one year ago to age of Jatin 4 years later is 1 : 2. If the present average age of Karan, Jatin and Suresh is 22 years, then find the average age of Karan and Suresh?

q) 24 years
r) 20 years
s) 25 years
t) 26 years

Correct Choice: b

Explanation:

Let present age of Karan, Jatin and Suresh be k, j and s years,

Present average age of Karan, Jatin and Suresh is 22 years, means

$\frac{(k + j + s)}{3}$ = 22

k + j + s = 66

Present age of Karan is 16 years, thus

16 + j + s = 66

j + s = 50 ---- (i) Ratio of age of Karan one year ago to age of Jatin 4 years later is 1 : 2, so

$$\frac{(k - 1)}{(j + 4)} = \frac{1}{2}$$

$$\frac{(16 - 1)}{(j + 4)} = \frac{1}{2}$$

j = 26

Put j = 26 in (i), we get

s = 24

Average age of Karan and Suresh

$$= \frac{16 + 24}{2} = 20 \text{ years}$$

Hence, option B is correct.

Topic - Areas - Volumes

11. Radius of a circle is 16.1 cm. A rectangle has length equal to the radius of this circle and area equal to the one-fourth the area of the circle. Find the perimeter of the rectangle.

u) 50.5 cm

v) 55.5 cm
w) 57.5 cm

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d) 12.65 cm

Correct Choice: c

Explanation:

Area of the circle = $\frac{22}{7} \times (16.1)^2 = 814.66$ sq cm

One-fourth of area of circle is area of rectangle

$= \frac{1}{4} \times 814.66 = 203.665$ sq cm

Length of the rectangle = radius of the circle = 16.1 cm

Breadth of the rectangle = $\frac{\text{area of rectangle}}{\text{length}}$

$= \frac{203.665}{16.1} = 12.65$ cm

Perimeter of the rectangle = 2 (12.65 + 16.1) = 57.5 cm

Hence, option C is correct.