

AFCAT MBT 16 feb 2024

Numerical Aptitude

- Q1** Train crosses the 153 m long platform in 45 sec if the train length is 747 m then what is the speed of the train ?
 (A) 80 km/hr (B) 55 km/hr
 (C) 72 km/hr (D) 90 km/hr
- Q2** What is the largest 4 digit number divisible by 88?
 (A) 9944 (B) 9000
 (C) 8488 (D) 9999
- Q3** A person sold an article for ₹ 3,600 and got a profit of 20 %. Had he sold the article for ₹ 3,150, how much profit would he have got?
 (A) 10% (B) 5%
 (C) 7% (D) 7.5%
- Q4** A and B can do a piece of work in 20 hours. B and C can do it in 25 hours, while A and C take 15 hours to complete the work. B independently can complete the work in
 (A) 85.71 hour (B) 66.66 hour
 (C) 60 hour (D) 45.50 hour
- Q5** 2 numbers are in ratio of 1 : 2, if 7 is added to both their ratio changes to 3 : 5 the greatest number is ?
 (A) 28 (B) 30
 (C) 35 (D) 34
- Q6** If the person got Rs 6800 amount by bank closing his bank account after 3 years at the rate of 12% will be the initial sum of amount?
 (A) 5000 (B) 4550
 (C) 6000 (D) 3000
- Q7** A Library has an average of 510 visitors on Sundays and 240 on other days. The average number of visitors per day in a month of 30 days beginning with a Sunday is
 (A) 250 (B) 285
 (C) 275 (D) 255
- Q8** A man can row $9\frac{1}{3}$ kmph in still water and finds it takes time thrice as much to row up than as to row down to cover the same distance and find the speed of the current?
 (A) $\frac{2}{5}$ (B) 5
 (C) $\frac{3}{2}$ (D) $\frac{14}{3}$ kmph
- Q9** The area of circle (in cm^2) formed by the rope of length 44 cm will be ?
 (A) 154 (B) 156
 (C) 160 (D) 146
- Q10** Arun purchased 20 kg of sugar and sold it for a profit to the extent of what he would have paid for 80 kg what is his profit?
 (A) 400% (B) 200%
 (C) 150% (D) 300%
- Q11** From a pack of 52 cards, two cards are drawn together at random. What is the probability of both the cards being Queen?
 (A) $\frac{1}{221}$ (B) $\frac{1}{225}$
 (C) $\frac{2}{13}$ (D) $\frac{1}{13}$
- Q12** $\frac{2}{3}$ of a number and $\frac{25}{216}$ of its reciprocal are equal the number is ?
 (A) $\frac{5}{12}$ (B) $\frac{36}{14}$
 (C) $\frac{8}{12}$ (D) $\frac{9}{14}$
- Q13** A sum invested at the rate of 5% grows to 1008 in 4 years, same amount at 10% SI per annum in $2\frac{1}{2}$ will grow to?
 (A) 1000 (B) 1250
 (C) 1050 (D) 1200
- Q14** A rectangle lawn 60m by 40 m has two roads 5m wide running in the middle one parallel to length and other parallel to breadth cost of gravelling of roads at Rs 60 paisa per sq metre?



(A) 225 Rs
(C) 300 Rs

(B) 325 Rs
(D) 285 Rs

(A) 50%
(C) 40%

(B) 30%
(D) 45%

Q15 The average age of husband, wife, and child 3 years ago was 27 and that of wife and child 5 years ago was 20 years. The present age of the husband is

(A) 40 yrs (B) 45 yrs
(C) 36 yrs (D) 30 yrs

Q16 A can do work in 20 days B can do work in 25 days and C can do it in 50 days. they work for 2 days then C left after again working for 2 days B left. Then how much percentage of work will be done by A?

(A) 60% (B) 65.5%
(C) 80% (D) 73%

Q17 Find the value of

$$5^3 - \sqrt{36} + \frac{4 \times (8 - 3^2)}{2}$$

(A) 110 (B) 117
(C) 1 (D) 27

Q18 A and B can do a work in 40 days and 25 days respectively. They started the work together, but A left after some days and B finish the remaining work in 12 days. After how many days did A leave?

(A) 8 days (B) 10 days
(C) 5 days (D) 7 days

Q19 Sudha decided to donate 12% of her monthly income to an orphanage. On the day of donation, she changed her decision and donated a sum of Rs 4800 which was equal to 80% of what she had decided earlier. What is 27% of her monthly income?

(A) 13500 (B) 11000
(C) 12000 (D) 12500

Q20 5L of honey contains 80% sugar. 3L of water is added to this honey. Percentage of sugar in the new mixture?



Answer Key

Q1 (C)
Q2 (A)
Q3 (B)
Q4 (A)
Q5 (A)
Q6 (A)
Q7 (B)
Q8 (D)
Q9 (A)
Q10 (A)

Q11 (A)
Q12 (A)
Q13 (C)
Q14 (D)
Q15 (A)
Q16 (C)
Q17 (B)
Q18 (A)
Q19 (A)
Q20 (A)

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Hints & Solutions

Q1 Text Solution:

Given:

- Length of the train (L_{train}) = 747 meters
- Length of the platform ($L_{platform}$) = 153 meters
- Time taken to cross the platform (t) = 45 seconds

Calculation:

The total distance covered by the train as it crosses the platform is:

$$\text{Total distance} = L_{train} + L_{platform} = 747 \text{ m} + 153 \text{ m} = 900 \text{ m}$$

Next, we use the formula for speed, which is:

$$\text{Speed} = \frac{\text{Total distance}}{\text{Time}}$$

Plugging in the values:

$$\text{Speed} = \frac{900 \text{ m}}{45 \text{ s}} = 20 \text{ m/s}$$

To convert this speed from meters per second (m/s) to kilometers per hour (km/h), we use the conversion factor

$$1 \text{ m/s} = \frac{18}{5} \text{ km/h}$$

$$\text{Speed in km/h} = 20 \text{ m/s} \times \frac{18}{5} = 72 \text{ km/h}$$

Hence, the correct answer is option (c), i.e 72 km/hr

Q2 Text Solution:

Calculation

The Largest 4 digit number is = 9999

Now we have to find the divisibility by 88

So after dividing 9999 by 88

We get 55 as a remainder

so to find the number we will subtract the remainder by 9999

$$\Rightarrow 9999 - 55 = 9944$$

Hence, the correct answer is option (a), i.e 9944

Q3 Text Solution:

Given

Previous SP of Article = 3600 Rs

Profit gained = 20%

SP afterwards = 3150 Rs

Calculation

$$\text{Profit percent} = \frac{SP - CP}{CP} \times 100$$

Now

$$\Rightarrow 20 = \frac{3600 - CP}{CP} \times 100$$

$$\Rightarrow \frac{3600}{CP} = 1 + \frac{1}{5} = \frac{6}{5}$$

$$\Rightarrow CP = 3000$$

Again for profit at 3150 Rs Cost price

$$\Rightarrow \frac{3150 - 3000}{3000} \times 100$$

$$\Rightarrow \frac{150}{3000} \times 100 = 5\%$$

Hence, the correct answer is option (b), i.e 5 %

Q4 Text Solution:

Given:

$$A + B = \frac{1}{20} \text{ (work per hour)}$$

$$B + C = \frac{1}{25} \text{ (work per hour)}$$

$$A + C = \frac{1}{15} \text{ (work per hour)}$$

Calculation:

Let's add all three equations:

$$(A + B) + (B + C) + (A + C) = \frac{1}{20} + \frac{1}{25} + \frac{1}{15}$$

$$2(A + B + C) = \frac{1}{20} + \frac{1}{25} + \frac{1}{15}$$

$$2(A + B + C) = \frac{15}{300} + \frac{12}{300} + \frac{20}{300} = \frac{47}{300}$$

$$A + B + C = \frac{47}{600}$$

Now, using the equation $A + C = \frac{1}{15}$:

Subtract $A + C$ from $A + B + C$:

$$C = \frac{47}{600} - \frac{1}{15}$$

$$C = \frac{47}{600} - \frac{40}{600} = \frac{7}{600}$$

The work rate of B is $\frac{7}{600}$ of the work per hour.

To find the time B takes to complete the work independently:

$$\text{Time} = \frac{1}{\frac{7}{600}} = \frac{600}{7} \approx 85.71 \text{ hours}$$

Hence, the correct answer is option (a), i.e 85.71 hours.

Q5 Text Solution:

Given

2 numbers are in ratio 1 : 2

Calculation

Let the number be x and $2x$, then


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$$\Rightarrow \frac{x+7}{2x+7} = \frac{3}{5}$$

$$\Rightarrow 5(x+7) = 3(2x+7)$$

$$\Rightarrow x = 14$$

$$\text{Greatest number} = 2x = 28$$

Hence, the correct answer is option (a), i.e 28

Q6 Text Solution:

Given:

- Amount = Rs. 6800

- Rate = 12%

- Time = 3 years

Using the simple interest formula

$$A = P + \frac{P \times R \times T}{100}$$

$$6800 = P + \frac{P \times 12 \times 3}{100}$$

$$6800 = P + 0.36P$$

$$6800 = 1.36P$$

$$P = \frac{6800}{1.36} = 5000$$

Hence, the correct answer is option (a), i.e Rs. 5000.

Q7 Text Solution:

Given

an average of 510 visitors on Sundays and 240 on other days, in a 30-day month beginning with a Sunday, there are 5 Sundays and 25 other days.

Calculation:

The total visitors on Sundays is $5 \times 510 = 2550$.

The total visitors on other days is

$$25 \times 240 = 6000.$$

The total visitors in the month is

$$2550 + 6000 = 8550.$$

The average number of visitors per day is

$$\frac{8550}{30} = 285.$$

Therefore, the average number of visitors per day is 285.

Hence, the correct answer is option (b), i.e 285

Q8 Text Solution:

Calculation

Let

speed upstream be x kmph

then speed downstream = $3x$ kmph

$$\Rightarrow 2x = \frac{28}{3}$$

$$\Rightarrow x = \frac{14}{3}$$

So Speed Upstream = $\frac{14}{3}$ km/hr

Speed Downstream = 14 km/hr

Hence speed of current =

$$\frac{1}{2} \times \left(14 - \frac{14}{3}\right) = \frac{14}{3} \text{ km/hr}$$

Alternative:

Given:

- Speed of the man in still water = $\frac{28}{3}$ km/hr

Let the speed of the current be x km/hr.

According to the given condition:

Time taken to row up = 3 times the time taken to row down.

Using the formula: $\text{Time} = \frac{\text{Distance}}{\text{Speed}}$,

then according to the question:

$$\frac{\frac{28}{3} + x}{\frac{28}{3} - x} = \frac{3}{1}$$

$$28 - 3x = \frac{28}{3} + x$$

$$x = \frac{14}{3}$$

Hence, the correct answer is option (d), i.e $\frac{14}{3}$ km/hr.

Q9 Text Solution:

Given

44 - meter long wire is used to make a circle

Formula Used

Circumference of the circle = $2\pi r$

Area of the square = πr^2

Calculation

Circumference of the circle = Length of the wire

$$\Rightarrow 2\pi r = 44$$

$$\Rightarrow r = \frac{44}{2\pi}$$

$$\Rightarrow r = \frac{44}{2} \times \frac{7}{22} = 7 \text{ cm}$$

Now area of the circle = πr^2

$$\Rightarrow \pi \times 7^2$$

$$\Rightarrow \frac{22}{7} \times 7 \times 7$$

$$\Rightarrow 22 \times 7 = 154 \text{ cm}^2$$

The area of the circle made from a 44 metre long wire is 154

Hence, the correct answer is option (a), i.e 154

Q10 Text Solution:

Given:



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Arun purchased 20 kg of sugar. His profit is equivalent to the cost of 80 kg of sugar.

Calculation:

If the cost price per kg of sugar is C , then the total cost for 20 kg is $20C$ and the profit is $80C$.

The selling price for 20 kg is

$$20C + 80C = 100C.$$

he profit percentage is calculated as

$$\left(\frac{80C}{20C}\right) \times 100 = 4 \times 100 = 400\%.$$

Hence, the correct answer is option (a), i.e 400%.

Q11 Text Solution:

Given:

- Number of cards = 52

Formula used:

$${}^nC_r = \frac{n!}{(n-r)! \times r!}$$

Calculation:

- Two cards can be drawn from a pack of 52 cards in:

$${}^{52}C_2 \text{ ways} = \frac{52 \times 51}{2} = 1326 \text{ ways}$$

- The situation that 2 Queens appear in a single draw can appear in:

$${}^4C_2 \text{ ways} = 6 \text{ ways}$$

The probability of both the cards drawn being Queens:

$$\frac{6}{1326} = \frac{1}{221}$$

Hence, the correct answer is option (a), i.e 1/221.

Q12 Text Solution:

Calculation:

Let's the number as x .

According to the given information:

$\frac{2}{3}$ of the number is equal to $\frac{25}{216}$ of its reciprocal.

Mathematically, we can express this as:

$$\frac{2}{3}x = \frac{25}{216} \times \frac{1}{x}$$

$$\frac{2}{3}x = \frac{25}{216x}$$

Cross multiply to eliminate the fractions:

$$2 \times 216xx = 3 \times 25$$

$$432xx = 75$$

Now, solve for x :

$$x^2 = \frac{75}{432} = \frac{25}{144}$$

$$x = \frac{5}{12}$$

Hence, the correct answer is option (a), i.e $\frac{5}{12}$.

Q13 Text Solution:

Let's denote the principal amount as P .

Given:

The principal amount grows to Rs. 1008 in 4 years at a rate of 5%.

The same principal amount grows to an unknown value in 2.5 years at a rate of 10%.

Let's denote the principal amount as P .

the formula for simple interest:

$$A = P + \frac{P \times R \times T}{100}$$

For the first case:

$$A = P + \frac{P \times 5 \times 4}{100}$$

$$1008 = P + \frac{20P}{100}$$

$$1008 = P + \frac{1}{5}P$$

$$1008 = \frac{6}{5}P$$

$$P = \frac{1008 \times 5}{6} = 840$$

So, the principal amount is Rs. 840.

For the second case:

$$A = P + \frac{P \times 10 \times 2.5}{100}$$



$$A = 840 + \frac{840 \times 10 \times 2.5}{100}$$

$$A = 840 + \frac{840 \times 25}{100}$$

$$A = 840 + 210$$

$$A = 1050$$

Hence, the correct answer is option (c), i.e Rs. 1050.

Q14 Text Solution:

Given:

- Length of the rectangular lawn = 60 meters
 - Breadth of the rectangular lawn = 40 meters
 - Width of each road = 5 meters
 - Cost of gravelling = Rs 0.60 per square meter
- To find the area of the road, we subtract the area of the lawn from the total area covered by the roads. The total area covered by the roads is the sum of the areas of the two strips of width 5 meters, one along the length and the other along the breadth, and the area of the square region where the two strips overlap.

$$= 200 + 300 - 25$$

$$= 475 \text{ sq m}$$

Now, we calculate the cost of gravelling the roads:

$$\begin{aligned} \text{Cost} &= \text{Area of the road} \\ &\times \text{Cost per square meter} \\ &= 475 \times 0.60 \text{ Rs} \\ &= 285 \text{ Rs} \end{aligned}$$

Hence, the correct answer is option (d), i.e 285 Rs.

Q15 Text Solution:

Let's

- The present age of the husband as H

- The present age of the wife as W
- The present age of the child as C

Given:

1. Three years ago, the average age of the husband, wife, and child was 27.
2. Five years ago, the average age of the wife and child was 20.

From the first statement:

$$\frac{(H-3)+(W-3)+(C-3)}{3} = 27$$

$$H + W + C - 9 = 81$$

$$H + W + C = 90 \dots (1)$$

From the second statement:

$$\frac{(W-5)+(C-5)}{2} = 20$$

$$W + C - 10 = 40$$

$$W + C = 50 \dots (2)$$

Subtracting equation (2) from equation (1):

$$H = 40$$

.Hence, the correct answer is option (a), i.e 40 yrs.

Q16 Text Solution:

Given:

- A can complete the work in 20 days.
- B can complete the work in 25 days.
- C can complete the work in 50 days.
- They work for 2 days together.
- Then C leaves, and they work for another 2 days.
- Finally, B leaves.

First, let's find out the rate at which each person works per day:

$$\text{- A's rate} = \frac{1}{20} \text{ of the work per day.}$$

$$\text{- B's rate} = \frac{1}{25} \text{ of the work per day.}$$

$$\text{- C's rate} = \frac{1}{50} \text{ of the work per day.}$$

When they work together for 2 days, the total work done is:

$$\begin{aligned} \text{Total work done in 2 days} \\ = 2 \left(\frac{1}{20} + \frac{1}{25} + \frac{1}{50} \right) \end{aligned}$$

Now, C leaves, and they work together again for 2 more days. The total work done in these 2 days is the same.



Now, B leaves, and A works alone. Let's find out how much work is left:

$$\text{Work left after 4 days} = 1 - 4 \left(\frac{1}{20} + \frac{1}{25} + \frac{1}{50} \right)$$

To find the percentage of work done by A, we'll subtract the work left from the total work and then find what percentage it is of the total work. Let's calculate:

$$\text{Total work} = 1$$

$$\begin{aligned} \text{Total work done in 2 days} \\ = 2 \left(\frac{1}{20} + \frac{1}{25} + \frac{1}{50} \right) = \frac{7}{10} \end{aligned}$$

$$\begin{aligned} \text{Work left after 4 days} &= 1 - 4 \times \frac{7}{10} = 1 - \frac{28}{10} = \frac{2}{10} \end{aligned}$$

Now, let's find out what percentage of work A has done:

$$\begin{aligned} \text{Percentage of work done by A} &= \frac{\frac{8}{10}}{\frac{2}{10}} \\ &\times 100\% = 80\% \end{aligned}$$

Hence, the correct answer is option (c), i.e 80%

Q17 Text Solution:

Calculation:

Alright, let's tackle a more challenging expression using BODMAS:

$$5^3 - \sqrt{36} + \frac{4 \times (8 - 3^2)}{2}$$

Using BODMAS:

Brackets

$$8 - 3^2 = 8 - 9 = -1$$

Now the expression becomes:

$$5^3 - \sqrt{36} + \frac{4 \times (-1)}{2}$$

Orders (Exponents)

$$5^3 = 125$$

$$\sqrt{36} = 6$$

Now the expression is:

$$125 - 6 + \frac{4 \times (-1)}{2}$$

Multiplication and Division

$$4 \times (-1) = -4$$

$$\frac{-4}{2} = -2$$

Now the expression becomes:

$$125 - 6 - 2$$

Addition and Subtraction

$$125 - 6 - 2 = 117$$

Hence, the correct answer is option (b), i.e 117

Q18 Text Solution:

Given:

- A takes 40 days to complete the work.

- B takes 25 days to complete the work.

Together, their work rate per day:

$$\frac{1}{40} + \frac{1}{25} = \frac{13}{200} \text{ of the work.}$$

After A leaves, B completes the remaining work in 12 days, which is $\frac{12}{25}$ of the total work.

So, the work completed by A and B together is:

$$1 - \frac{12}{25} = \frac{13}{25}$$

They work at $\frac{13}{200}$ of the work per day together.

To find out how many days they worked together:

$$\frac{\text{Number of days}}{\frac{13}{200}} = \frac{13}{25}$$

$$\text{Number of days} = \frac{\frac{13}{25}}{\frac{13}{200}} = 8$$

Hence, the correct answer is option (a), i.e 8 days.

Q19 Text Solution:

Calculation:

Let Sudha's monthly income be I .

Initially, Sudha decided to donate 12% of her monthly income:

$$12\% \text{ of } I = 0.12I$$

But she donated 80% of what she decided:

$$80\% \times 0.12I = 4800$$

Solving for I :

$$0.096I = 4800$$

$$I = \frac{4800}{0.096} = 50000$$

Now, find 27% of her monthly income:

$$27\% \text{ of } 50000 = 0.27 \times 50000 = 13500$$



Hence, the correct answer is option (a), i.e Rs. 13500.

Q20 Text Solution:**Given:**

- 5 liters of honey contains 80% sugar.
- 3 liters of water is added to this honey.

Calculation:

First, calculate the amount of sugar in the original 5 liters of honey:

$$\text{Amount of sugar} = 5 \text{ liters} \times 0.80 = 4 \text{ liters of sugar}$$

When 3 liters of water is added, the total volume of the mixture becomes:

$$\text{Total volume} = 5 \text{ liters of honey} + 3 \text{ liters of water} = 8 \text{ liters}$$

Now, the amount of sugar remains the same (4 liters), but it is now in 8 liters of the mixture. To find the percentage of sugar in the new mixture, we use the formula for percentage:

$$\text{Percentage of sugar} = \left(\frac{\text{Amount of sugar}}{\text{Total volume of mixture}} \right) \times 100$$

Substituting the values:

$$\text{Percentage of sugar} = \left(\frac{4 \text{ liters}}{8 \text{ liters}} \right) \times 100 = 0.5 \times 100 = 50\%$$

Hence, the correct answer is option (a), i.e 50%.

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