TCS NQT Aptitude (Numerical Ability) Questions & Answers - Paper 3

Data interpretation (pie chart, bar graphs on percentages & absolute values)

(1-3) Directions: Answer the questions based on the information given below.

A company manufactures two types of balls i.e. volleyball and football over six different years. The pie chart given below shows the percentage distribution of total number of balls manufactured by the company over the years. Total number of balls manufactured in all six years together is 4500.

The bar graph given below shows the number of volleyballs manufactured by the company in the respective years.
https://www.freshersnow.com/placement-papers-download/

1. What is the ratio of number of volleyballs to number of footballs manufactured in 2015?

A -

6:5

B -

8:7

C -

9:7

D -

7:5

Solution

Years	Total number of balls manufactured	Number of volleyballs manufactured	Number of footballs manufactured
2012	0.12 × 4500 = 540	240	540 – 240 = 300
2013	0.19 × 4500 = 855	480	855 – 480 = 375
2014	0.20 × 4500 = 900	576	900 – 576 = 324
2015	0.15 × 4500 = 675	360	675 – 360 = 315
2016	0.18 × 4500 = 810	432	610 – 432 = 378
2017	0.16 × 4500 = 720	360	720 – 360 = 360

Desired Ratio = 360:315 = 8:7

Hence, option b.

2. 60% of the balls manufactured in 2013, 2015 and 2017 together are sold for charity purpose. Find total number of balls sold for charity purpose in these three years.

A -

750

B -

1250

C -

1350

D -

900

Solution

Years	Total number of balls manufactured	Number of volleyballs manufactured	Number of footballs manufactured
2012	0.12 × 4500 = 540	240	540 – 240 = 300
2013	0.19 × 4500 = 855	480	855 – 480 = 375
2014	0.20 × 4500 = 900	576	900 – 576 = 324
2015	0.15 × 4500 = 675	360	675 – 360 = 315
2016	0.18 × 4500 = 810	432	610 – 432 = 378

2017	0.16 × 4500 = 720	360	720 – 360 = 360

Total number of balls sold for charity purpose = 0.60 × (855 + 675 + 720) = 0.60 × 2250 = 1350

Hence, option c.

3. Number of volleyballs manufactured in 2013 is how much percent more/less than the number of footballs manufactured in the same year?

A -

24%

B -

28%

C -

32%

D -

26%

Solution

Years	Total number of balls manufactured	Number of volleyballs manufactured	Number of footballs manufactured
2012	0.12 × 4500 = 540	240	540 – 240 = 300

2013	0.19 × 4500 = 855	480	855 – 480 = 375
2014	0.20 × 4500 = 900	576	900 – 576 = 324
2015	0.15 × 4500 = 675	360	675 – 360 = 315
2016	0.18 × 4500 = 810	432	610 – 432 = 378
2017	0.16 × 4500 = 720	360	720 – 360 = 360

Desired Percentage = [(480 – 375)/375] × 100 = 28%

Hence, option b.

Q1 & Q2 comparison on Problems on trains, quadratic equations

4. In the question, Quantity I and Quantity II are given. You have to solve both the quantities to establish the correct relation between Quantity-I and Quantity-II and choose the correct option.

Quantity-I: A train travelling with a speed of 'x' m/s can cross a pole as well as a platform of length 324 metres in 12 seconds and 28.2 seconds respectively. Find the value of x.

Quantity-II: Find the value of 'x' if $x^2 – 27x + 140 = 0$

A -

Quantity-I > Quantity-II

B -

Quantity-I < Quantity-II

C -

Quantity-I ≤ Quantity-II

D -

Quantity-I ≥ Quantity-II

Solution

Quantity I:

Let length of train is 'l' metres

So, l = 12x

And, l + 324 = 28.2x

So, 12x + 324 = 28.2x

Or, 16.2x = 324

Or, x = 20

So, Quantity I = 20

Quantity II:

$x^2 – 27x + 140 = 0$

$x^2 – 20x – 7x + 140 = 0$

$x(x – 20) – 7(x – 20) = 0$

$(x – 20)(x – 7) = 0$

$x = 20, 7$

So, Quantity II = 20 or 7

Therefore, Quantity I ≥ Quantity II

Hence, option d.

Mixtures & allegations

5. A 432 ml of mixture contains milk and water in the ratio of 5:4 respectively. If 25% of the mixture is taken out and x ml of water and (2x – 40) ml of milk is added into the remaining mixture then the quantity of milk in the final mixture will be 76 ml more than that of water. Find the value of x.

A -

60

B -

75

C -

100

D -

80

Solution

Quantity of milk in 432 ml of mixture = 5/9 × 432 = 240 ml

Quantity of water in 432 ml of mixture = 4/9 × 432 = 192 ml

According to question;

0.75 × 240 + 2x – 40 = 0.75 × 192 + x + 76

Or, 180 + 2x – 40 = 144 + x + 76

Or, x = 80

Hence, option d.

Time & work

6. Tap A can fill 75% of the tank in 42 minutes while tap A and B together can fill the same tank in 96 minutes. Find the time in which 75% of completely filled tank will be emptied by tap B.

A -

100.8 minutes

B -

112.8 minutes

C -

80.8 minutes

D -

120.8 minutes

Solution

Total time taken by tap A to fill the tank = 42/0.75 = 56 minutes

Let total capacity of the tank = 672 litres

Quantity of water filled by tap A in one minute = 672/56 = 12 litres

Quantity of water filled by tap A and B together in one minute = 672/96 = 7 litres

Quantity of water emptied by tap B in one minute = 12 – 7 = 5 litres

Desired time = (0.75 × 672)/5 = 100.8 minutes

Hence, option a.

Ratios & proportions

7. A bag contains 688 coins consisting of 1 rupee, 50-paise and 25-paise coins, and their values being in the ratio of 10:12:13 respectively. Find the value of 50-paise, 1 rupee and 25-paise coins in the bag respectively.

A -

96, 80, 104

B -

80, 96, 104

C -

104, 80, 96

D -

80, 96, 104

Solution

Let value of 1 rupee, 50-paise and 25-paise coins be Rs. 10x, 12x and 13x respectively

Number of 1 rupee coins = 1 × 10x = 10x

Number of 50-paise coins = 12x × 2 = 24x

Number of 25-paise coins = 13x × 4 = 52x

So, 10x + 24x + 52x = 688

86x = 688

x = 8

Therefore, values of 1 rupee, 50-paise and 25-paise coins are Rs. 80, Rs. 96 and Rs. 104 respectively.

Hence, option a.

Partnership

8. A and B entered into a business with a total investment of Rs. 4750. After one year, A and B made additional investments of Rs. 300 and Rs. 280 respectively. If the ratio of the profit shares of A to B is 5:3 then find the initial investment made by B.

A -

Rs. 3000

B -

Rs. 1750

C -

Rs. 3500

D -

Rs. 2250

Solution

Let initial investment made by A is Rs. x

Initial investment made by B = Rs. (4750 – x)

Ratio of profit share of A to B = [x + x + 300]:[4750 – x + 4750 – x + 280]

So, (2x + 300)/(9780 – 2x) = 5/3

Or, (x + 150)/(4890 – x) = 5/3

Or, 3x + 450 = 24450 – 5x

Or, 8x = 24000

Or, x = 3000

So, initial investment made by B = 4750 – 3000 = Rs. 1750

Hence, option b.

Problems on trains

9. Train A and Train B of lengths 140 metres and 160 metres respectively can cross each other in 30 seconds and 5 seconds while moving in same and opposite directions respectively. Find the distance travelled by the train A in 7 hours 30 minutes if the speed of train A is more than that of train B.

A -

950 km

B -

875 km

C -

945 km

D -

925 km

Solution

Let speed of train A and train B be ‘x’ m/s and ‘y’ m/s respectively.

So, (140 + 160)/(x + y) = 5

x + y = 300/5 = 60……..(1)

And, (140 + 160)/(x – y) = 30

x – y = 300/30 = 10……..(2)

Solving (1) and (2), we get

x = 35 m/s and y = 25 m/s

Speed of train A = 35 × 18/5 = 126 km/h

Desired distance = 126 × 7.5 = 945 km

Hence, option c.

Boats & streams

10. Ratio of speed of a boat in still water to speed of stream is 14:3 respectively. If a boat can travel a distance of 99 km upstream and 119 km downstream together in 8 hours then find the total time taken by the boat to cover 84 km in still water and 51 km in downstream.

A -

3.5 hours

B -

5.5 hours

C -

4.5 hours

D -

2.5 hours

Solution

Let speed of boat in still water and speed of stream is 14x km/h and 3x km/h respectively.

Speed of boat in upstream = 14x – 3x = 11x km/h

Speed of boat in downstream = 14x + 3x = 17x km/h

According to question;

99/11x + 119/17x = 8

Or, 9/x + 7/x = 8

Or, x = 2

Speed of boat in still water = 14 × 2 = 28 km/h

Speed of boat in downstream = 17 × 2 = 34 km/h

Desired time = 84/28 + 51/34 = 3 + 1.5 = 4.5 hours

Hence, option c.

Volumes

11. A right angle triangle with base 24 cm and height 7 cm is rotated along its base. Find the total surface area of the cone thus formed.

A -

724 cm^2

B -

704 cm^2

C -

744 cm^2

D -

684 cm^2

Solution

Slant height of the cone = hypotenuse of the triangle = $\sqrt{(7^2 + 24^2)}$ = 25 cm

When the triangle is rotated along its base then:

Radius of cone formed = height of the triangle = 7 cm

Height of the cone formed = base of the triangle = 24 cm

Desired Area = $\pi \times 7 \times 25 + \pi \times 7 \times 7 = 22 \times 25 + 22 \times 7 = 550 + 154 = 704\ cm^2$

Hence, option b.

Compound interest

12. Jyoti took a loan from a bank at 20% p.a. compound interest compounded annually for 3 years. She returned Rs. 3500 at the end of second year and cleared all her dues by returning Rs. 1416 at the end of third year. Find the amount of loan taken by Jyoti from the bank.

A -

Rs. 3050

B -

Rs. 3750

C -

Rs. 3450

D -

Rs. 3250

Solution

Let amount of loan taken by Jyoti from the bank is Rs. x

According to question;

1.20 × {1.44 × x – 3500} = 1416

Or, 1.44x – 3500 = 1180

Or, 1.44x = 4680

Or, x = 3250

Hence, option d.

Averages

13. Average rainfall for a week is 44 cm while average rainfall except Thursday and Friday is 35.8 cm. Total rainfall on Friday is 15% more than total rainfall on Thursday. Find the rainfall on Thursday.

A -

58 cm

B -

62 cm

C -

50 cm

D -

60 cm

Solution

Total rainfall for the whole week = 44 × 7 = 308 cm

Total rainfall on Thursday and Friday = 308 – 5 × 35.8 = 129 cm

Let rainfall on Thursday be ‘x’ cm

Rainfall on Friday = 1.15x cm

According to question,

x + 1.15x = 129

Or, 2.15x = 129

Or, x = 60 cm

Hence, option d.

Ratios & proportions

14. Ratio of monthly income to monthly expenditure of A is 16:7. Ratio of monthly savings of A and B is 5:8 respectively and monthly savings of B is 20% more than his monthly expenditure. If monthly income of B is Rs. 10560, then find monthly income of A.

A -

Rs. 6000

B -

Rs. 7200

C -

Rs. 6400

D -

Rs. 5600

Solution

Let monthly income and monthly expenditure of A is Rs. 16x and Rs. 7x respectively.

Monthly savings of A = 16x – 7x = Rs. 9x

Monthly savings of B = 8/5 × 9x = Rs. 72x/5

Monthly expenditure of B = (72x/5)/1.2 = Rs. 12x

So, 12x + 72x/5 = 10560

Or, x + 6x/5 = 880

Or, x + 1.2x = 880

Or, 2.2x = 880

Or, x = 400

So, monthly income of A = 400 × 16 = Rs. 6400

Hence, option c.

Problems on ages

15. When Anup was born, his father was 36 years elder than his elder brother while his sister was 22 years younger than his mother. If Anup's brother is 8 years elder than Anup and his mother is 6 years younger than his father then find the age of Anup's sister when Anup will be 10 years old.

A -

18 years

B -

24 years

C -

16 years

D -

26 years

Solution

Let age of Anup when he was born = 0 years

Age of Anup's brother = 0 + 8 = 8 years

Age of Anup's father = 8 + 36 = 44 years

Age of Anup's mother = 44 – 6 = 38 years

Age of Anup's sister = 38 – 22 = 16 years

Age of Anup's sister when Anup will be 10 years old = 16 + 10 = 26 years

Hence, option d.

Averages

16. There are four numbers a, b, c and d. The average of 'a', 'b' and 'c' is 110 and the average of 'b', 'c' and 'd' is 90. If the value of 'd' is 60, then find the value of 'a'.

A -

120

B -

150

C -

90

D -

180

Solution

According to the question,

(a + b + c) = 110 × 3 = 330..... (1)

Also, (b + c + d) = 90 × 3 = 270..... (2)

On subtracting equation (2) from (1), we get

(a – d) = 60

Or, a = 60 + 60 = 120

Hence, option a.

Time & distance

17. Ram heard the sound of a bullet which is fired 2.4 km away from him after 25 seconds from the time of firing. Find the speed of the sound of the bullet.

A -

84 m/s

B -

96 m/s

C -

72 m/s

D -

108 m/s

Solution

Speed of the sound of the bullet = (2.4 × 1000)/25 = 96 m/s

Hence, option b.

Discounts

18. Find the equivalent discount of three successive discounts of 15%, 20% and 25%, respectively.

A -

49%

B -

52%

C -

35%

D -

42%

Solution

Equivalent discount percentage of 15% and 20% = 15 + 20 – (15 × 20)/100 = 32%

Equivalent discount percentage of 32% and 25% = 32 + 25 – (32 × 25)/100 = 49%

Hence, option a.

Ratios & proportions

19. The ratio of the number of lotus and Lily flowers in a pond is 8:5. When 18 lotus and 8 lily flowers were plucked, the total number of flowers left becomes 20% less than the original. Find the original number of lotus flowers in the pond.

A -

80

B -

72

C -

50

D -

40

Solution

According to the question,

Let the number of Lotus and Lily flowers in the pond be 8x and 5x respectively.

According to the question,

(8x – 18 + 5x – 8) = 0.80(8x + 5x)

Or, 13x – 26 = 10.4x

Or, 2.6x = 26

Or, x = 10

Therefore, original number of lotus flowers = 8x = 80

Hence, option a.

Algebra

20. If $(2p/p^2 + 2p + 1) = 1/10$, then find the value of (p + 1/p).

A -

12

B -

15

C -

20

D -

18

Solution

Taking the reciprocal of the expression,

(p/2 + 1/2p + 1) = 10

Or, (1/2))(p + 1/p) = 9

Or, (p + 1/p) = 18

Hence, option d.

Simple interest

21. A certain sum gives the interest equals to 3/5th of the sum when invested for 5 years at simple interest. Find the rate of simple interest.

A -

15%

B -

10%

C -

12%

D -

20%

Solution

Let the sum invested be Rs. x and the rate of the interest be r% p.a.

According to te question,

(x × 5 × r)/100 = 3x/5

Or, r = 12%

Hence, option c.

Trigonometry (heights & distance)

22. The angle of elevation of top of a pole from the foot and top of a 50 m high building is 60° and 30° respectively. Find the height of the pole.

A -

75 metres

B -

60 metres

C -

90 metres

D -

120 metres

Solution

According to the question,

Therefore, tan60° = (50 + h)/ED

Or, ED = (h + 50)/√3

Also, tan30° = h/BC

Or, BC = √3h

Since,

ED = BC

Or, 3h = h + 50

Or, h = 25 m

Therefore, height of the pole = (25 + 50) = 75 metres

Hence, option a.

Geometry (triangles)

23. The centroid of a triangle is a point where

A -

Angle bisectors of the triangle meet

B -

Altitudes of the triangle meet

C -

Medians of the triangle meet

D -

None of these

Solution

Centroid of a triangle is a point where medians of the triangle meet.

Hence, option c.

Trigonometry

24. If cotx = 15/8, then find the value of $\sqrt{(1 – \cos x)/(1 + \cos x)}$.

A -

1/2

B -

1/4

C -

1/3

D -

1/6

Solution

Given cotx = 15/8 = b/p

Therefore, h = $\sqrt{(15^2 + 8^2)}$

Or, h = 17

$\sqrt{(1 – cosx)/(1 + cosx)}$

Or, $\sqrt{(1 – cosx)(1 – cosx)/(1 – cos^2x)} = (1 – cosx)/sinx$

Putting the value of sinx = p/h and cosx = b/h

We get, $\sqrt{(1 – cosx)/(1 + cosx)} = 1/4$

Hence, option b.

Data interpretation (tabular form on percentages)

25. The given table shows the monthly income of five different persons. Out of the total income, each spends certain percentage on four different items and saves the rest.

	A (Rs. 36000)	B (Rs. 42000)	C (Rs. 24000)	D (Rs. 48000)	E (Rs. 56000)
Food	20%	25%	30%	15%	25%
Education	25%	15%	20%	25%	30%
Rent	30%	20%	25%	40%	20%
Travelling	10%	10%	15%	10%	15%

Find the average monthly savings of all the five persons.

A -

Rs. 4680

B -

Rs. 5420

C -

Rs. 6160

D -

Rs. 7240

Solution

Monthly savings of ‘A’ = (1 – 0.20 – 0.25 – 0.30 – 0.10) × 36000 = 0.15 × 36000 = Rs. 5400

Monthly savings of ‘B’ = (1 – 0.25 – 0.15 – 0.20 – 0.10) × 42000 = 0.30 × 42000 = Rs. 12600

Monthly savings of ‘C’ = (1 – 0.30 – 0.20 – 0.25 – 0.15) × 24000 = 0.10 × 24000 = Rs. 2400

Monthly savings of ‘D’ = (1 – 0.15 – 0.25 – 0.40 – 0.10) × 48000 = 0.10 × 48000 = Rs. 4800

Monthly savings of ‘E’ = (1 – 0.25 – 0.30 – 0.20 – 0.15) × 56000 = 0.10 × 56000 = Rs. 5600

Required average = (5400 + 12600 + 2400 + 4800 + 5600)/5 = Rs. 6160

Hence, option c.

Time & work

26. ‘A’ and ‘B’ together can complete a work in 16 days. If ‘B’ had worked alone, then would have taken 8 days more to complete the work. How many days ‘A’ will take to complete the same work alone?

A -

54 days

B -

36 days

C -

48 days

D -

30 days

Solution

Time taken by ‘B’ to complete the work alone = 16 + 8 = 24 days

Let the total work = 48 units (L.C.M of 16 and 24)

Efficiency of ‘A’ and ‘B’ together = 48/16 = 3 units/day

Efficiency of ‘B’ = 48/24 = 2 units/day

Therefore, efficiency of ‘A’ = (3 – 2) = 1 unit/day

Therefore, time taken by ‘A’ to complete the work alone = 48/1 = 48 days

Hence, option c.