TCS NQT Aptitude (Numerical Ability) Questions & Answers - Paper 1

Topic - Probability

1) A bag contains 6 Red, 5 Blue and 4 Green balls. If two balls are drawn at random what is the probability that both are of same color?

a) $\frac{2}{3}$

b) $\frac{31}{105}$

c) $\frac{13}{21}$

d) $\frac{37}{105}$

Correct Choice: b

Explanation:

Both are either red, blue or green

$$P = \frac{{}^{5}C_2 + {}^{6}C_2 + {}^{4}C_2}{{}^{15}C_2}$$

$$P = \frac{31}{105}$$

Hence, option B is correct.

Topic – Permutations & Combinations

2) A family of a man, wife and their daughter is to be seated with three other bachelors on a round table with six chairs such that the daughter always sits adjacent to at least one of her parents. How many such arrangements are possible?

a) 75

b) 60

c) 72

d) 84

Correct Choice:d

Explanation:

Total possible arrangements = 5!

Now we calculate the arrangements in which no parent sits adjacent to the daughter

First we seat the daughter, now we seat two out of three bachelors on either side of her seat.

Ways = ${}^{3}C_{2} \times 2!$

Now rest three can be arranged in 3! Ways

Total ways in which daughter doesn't sit adjacent to her parents = ${}^3C_2 \times 2! \times 3! = 36$

Ways in which daughter sits adjacent to at least one parent = 5! – 36 = 84

Hence, option D is correct.

Topic – Profit & Loss

3) For A and B the ratio of cost price is 4 : 5 and ratio of selling price is 4 : 7. The ratio of total cost price and total selling price is 45 : 44 and the net loss is Rs 20. What is the difference between their selling prices?

a) Rs. 300

b) Rs. 240

c) Rs. 360

d) Rs. 250

Correct Choice: b

Explanation:

Let the CP of A = 4x and B = 5x and SP of A = 4y and B = 7y

$$\frac{\text{Total SP}}{\text{Total CP}} = \frac{44}{45}$$

$$\frac{11y}{9x} = \frac{44}{45}$$

$$\frac{y}{x} = \frac{4}{5}$$

9x – 11y = 20

Solving the above equations we get,

x = 100 and y = 80

Difference between their SP = 7y – 4y = 3y = 3 × 80 = Rs 240

Hence, option B is correct.

Topic – Simple Interest – Compound Interest

4) A person has Rs. 40000 out of which he puts Rs. 12000 at 10% SI for 3 years and Rs 16000 at 12.5% CI for 2 years and keeps the rest with himself. What is the total amount with him after three years?

a) Rs. 52240

b) Rs. 35850

c) Rs. 42650

d) Rs. 47850

Correct Choice: d

Explanation:

Amount left with him = 40000 – 16000 – 12000 = 12000

Amount after 3 years

$$= 12000 \left(1 + \frac{10}{3 \times 100}\right) + 16000 \left(1 + \frac{1}{8}\right)^2 = \text{Rs. } 47850$$

$$+ 12000$$

Hence, option D is correct.

Topic – Time & Distance

5) A can beat B by 160 m in a 1000 m race. When A and B run towards each other from the opposite ends of track XY, the difference between the distance travelled by them when they meet is 48 m. What is the length (in meter) of the track?

a) 552

b) 664

c) 564

d) 658

Correct Choice: a

Explanation:

$$\text{Ratio of speed} \quad \frac{A}{B} = \frac{1000}{840} = \frac{25}{21}$$

Let the length of track be X

Difference between distance travelled by them

$$= \frac{(25 - 21) \times X}{25 + 21} = \frac{4X}{46}$$

$$\frac{4X}{46} = 48$$

X = 552 m

Hence, option A is correct.

Topic – Percentages

6) A and B are two candidates in an election and a voter can vote for either A or B. Candidate A gets 66.67% of the votes got by candidate B. If only 90% of eligible voters cast their vote and B gets 64800 more votes than A, how many eligible voters were there?

a) 326000

b) 360000

c) 420000

d) 540000

Correct Choice: b

Explanation:

Let the total eligible voters = 100k

Votes cast = 90k

Ratio of votes got, $\frac{A}{B} = \frac{2}{3}$

Difference between the votes of A and B = $\frac{1 \times 90k}{5} = 18k$

18k = 64800

So 100k = 360000

Hence, option B is correct.

Topic – Time & Work

7) A, B and C can complete a work in 20, 30 and 25 days respectively. A and B work together for 8 days and C joins them on every second day, then D alone works for two days and the remaining work is done by C alone in 1 day. In how many days D alone can complete 80% of the work?

a) 16 days

b) 15 days

c) 18 days

d) 12 days

Correct Choice: d

Explanation:

Let the total work = 300k

Efficiency of A = $\frac{300k}{15k}$ =

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$$\frac{}{20}$$

$$B = \frac{300k}{30} = 10k$$

$$C = \frac{300k}{25} = 12k$$

Let efficiency of D = Z

Work done by A and B = 15k + 10k = 25k

Work done by A, B and C = 15k + 10k + 12k = 37k

Work done in 8 days (by A and B joined by C on every second day)

$$= \frac{8}{} \times (25 + 37) = 248k$$

$$\frac{}{2}$$

Work done by C alone in 1 day = 12k

Work done by D in 2 days = 300k – 248k – 12k = 40k

Per day work of D = 20k

Time taken by D to do 80% of work

$$= \frac{8}{10} \times \frac{300}{20} = 12 \text{ days}$$

Hence, option d is correct.

Topic – Pipes & Cisterns

8) Pipe A and B can fill a tank in 16 hrs and 32 hrs respectively while C alone can empty it in 20 hrs. When the tank is empty Pipe A and B are opened, '2x' hrs later A is closed and C is opened, 'x' hrs later B is closed and A is opened and '6x + 2' hrs later tank is full. What is the total time(in hrs) taken to fill the tank?

a) 38

b) 22

c) 42

d) 35

Correct Choice: a

Explanation:

Let tank capacity = 160k

Efficiency of A = $\frac{160k}{16}$ = 10k,

$B = \frac{160k}{32} = 5k$ and $C = \frac{160k}{20} = 8k$

$(10k + 5k) \times 2x + (5k - 8k) \times x + (10k - 8k) \times (6x + 2) = 160\ k$

$x = 4$

Total time = $2x + x + 6x + 2 = 9x + 2 = 38$ hrs

Hence, option A is correct.

Topic – Volumes

9) A tent has a cylindrical base and conical top. The height of tent is 61m and that of cylindrical portion is 40m the radius of tent is 28 m. What is the total area of cloth required to make the tent?

a) 10450 m^2

b) 12540 m^2

c) 10120 m^2

d) 9750 m^2

Correct Choice: c

Explanation:

Height of the cone = 61 – 40 = 21 m and radius of cone = 28 m

So, Slant height of cone = $\sqrt{(21^2 + 28^2)}$ = 35 m

Total surface area = 2πrh + πrl

$$= \frac{22}{7} \times 28 \times (2 \times 40 + 35) = 10120 \ m^2$$

Hence, option C is correct.

Topic – Areas

10) A prism has a triangular base with sides 30cm, 34cm and 16cm. If the volume of the prism is 2960 cm^2, what is the height (in cm) of the prism?

a) 14.5

b)

c) 15

d) 9.5

Correct Choice: b

Explanation:

As $34^2 = 30^2 + 16^2$

Area of the base of the prism

$$= \frac{1}{2} \times 30 \times 16 = 240 \text{ cm}^2$$

Volume of the prism = 240 × h = 2960

$$H = \frac{2960}{240} = 12 = \frac{1}{3} \text{ cm}$$

Hence, option B is correct.

Topic – Averages

11) The average weight of a class of N students is 47kg. If 8 students with average weight of 53kg leave the class and 3 new students with average weight 56kg join the class, the average weight of the class decreases by 0.6kg. What is the number of students in class now?

a) 40

b) 42

c) 37

d) 35

Correct Choice: d

Explanation:

Total weight initially = N × 47

Total weight of class now = (N – 8 + 3) × (47 – 0.6) = (N – 5)46.4

N × 47 – 8 × 53 + 3 × 56 = (N – 5) × (46.4)

N = 40

Number of students in the class now = N – 5

= 40 – 5 = 35

Hence, option D is correct.

Topic – Geometry (Triangles)

12) A triangle has sides 39 cm, 80 cm and 89 cm, what is circumference (in cm) of its incircle?

a) 15π

b) 30π

c) 64π

d) 24π

Correct Choice: b

Explanation:

As we can see, $39^2 + 80^2 = 89^2$

So, area of triangle = $\frac{1}{2} \times 39 \times 80 = 1560\ cm^2$

Perimeter of triangle = (39 + 80 + 89) = 208 cm

Semi perimeter, s = $\frac{208}{2} = 104cm$

Inradius = $\frac{A}{s} = \frac{1560}{104} = 15$

Circumference = $2\pi r = 2\pi (15) = 30\pi$

Hence, option B is correct.

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Topic – Percentages

13) In a class, 37.5% of the students are Girls and rest are boys. If 60% of the girls are present and 80% of the boys are present, then what percent of the total number of students in the class are absent?

a) 32.5%

b) 28.6%

c) 27.5%

d) 31.5%

Correct Choice: c

Explanation:

Let the total number of students = 80k

Girls = 37.5% (80k) = 30k and Boys = 50k

Girls absent = 40%(30k) = 12k

Boys absent = 20%(50k) = 10k

Total students absent = 10k + 12k = 22k

$$\text{Reqd. } \% = \frac{22k}{80k} \times 100 = 27.5\%$$

Hence, option C is correct.

Topic – Problems on Numbers

14) When a two-digit number is multiplied by the sum of its digits, the product is 913. When the number obtained by interchanging its digits is multiplied by the sum of the digits, the result is 418. The difference of the digits of the given number is:

a) 4

b) 6

c) 7

d) 5

Correct Choice: d

Explanation:

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Let the number be ab, numerical value = 10a + b

(10a + b) (a + b) = 913 ---------- (1)

When the digits are interchanged number = ba = 10b + a

(10b + a) (a + b) = 418 ---------- (2)

By doing 1 – 2

(a + b) (9a – 9b) = 913 – 418

$$(a - b)(a + b) = \frac{495}{9}$$

(a + b) (a – b) = 55

a + b = 11 and a – b = 5

Required difference = 5

Hence, option D is correct.

Topic – Partnership

15) A, B and C start a business. A invest 40% more than C, who invests 66.67% more than B. If the total profit at the end of the year is Rs.244500, what is the share (in Rs.) of A in the profit?

a) 124500

b) 114100

c) 142625

d) 130400

Correct Choice: b

Explanation:

$\frac{A}{} = \frac{140}{} = \frac{7}{}$

$\frac{}{C}$ $\frac{}{100}$ $\frac{}{5}$

$\frac{C}{} = \frac{5}{}$

$\frac{}{B}$ $\frac{}{3}$

A : B : C = 7 : 3 : 5

Let the profit share of A = 7k, B = 3k and C = 5k

Total profit = 15k

Profit share of A = $\frac{7k}{15k} \times 244500$

= Rs. 114100

Hence, option B is correct

Topic – HCF & LCM of Numbers

16) The HCF of two numbers is 35 and their LCM is 299 times the HCF. If one of the numbers lies between 400 and 500, the sum of the digits of the other number is :

a) 13

b) 15

c) 14

d) 17

Correct Choice : a

Explanation:

Let the numbers be 35a and 35b

LCM = 299 × 35

HCF × LCM = Product of digits

299 × 35 × 35 = 35a × 35b

a × b = 299

a × b = 13 × 23

a = 13 and b = 23

35a = 455 and 35b = 805

35a lies between 400 and 500

Sum of the digits odd 805 = 8 + 0 + 5 = 13

Hence, option A is correct

Topic – Percentages

17) If 55% of a number is 224 more than 20% of the number, then 35% of the number is less than 62.5% of the number by:

a) 164

b) 166

c) 182

d) 176

Correct Choice: d

Explanation:

Let the number be 100k

55%(100k) – 20%(100k) = 224

35k = 224

100k = 640

35% (640) = 224

62.5% (640) = 400

Required difference = 400 – 224 = 176

Hence, option D is correct.

Topic – Mixtures & Allegations

18) Alloy A contains copper and zinc in the ratio of 7 : 2 and alloy B contains cope and zinc in the ratio of 5 : 3. A and B are taken in the ratio of 6 : 5 and melted to form a new alloy. The percentage of copper in the new alloy is:

a) 69.44%

b) 70.83%

c) 65.67%

d) 72.45%

Correct Choice: b

Explanation:

$$\frac{\text{Copper}}{\text{Total in A}} = \frac{7}{9}$$

$$\frac{\text{Copper}}{} = \frac{5}{}$$

Total in alloy B		8	
Copper	=	(6 × 7/9 + 5 × 5/8)	= 17
Total in the mixture		(6 + 5)	24

Reqd. % = $\frac{17}{24} \times 100 = 70.83\%$

Hence, option B is correct.

Topic – Data Interpretation (Pie Chart on Degrees)

(19-21)Directions : Study the following pie chart carefully and answer the questions given beside.

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The chart given below shows the breakup of mobile phones sold by five stores A, B, C, D and E in May. The values given are in degrees.

19) The total number of phones sold by E in May is 4500 and A sold 25% more phones in June as compared to May. What is the number of phones sold by A in June?

a) 9325

b) 9250

c) 9375

d) 9750

Correct Choice: c

Explanation:

Total number of phones sold by all five in May

$$= \frac{360^\circ}{64.8^\circ} \times 4500 = 25000$$

$$\text{Phones sold by A in May} = \frac{108^\circ}{} \times (25000) = 7500$$

360°

Phones sold by A in June = 125% (7500) = 9375

Hence, option C is correct

20) B sells 20% more phones in June than in May and the phones sold by B in June is 25% of the total phones sold in that month. The phones sold in June are how much percent more than the phones sold in May?

a) 12.5%

b) 10%

c) 25%

d) 20%

Correct Choice: d

Explanation:

Let the phones sold in May = 100k

So, phones $\frac{90°}{360°} \times 100k = 25k$

$$\text{sold by B} = \frac{}{360^\circ}$$

Phones sold by B in June = 25k × 1.2 = 30k

$$\text{Total phones sold in June} = 30k \times \frac{100}{25} = 120k$$

$$\text{Reqd. \%} = \frac{120k - 100k}{100k} \times 100 = 20\%$$

Hence, option D is correct

21) The average number of mobile phones sold in May by C, D and E is 12600, what is the difference between the phones sold by A and B?

a) 4300

b) 6300

c) 4200

d) 4800

Correct Choice: c

Explanation:

Let the total phones sold in May = 100k

Average phones sold by C, D and E

$$= \frac{64.8^\circ + 43.2^\circ + 54^\circ}{3} = 54^\circ$$

Difference between the number of phones sold by A and B = 108° – 90° = 18°

54° corresponds to 12600

18° corresponds to 4200

Hence, option C is correct.

Topic – Problems on Ages

22) 6 years from now ratio of age of A and B will be 4 : 5 and the ratio of age of B and C, 4 years ago, was 7 : 8. If B is 5 years younger to C, what is the present average age of A and C?

a) 42

b) 35

c) 37

d) 39

Correct Choice: b

Explanation:

Let the age of A, 6 years from now = 4k, so age of B 6 years from now = 5k

Present age of B = 5k – 6

Age of B 4 years ago = 5k – 10

Ratio of age of B and C 4 years ago = 7 : 8

So, age of C 4 years ago = $\frac{8\,(5k - 10)}{7}$

Present age of C = $\frac{8\,(5k - 10)}{7} + 4 = \frac{(40k - 52)}{7}$

B is 5 years younger to C

$5k - 6 + 5 = \frac{(40k - 52)}{7}$

k = 9

Present age of A = 4 × 9 – 6 = 30,

$$C = \frac{(40 \times 9 - 52)}{7} = 44$$

$$\text{Present average age of A and C} = \frac{(30 + 44)}{2} = 37$$

Hence, option C is correct.

Topic – Ratios & Proportions

23) 6/11 employees of a company are males and the rest are females. If 11/18 of male employees and 4/9 of female employees are temporary and the total number of permanent employees is 322, then 13/21 of the total number of employees exceed the total number of female employees by:

a) 114

b) 98

c) 124

d) 118

Correct Choice: a

Explanation:

(Note: As we see fractions like 6/11, 11/18 and 4/9 we will assume the total number of employees to be 11 × 18k to avoid fractions)

Let the total number of employees be 198k

$$\text{Males} = \frac{6}{11} \times 198 = 108k$$

Females = 198k – 108k = 90k

$$\text{Temporary Male employees} = \frac{11}{18} \rightarrow \text{Permanent} = \frac{7}{18}$$

$$\text{Permanent male employees} = \frac{7}{18} \times 108 = 42k$$

Temporary female employees = $\frac{4}{9}$ → Permanent = $\frac{5}{9}$

Permanent female employees = $\frac{5}{9}$ × 90k = 50k

Total permanent employees = 50k + 4 2k = 92k

92k = 322

k = 3.5

Total employees = 198 × 3.5 = 693

Total female employees = 90 × 3.5 = 315

13/21 of total employees = $\frac{13}{21}$ × 693 = 429

Required difference = 429 – 315 = 114

Hence, option A is correct

Topic – Compound Interest

24) A loan has to be returned in two equal yearly installments each of Rs 36450. If the interest is compounded annually at the rate of 8% p.a., what is the total interest paid?

a) Rs. 8400

b) Rs. 7600

c) Rs. 10816

d) Rs. 7900

Correct Choice: d

Explanation:

Let the Principal be P

$$\left(P \times \frac{108}{100} - 36450\right) \times \frac{108}{100} = 36450$$

$$P = \frac{36450}{\left[\left(\frac{100}{108}\right) + \left(\frac{100}{108}\right)^2\right]}$$

P = 65000

Interest paid = 2*36450 – 65000 = Rs. 7900

Hence,option D is correct.

Topic – LCM & HCF of Numbers

25) What is the total number of factors of 8800?

a) 27

b) 54

c) 36

d) 18

Correct Choice: c

Explanation:

By prime factorization

$8800 = 11^1 \times 2^5 \times 5^2$

Total number of factors = (1 + 1) (5 + 1) (2 + 1) = 36

Hence, option C is correct.

Topic – Geometry

26) The graphs of the equations 3x + 2y – 27 = 0 and 5x – 3y = 7 intersect at P(x1, y1) and the graph of the equation 3x – 2y – 18 = 0 intersect the y-axis at Q(x2, y2). What is the value of (x2 – x1 + y2 – y1)?

a) – 12

b) – 5

c) – 2

d) – 20

Correct Choice: d

Explanation:

3x + 2y – 27 = 0 → 9x + 6y = 81 --------- (1)

5x – 3y = 7 → 10x – 6y = 14 ---------- (2)

Using 1 and 2 we get, x1 = 5 and y1 = 6

3x – 2y – 18 = 0

It intersects y-axis at point Q (x2, y2)

On y axis, x = 0

3 × 0 – 2y – 18 = 0

y2 = - 9

(x2 – x1 + y2 – y1) = (0 – 5 – 9 – 6) = – 20

Hence, option D is correct