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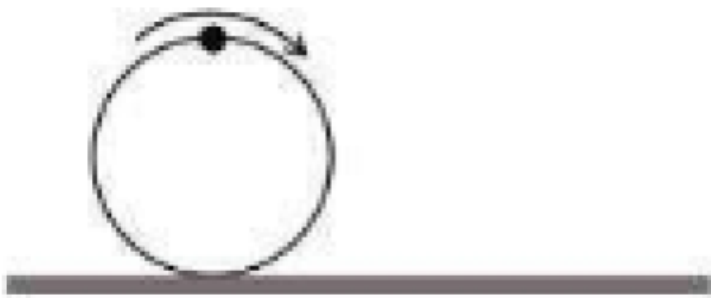


CSIR NET General Aptitude Questions Answers With Solutions

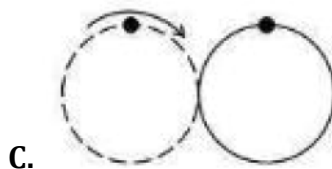
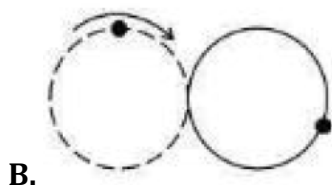
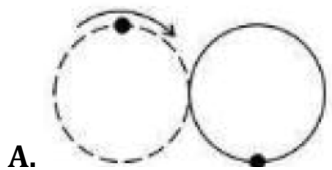
Q1. A group of 540 persons is to be seated row wise such that the number of persons in each row is 4 less than in the previous row. Which of the following number of rows is not possible?

- (a) 5
- (b) 6
- (c) 8
- (d) 9

Q2. A ring is rolling along a straight track as shown. The topmost point of the ring is marked.



Which of the diagrams shows a possible position of the ring at a later time, relative to the original position (shown by dashed circle)?



- (a) A
- (b) B
- (c) C
- (d) D

Q3. An experiment consists of tossing four fair coins independently. The outcome of the experiment is considered favourable, if the number of heads is greater than the number of tails. The probability of a favourable outcome from a single experiment is

- (a) $1/2$
- (b) $3/16$
- (c) $5/16$
- (d) $3/4$

Q4. In a class, among the boys B is taller than 10 boys, but shorter than 13 others. Among girls, G is taller than 6 girls, but shorter than 8 others. Two boys and three girls are shorter than B, but taller than G. If no two persons have the same height, then in the entire class, B is

- (a) taller than 21, but shorter than 18 others
- (b) taller than 20, but shorter than 18 others
- (c) taller than 20, but shorter than 19 others
- (d) taller than 19, but shorter than 19 others

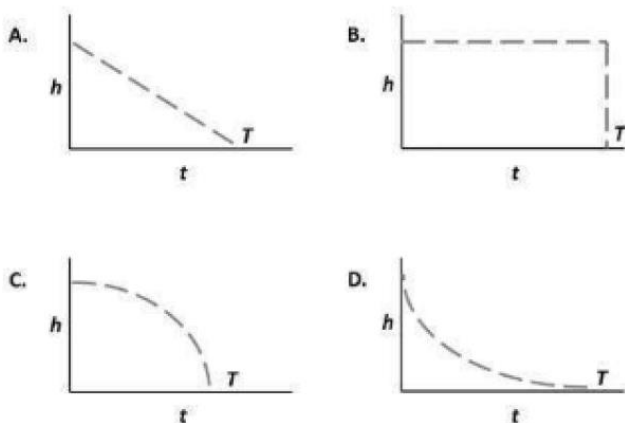
Q5. On a one-way road, to demarcate 4 lanes, line segments of 3.5 m length are painted with gaps of 3.5 m along the length of the road. What is the total length of the painted lines (in m) over a 350 m stretch of the road?

- (a) 300
- (b) 400
- (c) 525
- (d) 700

Q6. An athlete running on a track falls short of the finish line by 10 m when she runs at a constant speed for a given time. If she increases her speed by 20%, she overshoots by 20 m in the same time. What is the length of the track?

- (a) 134 m
- (b) 156 m
- (c) 160 m
- (d) 164 m

Q7. A cylindrical container has a tiny hole at the bottom. The container is initially filled to its brim with water. If T is the time taken for it to be completely emptied, the graph of height of the water column as a function of time is closest to



- (a) A
- (b) B
- (c) C
- (d) D

Q8. The length of bristle mouth fish is uniformly distributed between 2 and 4 inches. If a fisherman randomly catches 5 bristle mouth fishes, what is the probability that at least one of them will be 3 inches or longer?

- (a) 0.03125
- (b) 0.15625
- (c) 0.84375
- (d) 0.96875

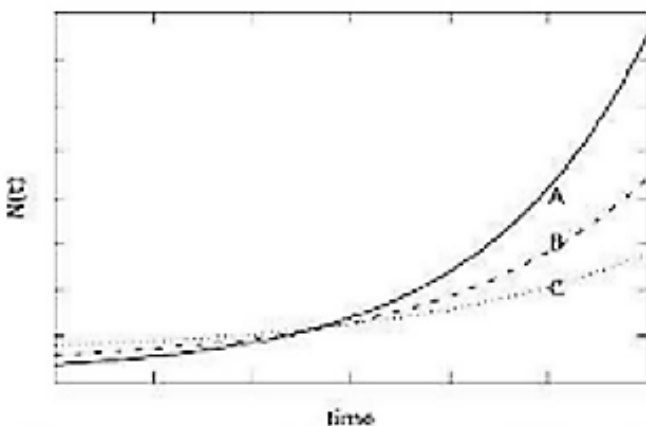
Q9. In a class of 30 students, those with roll numbers 1 to 20 secure an average of 72% marks, while those with roll numbers 11 to 30 secure an average of 75% marks. If the average marks of the entire class are 70%, what is the average marks of roll numbers 11 to 20 (in percent)?

- (a) 68
- (b) 74
- (c) 78
- (d) 84

Q10. The graph shows the growth curves for three independent populations (A, B, and C). The growth model for each of these populations is

$$N(t) = N_0 e^{rt}$$

where $N(t)$ is the population at time t , N_0 is the initial population and r is the per capita growth rate.



If r_A , r_B , r_C are the intrinsic growth rates of populations A, B, and C respectively, which of these statements is true?

- (a) $r_A = r_B = r_C$
- (b) $r_A > r_B = r_C$
- (c) $r_A = r_B > r_C$
- (d) $r_A > r_B > r_C$

Q11. Among finches males and females have one of the three colours - Red, Blue or Yellow - on their head. During the mating season, males and females pair up randomly. For a large population of finches with 50% red, 30% blue and 20% yellow coloured individuals among both males and females, what is the expected number of pairings between red males and yellow females if the total number of pairs formed is 10000?

- (a) 2500
- (b) 1500
- (c) 1000
- (d) 600

Q12. In a district, every second teacher who teaches chemistry also teaches physics and every third teacher who teaches physics also teaches chemistry. The ratio of teachers who only teach chemistry to those who only teach physics is

- (a) 3:2
- (b) 1:2
- (c) 2:3
- (d) 2:1

Q13. The son was born when his mother was 28 years old. The father is older to the mother by 4 years. If the current ages of the father and mother are in the ratio 9:8, what is the current age (in years) of the son?

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

Q14. By selling two items at the same price, a person gains 20% on one item and loses 20% on the other. Then over all

- (a) he neither loses nor gains.
- (b) he loses 5%.
- (c) he loses 4%.
- (d) he gains 4%.

Q15. Rajesh went to Sunil's house situated 1km North-East of his house. From there, he went to Arjun's house that is situated 707 m South of Sunil's house. What is the distance between Rajesh's current location and his house (to the nearest metre)?

- (a) 800 m
- (b) 600 m
- (c) 707 m
- (d) 1000 m

Q16. The diagrams show the distribution of trees in two forest patches A and B. Each patch is divided into smaller "quadrats". The number of trees in each quadrat is shown. Which one of the following statements about the means

(μ)

and standard deviations

(σ)

of the numbers of trees in the two patches is true?

Forest Patch A

1	1	1	1	1
1	1	1	1	1
1	1	1	1	1
1	1	1	1	1
1	1	1	1	1

Forest Patch B

2	0	0	0	0
0	0	0	0	0
0	0	0	7	0
0	10	0	0	0
0	0	0	0	6

- (a) $\mu(A) = \mu(B), \sigma(A) = \sigma(B)$
 (b) $\mu(A) > \mu(B), \sigma(A) > \sigma(B)$
 (c) $\mu(A) = \mu(B), \sigma(A) < \sigma(B)$
 (d) $\mu(A) < \mu(B), \sigma(A) < \sigma(B)$

Q17. What would be the minimum number of notes for Rs 4849 if notes are available only in denominations of Rs 2, 5, 20, 50, 500?

- (a) 19
 (b) 20
 (c) 21
 (d) 22

Q18. Out of a class of 100 students who can speak at least one of English or Hindi, 41 students can speak English. 21 students can speak both English and Hindi. How many students can speak Hindi?

- (a) 58
 (b) 80
 (c) 59
 (d) 38

Q19. The hypotenuse of a right triangle, whose sides are integers, is 17 cm. Its area in sq.cm is

- (a) not calculable due to insufficient data
 (b) 60
 (c) 68
 (d) 225

Q20. Choose the best alternative:

CURRY is to SPICE as _____ is to COLOUR.

- (a) CANVAS
 (b) PAINTING
 (c) BRUSH
 (d) BRIGHTNESS

Solutions

S1. Ans.(c)

Sol. Given:

- Total number of people to be seated = 540.
- The number of people in each row decreases by 4 compared to the previous row.
- We need to find which of the given numbers of rows n is not possible.

Formula:

The total number of people is modeled as an arithmetic progression (AP), where:

- First term (a) = x (number of people in the first row),
- Common difference (d) = -4 ,
- Number of terms (n) = number of rows.

The sum of an AP is given by:

$$S_n = \frac{n}{2} [2a + (n-1)d]$$

Here:

- $S_n = 540$
- $a = x$
- $d = -4$

Derivation:

Substitute the values into the formula:

$$540 = \frac{n}{2} [2x + (n-1)(-4)]$$

Simplify:

$$1080 = n[2x - 4n + 4]$$

Checking Each Option

1. **Option 1: $n=5$**

$$1080 = 5(2x - 4(5) + 4)$$

$$1080 = 5(2x - 20 + 4)$$

$$1080 = 5(2x - 16)$$

$$216 = 2x - 16$$

$$2x = 216 + 16 = 232$$

$$x = 116$$

This is valid. **5 rows is possible.**

1. **Option 2: $n=6$**

$$1080 = 6(2x - 4(6) + 4)$$

$$1080 = 6(2x - 24 + 4)$$

$$1080 = 6(2x - 20)$$

$$180 = 2x - 20$$

$$2x = 180 + 20 = 200$$

$$x = 100$$

This is valid. **6 rows is possible.**

1. **Option 3: $n=8$**

$$1080 = 8(2x - 4(8) + 4)$$

$$1080 = 8(2x - 32 + 4)$$

$$1080 = 8(2x - 28)$$

$$135 = 2x - 28$$

$$2x = 135 + 28 = 163$$

$$x = 81.5$$

This is not valid because x is not an integer. **8 rows is not possible.**

1. **Option 4: $n=9$**

$$1080 = 9(2x - 4(9) + 4)$$

$$1080 = 9(2x - 36 + 4)$$

$$1080 = 9(2x - 32)$$

$$120 = 2x - 32$$

$$2x = 120 + 32 = 152$$

$$x = 76$$

This is valid. **9 rows is possible.**

Final Answer

The number of rows that is **not possible** is:

Option c: 8 rows.

S2. Ans.(b)

Sol. Concept:

Translational Motion: The center of the ring moves forward in a straight line, maintaining a constant speed. This is because the ring is moving along a flat surface.

Rotational Motion: At the same time, the ring is rotating around its center. Each point on the ring traces a circular path relative to the center of the ring.

Solution:

When a ring rolls without slipping, the motion of any point on the ring can be described by a combination of rotational and translational motion. The key observation is that the point that is at the top of the ring will trace a circular arc relative to the center of the ring, while the entire ring itself is moving forward due to the rolling.

As the ring rolls, the topmost point (the marked one) moves forward, downward, and around the circumference of the ring while the entire ring also moves forward along the track.

After some rolling, the marked point will come down as the ring rotates and eventually reach a lower position on the ring compared to its starting point.

Position B shows the correct behavior, where the marked point has moved forward and downward as expected for a rolling motion.

Therefore, Option b is the correct answer.

S3. Ans.(c)

Sol. Concept:

The problem involves calculating the probability of a favorable outcome when tossing four fair coins. A favorable outcome occurs when the number of heads is greater than the number of tails. The probability is calculated as:

Probability = (Number of favorable outcomes) / (Total number of outcomes)

Solution:

Step 1: Total Number of Outcomes

Each coin toss has two possible outcomes: Head (H) or Tail (T). Since four coins are tossed independently, the total number of possible outcomes is:

Total outcomes = $2^4 = 16$.

A favorable outcome occurs when the number of heads is greater than the number of tails.

In 4 coin tosses, we need 3 heads and 1 tail, or 4 heads and 0 tails.

The number of ways to choose 3 heads from 4 tosses is given by $(4, 3) = 4$ and there is only 1 way to get 4 heads, i.e., HHHH.

Thus, the total number of favorable outcomes is

4 (for 3 heads, 1 tail) + 1 (for 4 heads) = 5 favorable outcomes.

The probability is the ratio of favorable outcomes to total outcomes $P(\text{Favorable}) = 5/16$.

The probability of a favorable outcome is Option c.

S4. Ans.(b)

Sol. B is taller than 10 boys and B is shorter than 13 boys.

Therefore, there are a total of $10 + 1 + 13 = 24$ boys in the class (including B).

G is taller than 6 girls and G is shorter than 8 girls.

Therefore, there are a total of $6 + 1 + 8 = 15$ girls in the class (including G).

Two boys and three girls are shorter than B, but taller than G.

If B is taller than 10 boys, then B's position among the boys is 11th in height order (since B is taller than 10 boys, but shorter than 13).

Among the girls, there are 15 girls, and we know two boys and three girls are shorter than B.

Therefore, 5 students (2 boys + 3 girls) are shorter than B overall.

Total Number of Students:

There are 24 boys and 15 girls, so the total number of students is 39

Since B is taller than 10 boys, and there are 2 boys and 3 girls shorter than B,

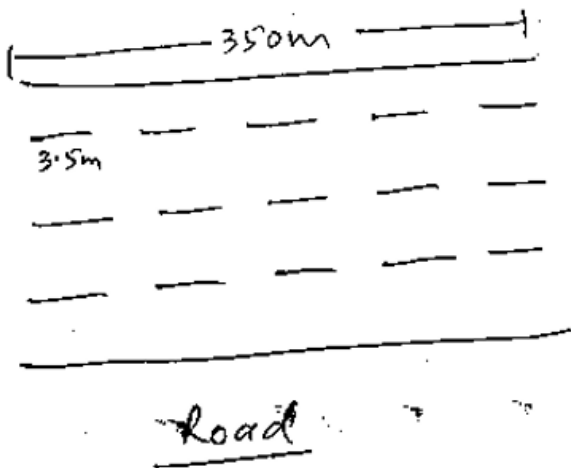
B must be taller than $10 + 1 + 3 + 6 = 20$ students.

Therefore, B is taller than 20 students and shorter than $39 - 20 - 1 = 18$ others.

Thus, the correct option is Option b.

S5. Ans.(c)

Sol. The length of the road = 350 m



Each cycle consists of a painted line of 3.5 m and a gap of 3.5 m.

Therefore, the length of one full cycle is $3.5 \text{ m} + 3.5 \text{ m} = 7 \text{ m}$

Therefore, number of cycles = $350 / 7 = 50$ cycles

Since, each cycle has a painted line of 3.5 m, and there are three painted lines on the road to make 4 lane.

Total painted line length = $50 \times 3.5 \times 3 = 150 \times 3.5 = 525$

Thus, the total length of the painted lines over the 350 m stretch of road is 525 meters.

Hence Option (c) is correct.

S6. Ans.(c)

Sol. Concept:

The fundamental formula for motion is, $\text{Distance} = \text{Speed} \times \text{Time}$

Solution:

Let d be the length of the track (what we are trying to find), v be her normal speed and t be the time she runs.

At normal speed, the distance covered is $d - 10$, so $v \cdot t = d - 10$ (Equation 1)

When she increases her speed by 20%, her new speed is $1.2v$, and she covers a distance of $d + 20$, so:

$$1.2v \cdot t = d + 20 \text{ (Equation 2)}$$

$$\Rightarrow v \cdot t = d - 10$$

$$\Rightarrow 1.2v \cdot t = d + 20$$

$$\Rightarrow 1.2(d - 10) = d + 20$$

$$\Rightarrow 1.2d - 12 = d + 20$$

$$\Rightarrow 1.2d - d = 20 + 12$$

$$\Rightarrow 0.2d = 32$$

$$\Rightarrow d = 320/2 = 160 \text{ meters}$$

Hence, the correct option is c.

S7. Ans.(d)

Sol. Concept:

The flow of water from a hole at the bottom of a container is governed by **Torricelli's Law**, which states that the velocity of efflux of a fluid under gravity through an orifice at the bottom of the container is proportional to the square root of the height of the fluid column.

Solution:

Option A: A straight line shows a constant rate of drainage, which is incorrect.

Option B: Shows no change until the very end, which doesn't match the continuous draining process.

Option C: Shows the wrong pattern of a steep drop does not matching Torricelli's law.

Option D: Shows the right pattern of a steep drop followed by a slower decrease, matching Torricelli's law.

Hence option (d) is correct.

S8. Ans.(d)

Sol. Concept:

Uniform Distribution: In a uniform distribution, all outcomes within a given range are equally likely.

Here, the length

of the fish is uniformly distributed between 2 and 4 inches, meaning every length in that range has the same probability.

Solution:

The length of bristlemouth fish is **uniformly distributed** between 2 and 4 inches.

This means every length between 2 and 4 inches has an equal probability of being selected.

The total range of fish lengths is from 2 to 4 inches, so the range is $4 - 2 = 2$ inches.

The range of fish lengths that are 3 inches or longer is from 3 to 4 inches. So the favorable range is $4 - 3 = 1$ inch.

The probability of catching a fish that is 3 inches or longer is given by the ratio of the range to the total range:

$$P(\text{Fish} \geq 3 \text{ inches}) = 1/2 = 0.5.$$

The probability of not catching a fish that is 3 inches or longer (i.e., catching a fish shorter than 3 inches) is:

$$P(\text{Fish} < 3 \text{ inches}) = 1 - 0.5 = 0.5.$$

If a fisherman catches 5 fish, the probability that none of the 5 fish are 3 inches or longer is:

$P(\text{None of the 5 fish} \geq 3 \text{ inches}) = (0.5)^5 = 0.03125$.

The probability that at least one fish is 3 inches or longer is the complement of the probability that none of the fish are 3 inches or longer:

$P(\text{At least one fish} \geq 3 \text{ inches}) = 1 - 0.03125 = 0.96875$.

The probability that at least one of the 5 bristlemouth fish is 3 inches or longer is **0.96875**.

S9. Ans.(d)

Sol. There are 30 students in total.

Roll numbers 1 to 20 secure an average of 72% marks, roll numbers 11 to 30 secure an average of 75% marks

and the average marks for the entire class is 70%.

We need to find the average marks of students with roll numbers 11 to 20.

Let the average marks of students with roll numbers 11 to 20 be x .

The average marks for the whole class is 70%, so the total marks for the 30 students is Total marks of the class = $30 \times 70 = 2100$ (in percentage terms).

The average marks of students with roll numbers 1 to 20 is 72%, so the total marks of these students is = Total marks of roll numbers 1 to 20 = $20 \times 72 = 1440$. The average marks of students with roll numbers 11 to 30 is 75%, so the total marks of these students is = Total marks of roll numbers 11 to 30 = $20 \times 75 = 1500$. Let the average marks of students with roll numbers 11 to 20 be x , and the total marks for these 10 students will be Total marks of roll numbers 11 to 20 = $10 \times x = 10x$. The sum of the total marks of all three groups (1 to 10, 11 to 20, and 21 to 30) should equal the total marks of the entire class $1440 + 10x + 1500 - 10x - 10x = 2100$. $\Rightarrow 10x = 1440 - 600$

$\Rightarrow 10x = 840 \Rightarrow x = 84$.

Hence the correct option is **(d)**.

S10. Ans.(d)

Sol. Concept:

Exponential population growth

$$N(t) = N_0 e^{rt}$$

Here, r represents the intrinsic growth rate.

Solution:

$$N(t) = N_0 e^{rt}$$

where, $N(t)$ is the population at time t , N_0 is the initial population, and r is the intrinsic growth rate.

Population A grows the fastest, showing a steep increase.

Population B grows more moderately, with a gentler curve compared to A.

Population C grows the slowest, with the flattest curve among the three.

Since the growth rate r dictates the steepness of the exponential curve, the following relationship can be inferred based on the graph $r_A > r_B > r_C$

Population A has the highest growth rate r_A because its curve rises the fastest.

Population B has a slower growth rate r_B than A but faster than C.

Population C has the slowest growth rate r_C .

The correct answer is Option **(d)**.

S11. Ans.(c)

Sol. Since males and females pair randomly, we assume that the proportion of red, blue, and yellow is the same for both males and females (i.e., 50% of males are red, 30% of males are blue, and 20% of males are yellow and the same proportions apply to females).

To find the expected number of red male–yellow female pairings:

The probability of selecting a red male is 50% = 0.50

The probability of selecting a yellow female is 20% = 0.20.

The expected number of red male–yellow female pairings is the product of these probabilities and

The total number of pairs = Expected number of red male-yellow female pairs = $0.50 \times 0.20 \times 10,000 = 0.10 \times 10,000 = 1,000$ The expected number of pairings between red males and yellow females is 1,000

Pairing is random, meaning the probability of selecting any male or female of a specific color is proportional to their population distribution.

Hence, option **(c)** is correct.

S12. Ans.(b)

Sol. Let C be the total number of teachers who teach chemistry and P be the total number of teachers who teach physics.

Given:

Every second teacher who teaches chemistry also teaches physics, so the number of teachers who teach both subjects from the chemistry group is $C/2$.

Every third teacher who teaches physics also teaches chemistry, so the number of teachers who teach both subjects from the physics group is $P/3$.

Let x represent the number of teachers who teach both chemistry and physics. Since these two groups overlap, the number of teachers who teach both chemistry and physics must be the same in both cases.

Therefore, we can set up the equation:

$$C/2 = P/3$$

Cross-multiply to find the relationship between C and P :

$$3C = 2P$$

$$\Rightarrow C = 2/3 P$$

Now, the number of teachers who only teach chemistry is the total number of chemistry teachers minus those who teach both subjects, which is:

$$\text{Teachers who only teach chemistry} = C - C/2 = C/2$$

Similarly, the number of teachers who only teach physics is:

$$\text{Teachers who only teach physics} = P - P/3 = 2P/3$$

To find the ratio of teachers who only teach chemistry to those who only teach physics, we calculate:

$$\text{Teachers who only teach chemistry} / \text{Teachers who only teach physics} =$$

$$\frac{\frac{C}{2}}{\frac{2P}{3}} = \frac{C}{2} \times \frac{3}{2P} = \frac{3C}{4P}$$

Substitute $C = 2/3P$ into the equation:

$$= \frac{3 \times \frac{2}{3} P}{4P} = \frac{2P}{4P} = \frac{1}{2}$$

Thus, the ratio of teachers who only teach chemistry to those who only teach physics is $1/2$.

S13. Ans.(c)

Sol. The son was born when the mother was 28 years old, the father is 4 years older than the mother, the current ages of the father and mother are in the ratio 9:8. We need to find the current age of the son. Let the current age of the mother be $8x$ years.

Then, the current age of the father will be $9x$ years (since their ages are in the ratio of 9:8).

From the problem, we know the father is 4 years older than the mother. Therefore,

$$9x = 8x + 4$$

$$\Rightarrow x=4$$

Mother's current age = $8x = 8 \times 4 = 32$ years.

Father's current age = $9x = 9 \times 4 = 36$ years.

The son was born when the mother was 28 years old. The mother is currently 32 years old.

The son is currently 4 years old, so the correct answer is Option **(c)**.

S14. Ans.(c)

Sol. Concept:

$$\text{Net loss} = \left(\frac{\text{Common gain/loss percentage}}{10} \right)^2 \%$$

Solution:

If a person gains $x\%$ on one item and loses $x\%$ on another item, the net result will always be a loss.

$$\text{Net loss} = \left(\frac{\text{Common gain/loss percentage}}{10} \right)^2 \%$$

Here, the common percentage is 20%, so the net loss is

$$\text{Net loss} = (20/10)^2 = 4\%$$

Therefore, the person incurs a net loss of 4%.

Thus, the correct option is Option **(c)**.

S15. Ans.(c)

Sol. Concept:

Net Displacement: After calculating the movement components, the total displacement is the vector sum of the

horizontal and vertical distances between the current and original positions.

Solution:

Rajesh moves **1 km North-East** (which is at a 45-degree angle) to Sunil's house.

From Sunil's house, he moves **707 meters South** to Arjun's house.

Rajesh's movement to Sunil's house forms a right-angled triangle, where the **horizontal** and **vertical components**

of the movement are equal since it's in the North-East direction.

The horizontal and vertical components of the 1 km (1000 m)

North-East move are $1000 \times \cos(45)$ and $1000 \times \sin(45)$, respectively.

Both components are equal to

$$1000 \times 1/\sqrt{2} = 707 \text{ meters.}$$

From Sunil's house, Rajesh moves **707 meters South**,

which directly affects the vertical component.

So, he is at the same latitude as his original house.

The horizontal component remains 707 meters to the East.
 Since Rajesh is almost at the same latitude (vertical difference is 0.1 meters),
 the total distance from his house is
 approximately the horizontal displacement = Distance = 707 meters
 Thus, the correct answer is Option **(c)**.

S16. Ans.(c)

Sol. Concept:

Mean $\mu(A)$:

$$\mu(A) = \frac{\text{Total number of trees}}{\text{Total number of quadrats}} = \frac{25}{25} = 1$$

Standard Deviation $\sigma(A)$:

$$\sigma(A) = \sqrt{\frac{1}{N} \sum_{i=1}^N (x_i - \mu(A))^2}$$

Solution:

Forest Patch A:

There are 25 quadrats, each containing exactly 1 tree.

Mean (μ_A): Total number of trees is 25.

Mean is $\mu(A) = 25/25 = 1$.

Standard deviation (σ_A): Since all values are the same (1), the standard deviation is $\sigma(A) = 0$.

Forest Patch B:

Quadrats contain the following numbers of trees: {2,0,0,0,0,0,0,7,0,10,0,0,0,6,0}

Mean (μ_B): Total number of trees is $2 + 7 + 10 + 6 = 25$.

Mean is $\mu(B) = \frac{25}{15} = 1.67$

Standard deviation (σ_B): Since values vary greatly, the standard deviation $\sigma(B) > 0$.

=> $\mu(A)$ and $\mu(B)$ are not equal.

=> The standard deviation in Patch B is higher due to the large variation in tree numbers.

Thus, Option **(c)** is correct.

S17. Ans.(b)

Sol. Rs. $4849 \div 500 = 9$ remainder 349.

So, we use 9 Rs. 500 notes, leaving us with Rs. 349 to be accounted for.

Rs. $349 \div 50 = 6$ remainder 49.

So, we use 6 Rs. 50 notes, leaving us with Rs. 49 to be accounted for.

Rs. $49 \div 20 = 2$ remainder 9. So, we use 2 Rs. 20 notes, leaving us with Rs. 9 to be accounted for.

Rs. $9 \div 5 = 1$ remainder 4. So, we use 1 Rs. 5 note, leaving us with Rs. 4 to be accounted for.

Rs. $4 \div 2 = 2$. So, we use 2 Rs. 2 notes.

Total number of notes used 9 notes of Rs. 500, 6 notes of Rs. 50, 2 notes of Rs. 20, 1 note of Rs. 5 and 2 notes of Rs. 2

Total = $9 + 6 + 2 + 1 + 2 = 20$ notes

Thus, the minimum number of notes required is Option **(b)**.

S18. Ans.(b)

Sol. Concept:

Inclusion-Exclusion principle:

If A and B are two sets, the size of their union is given by

$$|A \cup B| = |A| + |B| - |A \cap B|$$

Solution:

There are 100 students in total.

41 students can speak English and 21 students can speak both English and Hindi.

We need to find how many students can speak only Hindi or Hindi in total.

Let E = Number of students who can speak English = 41, H = Number of students who can speak Hindi (to be found).

B = Number of students who can speak both English and Hindi = 21 and total number of students = 100.

According to the inclusion-exclusion principle, the total number of students who can speak at least one of the two languages (English or Hindi) is $E + H - B = 100 \Rightarrow 41 + H - 21 = 100$

$$\Rightarrow H = 100 - 20$$

$$\Rightarrow H = 80$$

Therefore, 80 students can speak Hindi.

The correct answer is Option **(b)**.

S19. Ans.(b)

Sol. We are given that the hypotenuse of a right triangle is 17 cm, and the sides are integers.

Here the sides of the triangle are integers, so the triangle is a **Pythagorean triplet**.

The Pythagorean triplet involving 17 as the hypotenuse is **(8, 15, 17)**.

Now, the area A of a right triangle is given by

$$A = \frac{1}{2} \times \text{base} \times \text{height}$$

For the triplet (8, 15, 17);

Base = 8 cm, Height = 15 cm

So, the area is

$$A = \frac{1}{2} \times 8 \times 15 = \frac{1}{2} \times 120 = 60 \text{ sq. cm}$$

Thus, the correct answer is Option **(b)**.

S20. Ans.(b)

Sol. Concept:

Functional relationship: Two pairs of words are compared based on how they function or relate to one another.

Solution:

___ is to COLOUR.

Curry is a dish, and **spice** is an essential element that adds flavor to it.

Similarly, the blank should be something that is essentially defined or created by **color**.

Looking at the options:

1. **Canvas:** A surface where colors can be applied, but it is not directly related to color in the way that spice is to curry.

2. **Painting:** A painting is something that is created using colors, just as curry is created with spices. This makes **Painting** the correct analogy, as a painting is defined by its use of color, similar to how curry is defined by the use of spice.

3. **Brush:** This is a tool used to apply colors but is not analogous to spice in this context.

4. **Brightness:** This is a characteristic of color, but not something defined by the use of color in the same way a painting is.

Thus, the correct answer is Option **(b)**.

