IPMAT 2019 Solution

Ques 1. The sum of the interior angles of a convex n-sided polygon is less than 2019°. The maximum possible value of n is

Solu. To find the maximum possible value of n, we can use the formula for the sum of the interior angles of a polygon:
S = (n - 2) × 180°
Given that S < 2019°, we can set up the inequality:
(n - 2) × 180° < 2019°
Now, let's solve for n:
n - 2 < 2019° ÷ 180°
n - 2 < 11.2167
Since n must be an integer, the largest possible value for n is 11 + 2 = 13.
Therefore, the maximum possible value of n is 13.

Ques 3. A real-valued function f satisfies the relation f(x) * f(y) = f(2xy + 3) + 3f(x + y) - 3f(y) + 6y for all real numbers x and y. Then the value of f (8) is

Solu. f(x) f(y) = f(2xy + 3) + 3f(x + y) - 3f(y) + 6y
∴ Putting x = y = 0,
⇒ f(0) f(0) = f(2 × 0 × 0 + 3) + 3f(0 + 0) - 3f(0) + (6 × 0)
⇒ $f(0)^2$= f(3) + 3f(0) - 3f(0) + 0
⇒ f(3) = $f(0)^2$
Putting y = 0,
⇒ f (x) f (0) = f (2 × x × 0 + 3) + 3f (x + 0) - 3f (0) + (6 × 0)
⇒ f (x) f (0) = f (3) + 3f (x) - 3f (0)
⇒ f (x) f (0) = $f(0)^2$ + 3f (x) - 3f (0)
⇒ f (x) f (0) - $f(0)^2$= 3f (x) - 3f (0)
⇒ f (0) * (f (x)- f (0)) = 3 * (f (x)- f (0))

∴ Either f(x) = f(0) or f(0) = 3
Since, all functions can't have the same value, f(0) = 3
∴ Putting x = 0, y = 3,
⇒ f (0) f (3) = f (2 × 0 × 3 + 3) + 3f (0 + 3) - 3f (3) + (6 × 3)
⇒ f(0) f(3) = f(3) + 3f(3) - 3f(3) +18 = f(3) +18
⇒ 3 f(3) = f(3) + 18
⇒ f(3) = 9
∴ Putting x = 0, y = 8
⇒ f (0) f (8) = f (2 × 0 × 8 + 3) + 3f (0 + 8) - 3f (8) + (6 × 8)
⇒ 3f(8) = f(3) + 3f(8) – 3f(8) + 48
⇒ 3f(8) = 9 + 48.
⇒ f(8) = 19
∴ The value of f(8) is 19.

Ques 4. Let A, B, C be three 4 X 4 matrices such that det A = 5, det B = -3, and det C = 1/2. Then the det ($2AB^{-1}C^3B^T$) is

Solu. det(kA) = k det(A), where A is a Square Matrix
n is the order of the Square Matrix
k is some scalar constant
det(AB) = det(A) * det(B), where A,B are two matrices compatible for multiplication.
det(A-1)= 1 det(A) where A ^ - 1 is the inverse of matrix A.
det(AT)= det(A) where A ^ T is the transpose of matrix A.
Using the above properties,
det(2AB-1C3BT) = det(2A) * det(B-1) * det(C^3) * det(BT) = 24 det(A) * 1 det(B) * det(C) * det(C) * det(C) * det(B)
= 16 * 5 * 1/- 3 * 1/2 * 1/2 * 1/2 * (- 3) = 10 .
The question is "Let A, B, C be three 4 X 4 matrices such that det A = 5, det B = -3, and det C = 1/2 Then the det (2A * B ^ - 1 * C ^ 3 * B ^ T) is"
Hence, the answer is 10

Ques 5. If A is a 3 * 3 non-zero matrix such that A ^ 2 = 0 then determinant of [(I + A) ^ 50 - 50A] is equal to

Solu. Given that A is a non-zero 3x3 matrix such that $A^2 = 0$, and we need to find the determinant of $(I + A)^{50}$ - 50A, where I is the identity matrix.
We know that $A^2 = 0$ implies A is nilpotent.
First, let's find $(I + A)^{50}$:
Using the binomial expansion, $(I + A)^{50} = \sum(k=0 \text{ to } 50)$ (50 choose k) $I^{(50-k)}A^k$.
Since A^2 = 0, all terms where k ≥ 2 result in A^2, which is zero. So, we only need to consider terms up to k = 1:
$(I + A)^{50} = I^{50} + 50I^{49}A$.
Now, let's substitute this into $(I + A)^{50}$ - 50A:
$(I + A)^{50} - 50A = I^{50} + 50I^{49}A - 50A$.
Since I^50 is the identity matrix and I^{49} is also the identity matrix:
$(I + A)^{50} - 50A = I + 50A - 50A = I$.
So, the determinant of $(I + A)^{50}$ - 50A is the determinant of the identity matrix I, which is 1.

Ques 6. Three friends divided some apples in the ratio 3:5:7 among themselves. After consuming 16 apples they found that the remaining number of apples with them was equal to largest number of apples received by one of them at the beginning. Total number of apples these friends initially had was

Solu. Let's denote the initial number of apples received by the three friends as 3x, 5x, and 7x respectively, where x is a common multiplier.
According to the problem, they consume 16 apples, leaving behind a quantity equal to the largest initial share, which is 7x.
So, we have the equation:
$3x + 5x + 7x - 16 = 7x$
Solve for x:
$15x - 16 = 7x$
$8x = 16$
$x = 2$
Now, we can find the total number of apples initially:
Total = 3x + 5x + 7x = 15x = 15 * 2 = 30
Therefore, the total number of apples these friends initially had was 30.

Ques 7. A shopkeeper reduces the price of a pen by 25% as a result of which the sales quantity increased by 20%. If the revenue made by the shopkeeper decreases by x% then x is

Solu. Let's assume the original price of the pen is P.
After reducing the price by 25%, the new price becomes 0.75P.
The increase in sales quantity by 20% means the new quantity sold is 1.2Q, where Q is the original quantity sold.
So, the original revenue R1 is P * Q, and the new revenue R2 is 0.75P * 1.2Q.
The percentage change in revenue can be calculated using the formula:
Percentage change = ((New Value - Original Value) / Original Value) * 100%
So, the percentage decrease in revenue x is:
x = ((0.75P * 1.2Q - PQ) / PQ) * 100%
x = ((0.9PQ - PQ) / PQ) * 100%
x = (-0.1PQ / PQ) * 100%
x = -10%
Therefore, x = -10%, indicating that the revenue made by the shopkeeper decreases by 10%.

Ques 9. The maximum distance between the point (-5, 0) and a point on the circle x ^ 2 + y ^ 2 = 4 is

Solu. The circle centered at the origin (0, 0) with equation x^2 + y^2 = 4 has radius 2. This means the farthest possible point on the circle from (-5, 0) is the point that is 2 units to the right, which is (2,0).
Therefore, the maximum distance is simply the distance between these two points. The distance formula tells us that the distance between (a,b) and (c,d) is equal to $\sqrt{(a-c)^2+(b-d)^2}$. In this case, we have a distance of $\sqrt{(-5-2)^2+(0-0)^2}$ which equals √49 = 7

Ques 10. If x, y, z are positive real numbers such that $x^{12} = y^{16} = z^{24}$, and the three quantities $3 \log_y x$, $4 \log_z y$, $n \log_x z$ are in arithmetic progression, then the value of n is

Solu.

Given $x^{12} = y^{16} = z^{24}$, we can rewrite this as:

$$x = y^{\frac{16}{12}} = y^{\frac{4}{3}}$$
$$y = z^{\frac{24}{16}} = z^{\frac{3}{2}}$$

Now, let's rewrite the expressions $3 \log_y x$, $4 \log_z y$, and $n \log_x z$ using these relationships.

$$3 \log_y x = 3 \log_y (y^{\frac{4}{3}}) = 3 \cdot \frac{4}{3} = 4$$
$$4 \log_z y = 4 \log_z (z^{\frac{3}{2}}) = 4 \cdot \frac{3}{2} = 6$$
$$n \log_x z = n \log_{y^{\frac{4}{3}}} z = n \cdot \frac{3}{4} = \frac{3n}{4}$$

Now, we know that these quantities are in arithmetic progression. So, the middle term should be the average of the other two terms.

$$\frac{4 + \frac{3n}{4}}{2} = 6$$

Solving for n:

$$4 + \frac{3n}{4} = 12$$
$$\frac{3n}{4} = 8$$
$$3n = 32$$
$$n = \frac{32}{3}$$

So, the value of n is $\frac{32}{3}$.

Ques 11. The number of pairs (x, y) satisfying the equation sin x + sin y = sin(x + y) and |x| + |y| = 1 is

Solu. Let's crack a math problem together! We're looking for the number of solutions (x, y) that fit two equations:

1. Sine addition in action: This equation, sin x + sin y = sin(x + y), describes how the sines of two angles (x and y) relate to the sine of their combined angle (x + y). It doesn't tell us how big or small the angles are, just how they interact.

2. Limited space: This equation, |x| + |y| = 1, restricts x and y to live on a special circle. Imagine a circle centered at the origin (0, 0) with a radius of 1. This circle represents all possible combinations of x and y values where their absolute values add up to 1 (think distance from the center). Since we use absolute values, it considers both positive and negative values for x and y within the circle.

Finding the sweet spots: Here's how we can find the solutions that work for both equations:

- Picture the circle: Because |x| + |y| = 1, imagine x and y as locations on that unit circle. This circle represents all the possible x and y combinations that add up to 1 in absolute value.

- Thinking about opposites: The equations don't care if x and y are positive or negative. So, if (x, y) is a solution, then (-x, -y) is also a solution because sine is symmetrical.

Where do they meet?

- On the axes? Points where one coordinate (x or y) is zero and the other is +1 or -1 fit the second equation, but not necessarily the first (depending on the angle).

- Inside the circle? Points strictly within the circle (where both x and y are non-zero with smaller absolute values) are unlikely to satisfy both equations at the same time, due to the way sine values behave.

- On the edge! Points landing right on the circle's edge have a better chance of satisfying both equations depending on the specific angles they represent.

The answer: By considering these ideas, we see that only specific points on the circle's circumference have a shot at working for both equations. Because of sine addition and circle symmetry, there will be a total of 4 such points (considering positive and negative counterparts).
Therefore, there are 8 pairs (x, y) that satisfy both equations!

Ques 12. The circle $x^2 + y^2 - 6x - 10y + k = 0$ does not touch or intersect the coordinate axes. If the point (1, 4) does not lie outside the circle, and the range of k is (a, b) then a + b is

Solu. Let's solve a problem about circles! We're given a circle described by an equation, and we need to find a range of values for a term (k) in that equation. Here's how we'll crack it:

1. Peeking inside the circle equation: We are given the equation for a circle: $x^2 + y^2 - 6x - 10y + k = 0$. This equation can be rearranged to reveal more about the circle's shape. We'll do some algebraic magic to complete the squares for both the x^2 and y^2 terms. This will help us pinpoint the center and size of the circle.
2. Reshaping the equation: To complete the squares, we'll move terms around and add a special number to both sides. This will isolate the perfect square terms. The result will look like (x minus something)² + (y minus something)² equals something else. This "something else" will tell us the circle's center, and the "something else squared" will reveal the radius (remember, the radius is like the circle's arm length).
3. Circle's location: We know from the given information that the circle doesn't touch or cross the x and y axes. This means the circle isn't just a single dot (radius of zero) and it's not completely imaginary (negative radius). So, the radius must be a positive number.

4. A point inside the circle: We are also given that the point (1, 4) is either on the circle or inside it. This means the distance between the center of the circle and the point (1, 4) is less than or equal to the circle's radius. We'll use the distance formula to turn this into an inequality.
5. Finding the range of k: Since the radius can't be zero and must be positive (based on the circle's location), the value of k (the term in the circle equation) must be greater than or equal to 10. We can express this range mathematically as k being in the set (10, infinity]. This means k starts strictly bigger than 10 and goes on forever (including positive infinity).
6. The answer is 10! The question asks for a + b, where (a, b] is the range of k. In our case, a is 10 (the lower limit) and b is positive infinity (the upper limit). Since infinity can't be added, a + b is simply 10.

So, the value of a + b is 10.

Ques 13. If a 3 * 3 matrix is filled with +1's and -1's such that the sum of each row and column of the matrix is 1, then the absolute value of its determinant is

Solu. Consider a 3x3 matrix filled with either +1's or -1's such that the sum of each row and each column of the matrix equals 1. Visualize this as arranging the numbers in a way that every row and column adds up to 1. To achieve this, we must have a mix of +1's and -1's in each row and column. For instance, a row might have one +1 and two -1's, or vice versa.

Now, think about how the determinant of a matrix is calculated. It involves multiplying the elements of each row (or column) by their corresponding cofactors and adding them up. In our case, since each row contains two -1's and one +1 (or vice versa), when we multiply these elements and add them up, the result is always 0. This happens because the product of any row's elements will always have at least one 0 in it.

As a result, the determinant of this matrix will always be 0, regardless of the arrangement of the +1's and -1's. Therefore, the absolute value of the determinant is also 0.

However, we cannot have all +1's or all -1's in any row or column, as the sum would not be 1. Therefore, each row and each column must contain exactly one +1 and two -1's or exactly two +1's and one -1.

Considering the possible arrangements of +1's and -1's, we realize that the determinant of A will always be 0. This is because the determinant of a matrix is equal to the sum of the products of the elements of any row (or column) multiplied by their corresponding cofactors.

Since each row contains two -1's and one +1 (or vice versa), the product of these elements will be 0 in each row. Therefore, the determinant of Ais 0.

Thus, the absolute value of the determinant of the matrix is |0| = 0 .

Ques 17. The average of five distinct integers is 110 and the smallest number among them is 100. The maximum possible value of the largest integer is

Solu. To find the largest integer, we need to minimize the sum of the other four integers while maintaining their distinctiveness.
Given that the smallest integer is 100, let's minimize the next four integers, making them 101, 102, 103, and 104.
Now, the sum of these four integers is 410, so the largest integer must be 550 (the sum of all five integers) minus 410, which equals 140.

Ques 19. The number of pairs of integers whose sums are equal to their products is

Solu.

let the two numbers be x & y

Then ATQ

$xy = x + y$

$\Rightarrow x(y - 1) = y$

$\Rightarrow x = \dfrac{y}{y - 1}$

clearly for integral sol $y = 0$ or $y = 2$ thus $\{(0, 0), (1, 2)\}$ are two integral sol.

Ques 26. In a class of 65 students 40 like cricket, 25 like football and 20 like hockey. 10 students like both cricket and football, 8 students like football and hockey and 5 students like all three sports. If all the students like at least one sport, then the number of students who like both cricket and hockey is

a) 7

b) 8

c) 10

d) 12

Solu.

To solve this problem, we use the principle of inclusion-exclusion.

Let's denote:

- C as the set of students who like cricket,
- F as the set of students who like football,
- H as the set of students who like hockey.

Given:

- $|C| = 40,$
- $|F| = 25,$
- $|H| = 20,$
- $|C \cap F| = 10,$
- $|F \cap H| = 8,$
- $|C \cap H \cap F| = 5.$

Using the principle of inclusion-exclusion, we find the total number of students who like at least one sport:

$$|C \cup F \cup H| = |C| + |F| + |H| - |C \cap F| - |F \cap H| - |C \cap H| + |C \cap F \cap H|$$

$$|C \cup F \cup H| = 40 + 25 + 20 - 10 - 8 - |C \cap H| + 5$$

Now, let's solve for $|C \cap H|$:

$$|C \cup F \cup H| = 72 - |C \cap H|$$

Given that all students like at least one sport, $|C \cup F \cup H| = 65$.

So,

$$65 = 72 - |C \cap H|$$

$$|C \cap H| = 72 - 65$$

$$|C \cap H| = 7$$

Therefore, the number of students who like both cricket and hockey is 7. So, the answer is option (a) 7.

Ques 35. Two points on a ground are 1 m apart. If a cow moves in the field in such a way that its distance from the two points is always in ratio 3:2 then
a) the cow moves in a straight line
b) the cow moves in a circle
c) the cow moves in a parabola
d) the cow moves in a hyperbola

Solu. Let's analyze the situation. We have two fixed points (let's call them A and B) that are 1 meter apart. The cow moves in such a way that its distance from these two points is always in the ratio 3:2. Let's denote the distance of the cow from point A as 3x and from point B as 2x, where x is a variable representing the distance.
Now, let's draw this scenario. Imagine a line segment connecting points A and B. Since the cow's distance from A is 3x and from B is 2x, this implies

that the cow is closer to point A than point B. So, the cow's path must lie somewhere on the side of the line segment closer to point A.

Given this, we can conclude that the cow's path is a part of an ellipse with foci A and B. Ellipse is the locus of points such that the sum of the distances from two fixed points (the foci) is constant.

So, the correct option is not listed, but the closest one would be:
e) the cow moves along an elliptical path

Ques 40. For a > b > c > 0 the minimum value of the function f(x)= |x - a| + |x - b| + |x - c| * is
a) 2a - b - c
b) a + b - 2c
c) a + b + c
d) a - c

Solu. Let's analyze the function f(x) = |x - a| + |x - b| + |x - c| for a > b > c > 0 and find its minimum value.
Here's the approach:

1. Considering the absolute values: The absolute value function ensures that f(x) will always be non-negative (0 or greater) because it calculates the distance between x and each of the points (a, b, and c), and distance is inherently non-negative.
2. Understanding the impact of a, b, and c: Since a > b > c, as x increases from negative infinity towards positive infinity, the absolute value term |x - c| will become zero first (when x reaches c), followed by |x - b| (when x reaches b), and lastly |x - a| (when x reaches a).
3. Graphing the function (optional): Although not necessary for solving the problem, visualizing the function can be helpful. The graph of f(x) will consist of three piecewise linear sections due to the absolute values. As x moves from negative infinity to positive infinity, the graph will have a negative slope initially, then become zero at x = c, then

have a positive slope until it becomes zero again at x = b, and finally have a positive slope again.

4. Minimum value and key points: The minimum value of f(x) occurs where the function transitions from a negative slope to zero. This happens at x = c, the point where the absolute value term |x - c| becomes zero.
5. Evaluating f(x) at x = c: To find the minimum value, we calculate f(c) which is:
   f(c) = |c - a| + |c - b| + |c - c| (since |c - c| = 0)
   f(c) = (a - c) + (b - c) + 0 (substituting absolute values with their corresponding expressions for x = c)
   f(c) = a - c + b - c (simplifying)
6. Minimum value: Therefore, the minimum value of the function f(x) is a - c + b - c, which combines the answer choices (a) and (d). However, since b > c (given), b - c is a negative value. So, the minimum value simplifies to:
   f(x) minimum value = a - c + (negative value) = a - c (dominant term because a > c)

Answer: The minimum value of the function f(x) is d) a - c.

Ques 43. The number of terms common to both the arithmetic progressions 2, 5, 8, 11, ..., 179 and 3, 5, 7, 9, ..., 101 is
a) 17
b) 16
c) 19
d) 15

Solu. To find the number of terms common to both arithmetic progressions (APs), we need to find the terms that are present in both sequences.
First, let's find the number of terms in each sequence.
For the sequence 2, 5, 8, 11, ..., 179:
a = 2
d = 5 - 2 = 3
n = (179 - 2) / 3 + 1 = 59

For the sequence 3, 5, 7, 9, ..., 101:
a = 3
d = 5 - 3 = 2
n = (101 - 3) / 2 + 1 = 50
Now, let's find the terms of each sequence.
For the first sequence, the terms are:
2, 5, 8, 11, ..., 179
For the second sequence, the terms are:
3, 5, 7, 9, ..., 101
Now, let's identify the terms common to both sequences. We notice that the common difference of both sequences is 3. Also, since 5 is a common term, it means that the first terms of both sequences are in common.
Thus, the common terms will occur at intervals of every 3 terms. So, to find the number of common terms, we divide the difference of the last term of the common terms in both sequences (179 - 5 = 174) by 3 (the common difference):
174 / 3 = 58
But we counted the first common term (5) twice, so we add 1 to the count:
58 + 1 = 59
So, there are 59 terms common to both sequences.
However, we need to check if the last term (179) is present in the second sequence. Since the common difference is 2, we can check if 179 is formed from the initial term 3:
3 + (n - 1) * d = 3 + (n - 1) * 2 = 3 + 2n - 2 = 2n + 1 = 179
2n = 178
n = 89
So, 179 is not present in the second sequence.
Thus, the actual number of terms common to both sequences is 58.
So, the correct option is:
b) 16

Ques 45. A die is thrown three times and the sum of the three numbers is found to be 15. The probability that the first throw was a four is
a) 1/6

b) 1/4
c) 1/5
d) 1/10

Solu. Imagine you roll a regular six-sided die three times. There are many possible results you could get, like (3, 2, 1) or (5, 4, 6). We want to know how likely it is that the first number you roll is a 4, given that the total of all three rolls ends up being 15.
There are a total of 216 possible outcomes when you roll a die three times (6 options for each roll multiplied by itself three times). Out of all these possibilities, there are only 3 where you get a 4 on the first roll and the sum of all three rolls is 15 (either a 5 and a 6 later, or a 6 and a 5 later).
The chance of something happening is the number of times it happens divided by the total number of possibilities. In this case, the chance of getting a 4 on the first roll and a sum of 15 in total is 3 out of 216. This can also be written as 1 out of 72, but most answer choices didn't have that option. An even closer option, although not exactly the same, is 1 out of 10. So, while the exact answer might be a little different, option d) is the closest guess.

Ques 46. How many different numbers can be formed by using only the digits 1 and 3 which are smaller than 3000000?
a) 64
b) 128
c) 190
d) 254

Solu. 190

Ques 61.When a dozen men are cast away on an imaginary island, the best educated would look for metals in rocks because
(a) metals can be used to make weapons.
(b) such an island probably has unexploited resources.
(c) he may find it beneath him to dig or cut or make shoes.
(d) he is suited for such work.

Solu. (d) he is suited for his work
Reasoning: The passage states that "the best educated to look for iron or lead in the rocks." This implies that the most educated person has the knowledge and skills (perhaps in geology or mining) that make him suited for this specific task. While other options might be true or consequences of this role, the passage directly suggests (d) as the reason.

Ques. 62. The author states that any appearance of secrecy or separateness would instantly and justly be looked upon with suspicion. From this statement we may infer that
(a) what is secret is not what is separate college India's largest St
(b) secrecy is not exactly the same as separateness
(c) it is natural to be suspicious of secrecy
(d) it only takes an instant for a relationship to deteriorate

Solu. (c) it is natural to be suspicious of secrecy
Reasoning: The passage says, "any appearance of secrecy or separateness would instantly, and justly, be looked upon with suspicion." This directly tells us that in this situation, secrecy leads to suspicion. The other answer choices don't necessarily follow from the passage:

- (a) Secrecy and separateness are related but not necessarily the same. Secrecy can exist without physical separation.
- (b) Similar to (a), secrecy and separateness are overlapping concepts but not identical.
- (d) The passage doesn't talk about the timeframe for relationships to deteriorate, just that secrecy leads to suspicion.

Ques 63. The instance of the shoemaker who refuses to show his source and asks for more corn and potatoes, is an example of
(a) a strong bargain.
(b) unfair practice.
(c) the system of barter.
(d) the intent to make trouble.

Solu. (b) unfair practice

Reasoning: The passage describes the shoemaker refusing to show where he gets the bark for sandals and asking for more corn and potatoes in exchange. This implies he's trying to gain an advantage by keeping his resource a secret and potentially inflating the price of his sandals. So, it's an unfair practice, not a strong bargain (a), just barter (c), or troublemaking (d).

Ques 64. According to the author, whatever one's work might be
(a) hardships are going to be part of it.
(b) one cannot keep complaining.
(c) one should expect others to assure of help and advance our labours.
(d) one must offer help to others in order to receive help.

Solu. (a) hardships are going to be part of it
Reasoning: The passage states, "whatever the work might be, certainly there would be difficulties about it." This directly tells us the author believes any work on the island will have challenges. The other options are not directly supported by the passage:

- (b) There's no mention of constant complaining being a requirement.
- (c) The passage suggests offering help, not expecting others to do it for you.
- (d) While offering help is encouraged, it's not framed as a requirement to receive help.

Ques 65. The author's belief is that for progress to happen
(a) a team should consist of people with multiple talents. members is essential.
(b) co-operation among team
(c) one must deal with those who are secretive.
(d) transparency among all concerned is mandatory.

Solu. (d) transparency among all concerned is mandatory

Reasoning: The entire passage emphasizes the importance of openness and frankness for the group's success. The author states, "any appearance of secrecy or separateness... would be immediately... looked upon with suspicion" and that difficulties "might be more or less done away with by the help of the rest." This highlights the need for transparency for progress.

- (a) While having diverse skills is helpful, it's not the main focus on why progress happens.
- (b) Cooperation is indeed essential, but transparency is specifically mentioned as a key aspect of cooperation.
- (c) The passage doesn't say dealing with secretive people is mandatory, just that secrecy itself is a problem.

Ques 66. The writer makes a hypothesis, which can be related to
(a) communities in general.
(b) an imaginary island, rich with resources.
(c) an ideal world of talented people.
(d) a primitive and unsophisticated world.

Solu. (a), communities in general

- The passage describes a scenario where a small group of people (a dozen men) are stranded on an island and forced to work together for survival and progress.
- The author explores the dynamics of cooperation, suspicion, and the importance of open communication within this group.
- While the specific scenario is an island, the underlying principles about collaboration and communication can be applied to any community where people work together for a common goal.

Ques 98.
1. He just harvested the wild grains.
2. The hunter-gatherer went from place to place in search of food.
3. As the crops began to give better yields, this reduced his need to go in search of
animals and wild plants.

4. This was followed by an attempt to grow food by scattering the spare grains.

Solu. 2, 4, 1, 3

Reasoning:

1. Start with the hunter-gatherer lifestyle: Sentence 2 introduces the lifestyle of the hunter-gatherer, who constantly searches for food.
2. Introduce the attempt at cultivation: Sentence 4 describes the first attempt at growing food by scattering spare grains.
3. Show the successful harvest: Sentence 1 depicts the successful harvest of wild grains, likely from the scattered seeds.
4. Conclude with the impact: Sentence 3 explains how successful cultivation reduced the need for constant hunting and gathering.

Ques 99. Question 99

1. People here are one injury away from starvation, one misspoken word away from detainment
or death.
2. Soon, however, she notices the lack of access to basic medical care or education.
3. Life in a rural Kashmiri village seems idyllic to Shalini at first, as she's befriending lovely people and admiring majestic natural scenery, especially in contrast to the cacophony of urban Mumbai.
4. Moreover, the ever-present political disruptions mean that life in Kashmir is far from a Shangri- La utopia.

Solu. 3, 2, 4, 1

Reasoning:

1. Start with Shalini's initial impression: Sentence 3 introduces the idyllic first impression Shalini has of the village, focusing on the friendly people and beautiful scenery.
2. Introduce contrasting realities: Sentence 2 highlights the harsh realities that go against Shalini's initial impression, such as the lack of basic medical care and education.

3. Deepen the contrast with political issues: Sentence 4 adds another layer of complexity by mentioning the political disruptions that disrupt the utopian image further.
4. Conclude with the harsh consequences: Sentence 1 summarizes the precariousness of life in the village, where a single injury or misspoken word can have serious consequences.

Ques 100.
1. The study, published in the Lancet recently, revealed that people living in democratic countries live longer than those who don't; they also have less of a chance of dying from heart disease, strokes, and even road accidents.
2. Incredible as it may sound, we are now told that democracy is not just good for the soul, it is good for the body too.
3. Without pressure from voters or foreign-aid agencies, dictators have less incentive to finance more expensive prevention and treatment of heart disease, cancers, and other chronic illnesses.
4. The study suggests that elections and the health of the people are increasingly inseparable.
5. A study spanning 170 countries found a strong correlation between health and the most progressive form of government.

Solu. 1, 5, 4, 3, 2
Reasoning:

1. Start with the main finding: Sentence 1 presents the key finding of the study: democracies have better health outcomes.
2. Introduce the broader concept: Sentence 5 connects the finding to a broader idea – the link between health and a specific type of government (most progressive, likely referring to democracies).
3. Explain the connection: Sentence 4 elaborates on the connection mentioned in sentence 5, suggesting that elections (a key aspect of democracy) play a role in health outcomes.

4. Provide a reason: Sentence 3 explains why democracies might have better health outcomes – pressure from voters and foreign aid incentivizes investment in healthcare.
5. Conclude with a broader statement: Sentence 2 summarizes the main point in a more general and relatable way, highlighting the health benefits of democracy.