# 3

# Logical Reasoning based on Rankings

Reasoning questions on Rankings involve an ordering of people objects based on their heights/weights/performance in an exam, etc. As the name suggests, in questions on rankings you are supposed to place people/objects in a decreasing or increasing order based on an attribute being measured.

Key skills required in solving Logical Reasoning questions based on rankings:

(i) The ability to visualise the structure in which the rankings have to be created

(ii) The ability to order the clues in the correct order of usage (as explained in the theory of logical reasoning)

(iii) The ability to perceive what indirect clues are talking about, and find the appropriate point in the solving process about how to use them

(iv) The ability to convert clues written in language form into visual cues so that you do not need to read the text again and again, and also are able to 'see' all the clues at one go.

The following illustrated examples (with the reaction tracker used to explain the solutions) would help you get acquainted with questions based on rankings. For each of the following questions first try to solve them on your own before looking at the reaction tracker process of solving the same.

**Example 1**

***Directions for Questions 1 to 4 (Constraint Based Arrangement):***

i. Six students A, B, C, D, E and F participated in a self-evaluation test of Quants and Dat Interpretation (D.I.).

ii. The total marks of A in Quants was just above C and in D.I. just above F.

iii. B was just above C in D.I. but he scored less than D in Quants.

iv. F got more marks than D and E in D.I. but did not perform as well in Quants as in D.I. a compared to D and E.

v. No one is in between C and D in Quant and C and A in D.I.

1. Who got the highest marks in D.I.?

(a) A

(b) B

(c) C

(d) Data inadequate

2. Which of the following students has scored the least in D.I.?

(a) Only D

(b) Only E

(c) Only D or E

(d) None of these

3. Who was just below D in Quants?

(a) B

(b) E

(c) C

(d) Data inadequate

4. Which of the given statements is not necessary to answer the questions?

(a) (ii)

(b) (iii)

(c) (iv)

(d) All are necessary

## REACTION TRACKER

From the second statement we have:

| QUANTS | D.I. |
|---|---|
| A | A |
| C | F |

From Statement (iii) we have: B just above C in D.I. & B somewhere below D in Quants. At thi point our figure remains the same as we cannot put this information into the figure.

| QUANTS | D.I. |
|---|---|
| A | A |
| C | F |

From Statement (iv) we have:

| QUANTS | D.I. |
|---|---|
| A | A |
| C | F |

| | |
|---|---|
| D & E above F | D & E below F |

From Statement (v) we have:

| QUANTS | D.I. |
|---|---|
| A | B |
| C | C |
| D | A |
| | F |
| | D & E below F |

This leads us to the following table:

| In Quants | In Data Interpretation |
|---|---|
| A | B |
| C | C |
| D | A |
| Also, B is less than D, | F |
| F is below D and E. | D and E are below F. |
| Note: E could be placed | Hence B must be first. |
| anywhere as we don't have | |
| any information about E. | |

The answers are:

1. B (b)
2. D or E (c)
3. Data inadequate (d)
4. All are necessary (d)

**Example 2** Solve the following questions based on the information provided:

i. A, B, C, D, E, F, G and H are eight friends. Three of them play cricket and table tennis eac
and two of them play football. Each one of them has different height.

ii. The tallest does not play football and the shortest does not play cricket.

iii. F is taller than A and D but shorter than H and B.

iv. E who does not play cricket, is taller than B and is second to the tallest.

v. G is shorter than D but taller than A.

vi. H, who is fourth from the top, plays table tennis with D.

vii. G does not play either cricket or football. B does not play football.

1. Who is the tallest?

(a) B (b) H

(c) C (d) Data inadequate

2. Who is the shortest?

(a) G (b) D

(c) A (d) Data inadequate

3. Which of the following pairs of friends plays football?

(a) EA (b) EH

(c) HF (d) Data inadequate

4. What is F's position from the top when they are arranged in descending order of their height?

(a) Fifth (b) Fourth

(c) Sixth (d) None of these

## REACTION TRACKER

The first direct clue in the question is Clue (vi). Clue (vii) is the next clue to use as using the last 2 clues we get that H,G and D play table tennis (thus fixing our list of TT players). Hence, when we read that B does not play football we can deduce that B plays cricket—as he cannot be playing table tennis since we already know the three people playing TT. The other direct clue that we can use for placing an individual in our starting figure based on height is clue (iv). According to this, E does not play cricket (hence must be football) and he is second to the tallest. At this point we also need to keep aside the information that E is taller than B outside the purview of the figure for later use. At this point our figure would be as given below with the additional knowledge that H,G & D play TT and E plays cricket.

| | |
|---|---|
| E | Football |
| H | Table tennis |

From this point we need to first focus on placing the other 6 people in the decreasing order of their heights inside the figure above.

Clue (iii) combined with Clue (v) helps us understand that:

Between A, G and D, the order of heights from lower to higher would be A Æ G Æ D.

And Since F is taller than A and D, F must be taller than AÆ G Æ D. Also because F is shorter than H and B, F cannot take the topmost or the third position from top in the figure. Based on these deductions the figure changes to:

| | |
|---|---|
| E | Football |
| H | Table tennis |
| F | |
| D | Table tennis |
| G | Table tennis |
| A | |

Placing B in the above figure is easy because we had kept aside the information that "E is taller than

B". Thus, B can only take the third place position and the highest place goes to C. Thus the figure becomes:

| | |
|---|---|
| C | |
| E | Football |
| B | Cricket |
| H | Table tennis |
| F | |
| D | Table tennis |
| G | Table tennis |
| A | |

At this point we can use the clues about who does not play what and identify the remaining 2 people for cricket and the remaining person for football as:

The tallest does not play football Æ deduction Æ the tallest plays cricket.

The shortest does not play cricket Æ deduction Æ the shortest plays football. The table can be completed at this point as below:

| | |
|---|---|
| C | Cricket |
| E | Football |
| B | Cricket |
| H | Table tennis |
| F | Cricket |
| D | Table tennis |
| G | Table tennis |
| A | Football |

The answers can be read off easily at this point from the table above:

1. C is the tallest. Option (c).
2. A is the shortest. Option (c).
3. E & A are the two football players. Option (a).
4. F is placed fifth from the top. Option (a).

## EXERCISE ON RANKINGS

***Directions for Questions 1 to 4:*** (Matching Puzzle):

Mr Bankatlal acted as a judge for the beauty contest. There were four participants, viz. Ms Andhra Pradesh, Ms Uttar Pradesh, Ms West Bangal and Ms Maharashtra. Mrs Bankatlal, who was very anxious about the result asked about it as soon as he was back home. Mr Bankatlal told her just that the one who was wearing the yellow saree won the contest. When Mrs Bankatlal pressed for further details, he elaborated as follows:

i. All of them were sitting in a row.

ii. All of them wore sarees of different colours, viz. green, yellow, white, red.
iii. There was only one runner-up and she was sitting beside Ms Maharashtra.
iv. The runner-up was wearing the green saree.
v. Ms West Bengal was not sitting at the end and was not the runner-up.
vi. The winner and the runner up are not sitting adjacent to each other.
vii. Ms Maharashtra was wearing a white saree.
viii. Ms Andhra Pradesh was wearing a green saree.
ix. Participants wearing yellow saree and white saree were at the ends.

1. Who wore the red saree?
   (a) Ms Andhra Pradesh
   (b) Ms West Bangal
   (c) Ms Uttar Pradesh
   (d) Ms Maharashtra
2. Ms West Bengal was sitting adjacent to
   (a) Ms Andhra Pradesh and Ms Maharashtra
   (b) Ms Uttar Pradesh and Ms Maharashtra
   (c) Ms Andhra Pradesh and Ms Uttar Pradesh
   (d) Ms Uttar Pradesh only
3. Which saree was worn by Ms Andhra Pradesh?
   (a) Yellow (b) Red
   (c) Green (d) White
4. Who was the runner-up?
   (a) Ms Andhra Pradesh
   (b) Ms West Bengal
   (c) Ms Uttar Pradesh
   (d) Ms Maharashtra
5. Who was the winner of the beauty contest?
   (a) Ms Andhra Pradesh
   (b) Ms West Bengal
   (c) Ms Uttar Pradesh
   (d) Ms Maharashtra

***Directions for Questions 6 to 10:*** Study the following information carefully and answer the questions given below:

Five geeks (enthusiasts) entered a comic book character costume contest held during the comic con festival. The contestants dressed up and were given two awards—one for being best in a particular category (i.e. strongest, smartest, most efficient, scariest and powerful) and one for being ranked (i.e. $1^{st}$, $2^{nd}$, $3^{rd}$, $4^{th}$ and $5^{th}$). Determine who wore what costume and what two awards they received.

(i) The winner of the most efficient character's costume was ranked just above Sacha's character's costume (which wasn't the superman).

(ii) The winner of the strongest category (which wasn't the Wonderwoman) was not worn by Billy.

(iii) The joker's costume was ranked just above Sacha's costume (which wasn't the strongest costume winner).

(iv) The Wonderwoman costume ranked just above the scariest costume and just below Vladimirs's costume.

(v) The Batman costume was placed just higher than the winner of the strongest costume and just lower than Catherine's costume.

(vi) The Lex Luthor costume ranked just above Jelena's (which wasn't the Superman) and just below the smartest.

6. Who among the following ranked fifth?

(a) Billy (b) Jelena

(c) Vladimir (d) Can't be determined

7. Who among the following got the award of the scariest costume?

(a) Billy (b) Catharine

(c) Sacha (d) Vladimir

8. Which of the following is the costume of Sacha?

(a) Joker (b) Batman

(c) Lex Luthor (d) Wonderwoman

9. Which of the following shows the correct order of ranks $1^{st}$, $2^{nd}$, $3^{rd}$, $4^{th}$ and $5^{th}$ respectively?

(a) Billy, Jelena, Vladimir, Sacha, Catherine

(b) Vladimir, Sacha, Catherine, Billy, Jelena

(c) Catherine, Sacha, Vladimir, Jelena, Billy

(d) Vladimir, Billy, Catherine, Sacha, Jelena

10. Which of the following are not correctly matched?

| **Costume** | **Category** |
|---|---|
| I. Joker | Most Efficient |
| II. Batman | Smartest |
| Ill. Lex Luthor | Strongest |

IV. Wonderwoman — Scariest
V. Superman — Powerful

(a) Only IV and V
(b) Only III and IV
(c) Only ll and III
(d) Only I and II

***Directions for Questions 11 to 15:*** Sprinters in Olympics running on the track are carrying numbers from 1 to 7 at the back of their vests. They complete the race when their feet touches the finish line at 9.10, 9.20, 9.30 seconds till 9.7 seconds i.e. at an interval of one mili second each. Each athlete is ranked from 1 (for the fastest) to 7 (for the slowest). The following additional information is known:

(i) The square of the highest total of the vest number and rank is 169 which occurs only once.
(ii) The square of the lowest total of vest number and rank is 16 and occurs only once.
(iii) The square of the total of vest number and rank = 81, occurs thrice.
(iv) The winners' vest no. exceeds that of the first runner up.

11. The vest number of the sprinter coming first is:
    (a) 3
    (b) 6
    (c) 1
    (d) 5
12. The sprinter number finishing second is:
    (a) 7
    (b) 6
    (c) 4
    (d) 3
13. The sprinter number finishing third is:
    (a) 6
    (b) 3
    (c) 1
    (d) 2
14. The sprinter number finishing last is:
    (a) 7
    (b) 2
    (c) 5
    (d) 1
15. The sprinter number finishing last but one is:
    (a) 7
    (b) 2
    (c) 5
    (d) 1

***Directions for Questions 16 to 20:*** In a bike racing competition, ten selected bikers from a city were to compete in various stunts. The structure of the competition requires all bikers to compete in five events before the elimination round begins so as to choose the top five bikers who will participate from that city at the national level. The ranks attained by each biker in the five events from first to tenth are:

| Names | Event A | Event B | Event C | Event D | Event E |
|---|---|---|---|---|---|
| Alex | 2 | 5 | 8 | 5 | 1 |
| Ben | 8 | 1 | 7 | 1 | 2 |

| | | | | | |
|---|---|---|---|---|---|
| Charlie | 5 | 6 | 1 | 4 | 9 |
| Devon | 1 | 10 | 2 | 10 | 3 |
| Ethan | 9 | 4 | 9 | 2 | 7 |
| Frank | 6 | 7 | 6 | 6 | 8 |
| Garry | 3 | 2 | 3 | 7 | 4 |
| Harry | 10 | 8 | 5 | 3 | 10 |
| Ian | 7 | 9 | 10 | 8 | 5 |
| John | 4 | 3 | 4 | 9 | 6 |

It is also stated that:

i. The biker with the first rank in most events gets to eliminate the biker with the last rank in most of the events.

ii. The first rank holder of event E is not to be eliminated.

iii. A biker whose highest rank and the lowest rank difference is the second highest among all bikers is not to be eliminated.

iv. A biker who does not rank in the top five positions in any of the five events gets eliminated.

v. The biker with the same rank in most of the events gets to eliminate that event E biker with an immediately lower rank than his same ranks in all events.

vi. A biker who got the second highest rank in event D gets to eliminate the biker who got the same rank in event B.

vii. Any biker who gets the first rank in two or more events will not be eliminated.

viii. Among the bikers who got the lowest rank in event B and the one who got the ninth rank in event D, the one who got a higher rank in the event E gets to eliminate the other.

ix. The biker whose sum of all the ranks in the events is the highest and does not get eliminated by any other condition will not be eliminated.

It is also known that if more than 5 people are getting eliminated by one rule or the other, then it is allowed. However, if less than 5 people are getting eliminated, then there is a toss up between the remaining ones and the results are determined by the toss of a coin.

16. Who among the following is a biker who does not get a chance to eliminate another biker?

(a) Ben (b) Charlie

(c) Devon (d) Frank

17. Who among the following is a biker who does not rank in the top four positions in any of the five events but does not get eliminated?

(a) Ethan (b) Frank

(c) Harry (d) Ian

18. If a new condition is included in the problem stating that, ‘any biker who gets second rank in any event will not be eliminated’, then who among the following will not get eliminated?

(a) Garry (b) Harry

(c) Ian (d) John

19. Which of the following conditions if not included in the problem do not change the final solution?

(a) ii (b) iv

(c) vi (d) viii

20. It is found that the results of event D are wrong and the last two ranks have been mistakenly interchanged, then who among the following bikers cannot be definitely eliminated in the elimination round?

(a) Ethan & Devon (b) Garry & John

(c) Harry & Devon (d) John & Devon

***Directions for Questions 21 to 23:*** Refer to the following information to answer the questions that follow.

A. Seven students A, B, C, D, E, F and G take a series of tests.

B. No two students get similar marks.

C. G always scores more than A.

D. A always scores more than B.

E. Each time either C scores the highest and E gets the least, or alternatively D scores the highest and F or B scores the least.

21. If G is ranked fifth, which of these must be true?

(a) D scores the highest.

(b) C is ranked second.

(c) E is ranked third.

(d) B is ranked fourth.

22. If D is ranked second, which of the following can be true?

(a) A gets more than C.

(b) G gets more than D.

(c) A gets more than G.

(d) F gets more than G.

23. If D is ranked sixth and B is ranked fifth, which of these can be true?

(a) G is ranked first or fourth.

(b) C is ranked second or third.

(c) A is ranked second or fifth.

(d) F is ranked third or fourth.

***Directions for Questions 24 to 28:*** Each of the following questions gives information about an

individual attribute through statements 1, 2, and 3. For each question if the first two statement are true, what conclusion can be drawn about the third statement?

24.

(1) *Gulabjamuns* are sweeter than *rosagullas* but *laddoos* are sweeter than *gulabjamuns*.

(2) *Rosagullas* are sweeter than *chamchams* but *pethas* are sweeter than *rosagullas*.

(3) Of the five kinds of sweets, *chamchams* are the least in terms of sweetness.

If the first two statements are true, the third statement is

(a) True

(b) False

(c) Uncertain

25. On the day the triplets were born to Moti the female dog,

(1) A weighs more than B.

(2) B weighs less than C.

(3) Of the three puppies, C weighs the most.

If the first two statements are true, the third statement is

(a) True

(b) False

(c) Uncertain

26. At a car showroom,

(1) the price of Car A was lower than that of Car B.

(2) the price of Car C was lower than that of Car B.

(3) the price of Car A was higher than that of Car C.

If the first two statements are true, the third statement is

(a) True

(b) False

(c) Uncertain

27. In the country of Mohenjo Daro,

(1) Cricket is bigger than Football and smaller than Tennis.

(2) Hockey is smaller than Tennis and bigger than Cricket.

(3) Football is bigger than Hockey.

If the first two statements are true, the third statement is

(a) True

(b) False

(c) Uncertain

28. Ramu has 3 marble boxes.

(1) Box A contains more marbles than Box B.

(2) Box B contains more marbles than Box C.

(3) Box C contains more marbles than Box A.

If the first two statements are true, the third statement is

(a) True

(b) False

(c) Uncertain

***Directions for Questions 29 to 32:*** Five cities all got more rain than usual this year. The five cities are: Aurangabad, Ahmednagar, Pune, Mumbai and Nagpur. The cities are located in five different areas of the country: the mountains, the forest, the coast, the desert, and in a valley. The rainfall amounts were: 24 inches, 54 inches, 64 inches, 88 inches and 130 inches.

- The city in the desert got the least rain; the city in the forest got the most rain.
- Pune is in the mountains.
- Aurangabad got more rain than Mumbai.
- Ahmednagar got more rain than Nagpur, but less rain than Pune.
- Mumbai got 88 inches of rain.
- The city in the mountains got 64 inches of rain; the city on the coast got 54 inches of rain.

29. Which city is in the desert?

(a) Aurangabad (b) Ahmednagar

(c) Pune (d) Nagpur

30. Which city got the most rain?

(a) Aurangabad (b) Ahmednagar

(c) Pune (d) Mumbai

31. How much rain did Ahmednagar get?

(a) 24 inches (b) 54 inches

(c) 64 inches (d) 88 inches

32. Where is Mumbai located?

(a) The mountains (b) The coast

(c) In a valley (d) The desert

## Answer Key

| | | | |
|---|---|---|---|
| 1. (b) | 2. (c) | 3. (c) | 4. (a) |
| 5. (c) | 6. (a) | 7. (a) | 8. (b) |
| 9. (c) | 10. (a) | 11. (b) | 12. (d) |
| 13. (d) | 14. (b) | 15. (a) | 16. (b) |
| 17. (d) | 18. (a) | 19. (a) | 20. (d) |
| 21. (a) | 22. (d) | 23. (d) | 24. (c) |
| 25. (c) | 26. (c) | 27. (c) | 28. (b) |
| 29. (d) | 30. (a) | 31. (b) | 32. (c) |

# Solutions

***Solutions 1–4.***

Based on the information given, we can come up with the following alternatives:

**Possibility 1:**

| | | Runner Up | |
|---|---|---|---|
| Miss UP | Miss WB | Miss AP | Miss Maharashtra |
| Yellow | Red | Green | White |

**Possibility 2:**

| | Runner Up | | |
|---|---|---|---|
| Miss Maharashtra | Miss AP | Miss WB | Miss UP |
| White | Green | Red | Yellow |

In either case the answers are the same:

1. Miss West Bengal wore red. Option (b) is correct.
2. Miss West Bengal was adjacent to Miss Andhra Pradesh and Miss Uttar Pradesh. Option (c) is correct.
3. Miss Andhra Pradesh wore the green saree. Option (c) is correct.
4. Miss Andhra Pradesh was the runner up as she wears green and sits next to Miss Maharashtra in both cases. Option (a) is correct.
5. Miss Uttar Pradesh was the winner. Option (c) is correct.

***Reaction Tracker for Questions 6 to 10:*** This question seems to be quite confusing due to the reason that all the clues seem to be the same/similar in nature. While that might be true on the surface, there are a few distinctions in the ways the clues can be used—especially when we look at the clues in the correct order.

On combining clues (i) and clues (iii) we would get the following Table 1:

| | | |
|---|---|---|

| Costume | Person | Category best |
|---|---|---|
| Joker | | Most efficient |
| | Sacha | |

Note: We combine Clues (i) and (iii) because Clue (ii) is not usable at this stage, as it is what can be described as "a checking" clue, i.e. once we have multiple final figure possibilities in place, we use clues of the nature of clue (ii) and also clue (i) (Sacha was not the superman), to eliminate one of the possibilities.

Clue (iv) will give us Table 2:

| Costume | Person | Category best |
|---|---|---|
| | Vladimir | |
| Wonderwoman | | |
| | | Scariest |

Clue (v) would give us Table 3:

| Costume | Person | Category best |
|---|---|---|
| | Catherine | |
| Batman | | |
| | | Strongest |

Clue (vi) would give us Table 4:

| Costume | Person | Category best |
|---|---|---|
| | | Smartest |
| Lex Luthor | | |
| | Jelena | |

From this point we need to focus on Sacha's costume. We would realise that Sacha cannot wear Superman (given clue (i)); Cannot wear joker (as joker is above Sacha according to Table 1) and cannot wear Lex Luthor because we cannot superimpose Table 4 on Table 1 by making Sacha correspond to Lex Luthor as it leads to the joker being the smartest (but Table 1 has joker as most efficient).

This leaves us with 2 possibilities for Sacha's costume—Wonderwoman or Batman.

Let us take a look at how possibility 1 rolls out:

For Sacha to be **Wonderwoman** we would need to merge Tables 1 and 2 to get Table 5 below:

| Costume | Person | Category best |
|---|---|---|
| Joker | **Vladimir** | Most Efficient |

| | | |
|---|---|---|
| **Wonderwoman** | Sacha | |
| | | **Scariest** |

To this we need to merge Table 3, which would give us Table 6 below:

| Costume | Person | Category best |
|---|---|---|
| Joker | Vladimir | Most Efficient |
| Wonderwoman | Sacha | |
| | **Catherine** | Scariest |
| **Batman** | | |
| | | **Strongest** |

There is only one way from this point that Table 4 can get merged into Table 6. That would give us:

| Costume | Person | Category best |
|---|---|---|
| Joker | Vladimir | Most Efficient |
| Wonderwoman | Sacha | **Smartest** |
| **Lex Luthor** | Catherine | Scariest |
| Batman | **Jelena** | |
| | | Strongest |

That leaves us with a final solution as below.

| Costume | Person | Category best |
|---|---|---|
| Joker | Vladimir | Most Efficient |
| Wonderwoman | Sacha | Smartest |
| Lex Luthor | Catherine | Scariest |
| Batman | Jelena | Most powerful |
| Superman | Billy | Strongest |

We can clearly see that this solution table contradicts clue (ii) – i.e. Billy was not the strongest.

Thus, we reject Possibility 1 and move to a possibility which would give us that Sacha must be Batman. In this case the thinking pattern would go as follows:

Combining Table 3 with Table 1:

| Costume | Person | Category best |
|---|---|---|
| Joker | **Catherine** | Most efficient |

| | | |
|---|---|---|
| **Batman** | Sacha | |
| | | **Strongest** |

To this we merge Table 3 and get:

| Costume | Person | Category best |
|---|---|---|
| Joker | Catherine | Most efficient |
| Batman | Sacha | |
| | **Vladimir** | Strongest |
| **Wonderwoman** | | |
| | | **Scariest** |

To this we merge Table 4 and get:

| Costume | Person | Category best |
|---|---|---|
| Joker | Catherine | Most efficient |
| Batman | Sacha | **Smartest** |
| **Lex Luthor** | Vladimir | Strongest |
| Wonderwoman | **Jelena** | |
| | | Scariest |

This leaves us with the task of placing the remaining values in each column. When we do this we get:

| Costume | Person | Category best |
|---|---|---|
| Joker | Catherine | Most efficient |
| Batman | Sacha | Smartest |
| Lex Luthor | Vladimir | Strongest |
| Wonderwoman | Jelena | **Powerful** |
| **Superman** | **Billy** | Scariest |

This solution does not contradict any of the basic clues given in the question. Hence, the answers are:

6. Billy ranked fifth. Option (a)
7. Billy got the scariest costume. Option (a)
8. Sacha's costume is Batman. Option (b) is correct.
9. Option (c) is the correct order.
10. Only (IV) and (V) are not properly matched. Hence, Option (a) is correct.

***Reaction Tracker to Questions 11–15:*** There are essentially two logical forks in this question:

The first one comes from Clue (i), according to which the highest total of vest number and time must be 13 (as the square is 169).

This could mean two scenarios:

Vest number 7 with time=6; or vest number 6 with time=7.

The two scenarios can be shown as:

| **Possibility 1** | | **Possibility 2** | |
|---|---|---|---|
| Vest Number | Rank | Vest Number | Rank |
| 1 | | 1 | |
| 2 | | 2 | |
| 3 | | 3 | |
| 4 | | 4 | |
| 5 | | 5 | |
| 6 | | 6 | 7 |
| 7 | 6 | 7 | |

Inside these two scenarios we need to merge the other three way fork:

The square of the least total of vest number and rank is 16 and occurs only once. It gives us 3 scenarios on the surface:

However in this scenario we can reject Vest 3 ranking 1 because then the second ranker's vest number would exceed the winner's vest number (Clue (iv))—as we cannot put the 2nd rank for either 1 or 2 as the total of 4 is the least sum and occurs only once.

This leaves us with 4 principal situations 1A, 1B, 2A and 2B. Let us evaluate each of these separately:

| **Possibility 1A (starting thought)** | |
|---|---|
| Vest number | Rank |
| 1 | 3 |
| 2 | 4/5/7 |
| 3 | 2/4/5/7 |
| 4 | 1/2/4/5/7 |
| 5 | 1/2/4/5/7 |
| 6 | 1/2/4/5 |
| 7 | 6 |

In the above situation, the total of vest number + rank has to occur thrice. There are only 3 places

where this can actually occur given the possibilities listed above. These are 2-7; 4-5 and 5-4. Hence, the following conclusions can be made:

| **Possibility 1A (starting thought)** | |
|---|---|
| Vest number | Rank |
| 1 | 3 |
| 2 | 7 |
| 3 | 2 |
| 4 | 5 |
| 5 | 4 |
| 6 | 1 |
| 7 | 6 |

3-2 and 6-1 get automatically selected. As for the vest number 3, only rank possibility left is 2nd rank and after than rank 1 must go to vest number 6.

If we go for a similar analysis with the other possibilities you can see that they do not work out. For instance in Possibility 1B, if we put down what is possible to be placed against vest numbers 1 and 3 respectively we get the following figure.

| **Possibility 1B** | |
|---|---|
| Vest number | Rank |
| 1 | 4/5/7 |
| 2 | 2 |
| 3 | 3/4/5/7 |
| 4 | |
| 5 | |
| 6 | |
| 7 | 6 |

From this point we know that there have to be exactly 3 totals of 9, which can only be achieved by matching 4-5; 5-4 and 6-3. Then, 3rd vest must be 7th rank but that leaves us with no rank possibility for vest 1 and also rank 1 not getting allotted anywhere. Thus, this possibility does not exist.

Similarly we can reject possibilities 2A and 2B:

| **Possibility 2A** | |
|---|---|
| Vest number | Rank |
| 1 | 3 |

| | |
|---|---|
| 2 | 4/5/6 |
| 3 | 2/4/5/6 |
| 4 | 1/2/4/5/6 |
| 5 | 1/2/4/5/6 |
| 6 | 7 |
| 7 | 1/2/4/5/6 |

In the above table we need three 9s. There are 4 possibilities for the sum of vest number and rank to be 9. These are 3-6, 4-5, 5-4 and 7-2. Only 3 of these 4 have to make up 9, hence we will have to leave out one of the 4. If we leave out 3-6, 4-5 or 5-4 then vest number 7 must take Position 2 (runner up). This will contradict Clue (iv) as the winner's vest number > the runner-ups vest number. If we leave out 7-2 and place 3-6, 4-5 and 5-4 there will be no place to put rank 2. Thus, this possibility gets rejected.

Possibility 2B also gets rejected as follows:

| **Possibility 2B** | |
|---|---|
| Vest number | Rank |
| 1 | 4/5/6 |
| 2 | 2 |
| 3 | 3/4/5/6 |
| 4 | 1/3/4/5/6 |
| 5 | 1/3/4/5/6 |
| 6 | 7 |
| 7 | 1/3/4/5/6 |

In the table above, there are only 3 cases of total of vest number + rank = 9. Thus, the table should become:

| **Possibility 2B** | |
|---|---|
| Vest number | Rank |
| 1 | 4/5/6 no place for 3rd rank?? |
| 2 | 2 |
| 3 | 6 |
| 4 | 5 |
| 5 | 4 |

| | |
|---|---|
| 6 | 7 |
| 7 | 1 |

Thus, this possibility is also rejected.

The answers are:

11. Vest number 6. Option (b)
12. Vest number 3. Option (d)
13. Vest number 2. Option (d)
14. Vest number 2. Option (b)
15. Vest number 7. Option (a)
16. Ben gets a chance to eliminate (Clue a); Frank gets a chance to eliminate (Clue e); Devon gets a chance to eliminate (Clue h); Only Charlie does not get a chance to eliminate someone. Option (b) is correct.
17. Frank and Ian satisfy the condition of not being in the top four in any event. Of them Ian would not get eliminated (Clue i); Frank would get eliminated (Clue d). Option (d)
18. Garry who is getting eliminated by Clue f would not be eliminated due to this Clue.
19. Clue b does not have any usage in this question.
20. John is getting eliminated due to Clue h, which pertains to $9^{th}$ rank in the event D. Also, Devon is getting eliminated due to maximum number of last ranks, which would no longer be true. Thus, Option (d) is correct.
21. If G is fifth, then A and B must be ranked $6^{th}$ and $7^{th}$ respectively. This can only happen if D scores the highest (as, if C is highest, then E must be $7^{th}$. Option (a)
22. The first three options are not feasible. Option (d) is the only thing that can be true.
23. Option (d) is possible.
24. The ordering in terms of sweetness would be L>G>R>C and *pethas* (P) have to be greater than *chamchams* (C). Thus, clearly the third statement is true.
25. Both A and C weigh more than B. However, it is not certain whether C weighs the most. Thus we choose Option (c).
26. Uncertain. Option (c).
27. We will get from the first two statements T>H>C>F. Thus Statement 3 is false if the first two statements are true.
28. False, as we get A>B>C and hence C>A is definitely false. Option (b)

***Solutions to 29 to 32:***

The solution table would be:

| Rainfall (From Max to Min) | Location | City |
|---|---|---|
| 130 | Forest | Aurangabad |
| 88 | Valley | Mumbai |
| | | |

| | | |
|---|---|---|
| 64 | Mountains | Pune |
| 54 | Coast | Ahmednagar |
| 24 | Desert | Nagpur |

Hence, the answers are:

29. Nagpur (Option d)
30. Aurangabad (Option a)
31. Ahmednagar ranked fourth and got 54 inches of rain. (Option b).
32. Mumbai is located in a valley (Option c).