CAT 2021 Question Paper Slot 3

LRDI

Instructions [25 - 28]

Each of the bottles mentioned in this question contains 50 ml of liquid. The liquid in any bottle can be 100% pure content (P) or can have certain amount of impurity (I). Visually it is not possible to distinguish between P and I. There is a testing device which detects impurity, as long as the percentage of impurity in the content tested is 10% or more.

For example, suppose bottle 1 contains only P, and bottle 2 contains 80% P and 20% I. If content from bottle 1 is tested, it will be found out that it contains only P. If content of bottle 2 is tested, the test will reveal that it contains some amount of I. If 10 ml of content from bottle 1 is mixed with 20 ml content from bottle 2, the test will show that the mixture has impurity, and hence we can conclude that at least one of the two bottles has I. However, if 10 ml of content from bottle 1 is mixed with 5 ml of content from bottle 2. the test will not detect any impurity in the resultant mixture.

25. 5 ml of content from bottle A is mixed with 5 ml of content from bottle B. The resultant mixture, when tested, detects the presence of I. If it is known that bottle A contains only P, what BEST can be concluded about the volume of I in bottle B?

A 1 ml

B Less than 1 ml

C 10 ml

D 10 ml or more

26. There are four bottles. Each bottle is known to contain only P or only I. They will be considered to be “collectively ready for despatch” if all of them contain only P. In minimum how many tests, is it possible to ascertain whether these four bottles are “collectively ready for despatch”?

27. There are four bottles. It is known that three of these bottles contain only P, while the remaining one contains 80% P and 20% I. What is the minimum number of tests required to definitely identify the bottle containing some amount of I?

28. There are four bottles. It is known that either one or two of these bottles contain(s) only P, while the remaining ones contain 85% P and 15% I. What is the minimum number of tests required to ascertain the exact number of bottles containing only P?

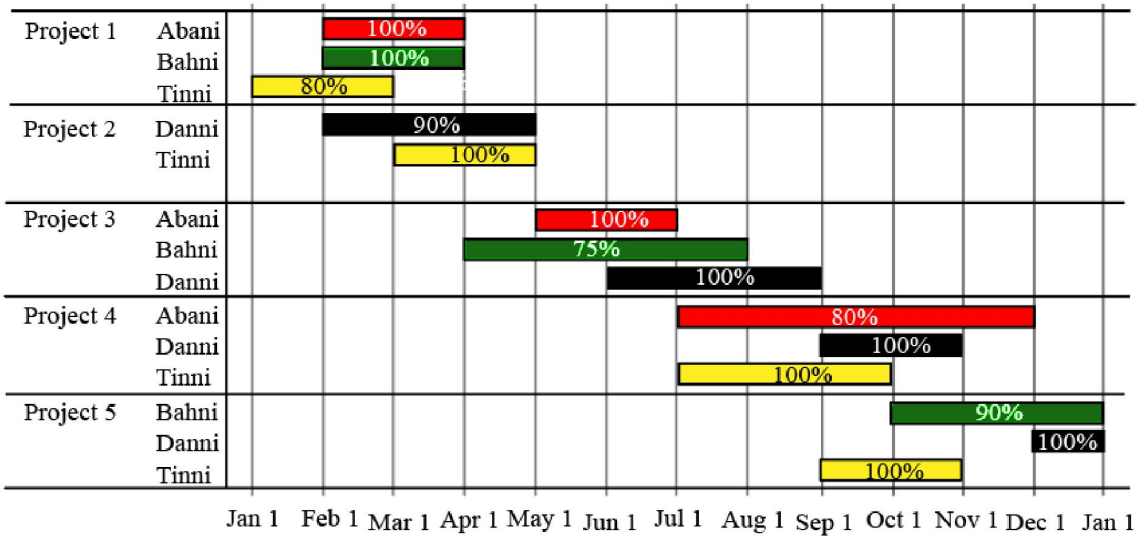
A 4

B 2

C 3

D 1

Instructions [29 - 32]



The figure above shows the schedule of four employees - Abani, Bahni, Danni, and Tinni - whom Dhoni supervised in 2020. Altogether there were five projects which started and concluded in 2020 in which they were involved. For each of these projects and for each employee, the starting day was at the beginning of a month and the concluding day was the end of a month, and these are indicated by the left and right end points of the corresponding horizontal bars. The number within each bar indicates the percentage of assigned work completed by the employee for that project, as assessed by Dhoni.

For each employee, his/her total project-month (in 2020) is the sum of the number of months (s)he worked across the five projects, while his/her annual completion index is the weightage average of the completion percentage assigned from the different projects, with the weights being the corresponding number of months (s)he worked in these projects. For each project, the total employee-month is the sum of the number of months four employees worked in this project, while its completion index is the weightage average of the completion percentage assigned for the employees who worked in this project, with the weights being the corresponding number of months they worked in this project.

29. Which of the following statements is/are true?

I: The total project-month was the same for the four employees.
II: The total employee-month was the same for the five projects.

A Only II

B Both I and II

C Neither I nor II

D Only I

30. Which employees did not work in multiple projects for any of the months in 2020?

A Only Abani, Bahni and Danni

B Only Abani and Bahni

C All four of them

D Only Tinni

31. The project duration, measured in terms of the number of months, is the time during which at least one employee worked in the project. Which of the following pairs of the projects had the same duration?

A Project 1, Project 5

B Project 4, Project 5

C Project 3, Project 5

D Project 3, Project 4

32. The list of employees in decreasing order of annual completion index is:

A Danni, Tinni, Bahni, Abani

B Bahni, Abani, Tinni, Danni

C Danni, Tinni, Abani, Bahni

D Tinni, Danni, Abani, Bahni

Instructions [33 - 38]

10 players - P1, P2, … , P10 - competed in an international javelin throw event. The number (after P) of a player reflects his rank at the beginning of the event, with rank 1 going to the topmost player. There were two phases in the event with the first phase consisting of rounds 1, 2, and 3, and the second phase consisting of rounds 4, 5, and 6. A throw is measured in terms of the distance it covers (in meters, up to one decimal point accuracy), only if the throw is a 'valid' one. For an invalid throw, the distance is taken as zero. A player's score at the end of a round is the maximum distance of all his throws up to that round. Players are re-ranked after every round based on their current scores. In case of a tie in scores, the player with a prevailing higher rank retains the higher rank. This ranking determines the order in which the players go for their throws in the next round.

In each of the rounds in the first phase, the players throw in increasing order of their latest rank, i.e. the player ranked 1 at that point throws first, followed by the player ranked 2 at that point and so on. The top six players at the end of the first phase qualify for the second phase. In each of the rounds in the second phase, the players throw in decreasing order of their latest rank i.e. the player ranked 6 at that point throws first, followed by the player ranked 5 at that point and so on. The players ranked 1, 2, and 3 at the end of the sixth round receive gold, silver, and bronze medals respectively.

All the valid throws of the event were of distinct distances (as per stated measurement accuracy). The tables below show distances (in meters) covered by all valid throws in the first and the third round in the event.

Distances covered by all the valid throws in the first round

Player	Distance(in m)
P1	82.9
P3	81.5
P5	86.4
P6	82.5
P7	87.2
P9	84.1

Distances covered by all the valid throws in the third round

Player	Distance(in m)
P1	88.6
P3	79.0
P9	81.4

The following facts are also known.

i. Among the throws in the second round, only the last two were valid. Both the throws enabled these players to qualify for the second phase, with one of them qualifying with the least score. None of these players won any medal.
ii. If a player throws first in a round AND he was also the last (among the players in the current round) to throw in the previous round, then the player is said to get a double. Two players got a double.
iii. In each round of the second phase, exactly one player improved his score. Each of these improvements was by the same amount.
iv. The gold and bronze medalists improved their scores in the fifth and the sixth rounds respectively. One medal winner improved his score in the fourth round.
v. The difference between the final scores of the gold medalist and the silver medalist, as well as the difference between the final scores of the silver medalist and the bronze medalist was 1.0 m.

33. Which two players got the double?

A P1, P8

B P2, P4

C P8, P10

D P1, P10

34. Who won the silver medal?

A P5

B P7

C P9

D P1

35. Who threw the last javelin in the event?

A P7

B P1

C P9

D P10

36. What was the final score (in m) of the silver-medalist?

A 89.6

B 88.4

C 88.6

D 87.2

37. Which of the following can be the final score (in m) of P8?

A 81.9

B 0

C 82.7

D 85.1

38. By how much did the gold medalist improve his score (in m) in the second phase?

A 1.0

B 2.0

C 2.4

D 1.2

Instructions [39 - 44]

Three reviewers Amal, Bimal, and Komal are tasked with selecting questions from a pool of 13 questions (Q01 to Q13). Questions can be created by external "subject matter experts" (SMEs) or by one of the three reviewers. Each of the reviewers either approves or disapproves a question that is shown to them. Their decisions lead to eventual acceptance or rejection of the question in the manner described below.

If a question is created by an SME, it is reviewed first by Amal, and then by Bimal. If both of them approve the question, then the question is accepted and is not reviewed by Komal. If both disapprove the question, it is rejected and is not reviewed by Komal. If one of them approves the question and the other disapproves it, then the question is reviewed by Komal. Then the question is accepted only if she approves it.

A question created by one of the reviewers is decided upon by the other two. If a question is created by Amal, then it is first reviewed by Bimal. If Bimal approves the question, then it is accepted. Otherwise, it is reviewed by Komal. The question is then accepted only if Komal approves it. A similar process is followed for questions created by Bimal, whose questions are first reviewed by Komal, and then by Amal only if Komal disapproves it. Questions created by Komal are first reviewed by Amal, and then, if required, by Bimal.

The following facts are known about the review process after its completion.

1. Q02, Q06, Q09, Q11, and Q12 were rejected and the other questions were accepted.
2. Amal reviewed only Q02, Q03, Q04, Q06, Q08, Q10, Q11, and Q13.
3. Bimal reviewed only Q02, Q04, Q06 through Q09, Q12, and Q13.
4. Komal reviewed only Q01 through Q05, Q07, Q08, Q09, Q11, and Q12.

39. How many questions were DEFINITELY created by Amal?

40. How many questions were DEFINITELY created by Komal?

41. How many questions were DEFINITELY created by the SMEs?

42. How many questions were DEFINITELY disapproved by Bimal?

A 3

B 4

C 7

D 5

43. The approval ratio of a reviewer is the ratio of the number of questions (s)he approved to the number of questions (s)he reviewed. Which option best describes Amal's approval ratio?

A either 0.25 or 0.75

B 0.25

C lies between 0.25 and 0.50

D lies between 0.25 and 0.75

44. How many questions created by Amal or Bimal were disapproved by at least one of the other reviewers?

A 7

B 4

C 5

D 2

Answers

LRDI

25.**D**	26.**1**	27.**2**	28.**D**	29.**D**	30.**A**	31.**D**	32.**C**
33.**C**	34.**D**	35.**A**	36.**C**	37.**C**	38.**C**	39.**3**	40.**1**
41.**3**	42.**B**	43.**D**	44.**C**				

Explanations

LRDI

25. **D**

Given that each of the bottles contains a volume of 50 ml each.

If 5 ml from bottle A which contains only P is mixed with 5 ml of bottle B and in the resultant mixture the presence of I was detected.

In order to detect the presence of I in this, there must be at least 10% impurity in the 10 ml which is equivalent to 1 ml. This must be from bottle B.

Hence 5 ml of solution from B must contain at least 1ml of impurity and since bottle B is of a total volume of 50 ml. This must contain at least 10 ml of impurity.

26. **1**

The bottles contain either P(pure) or I(impure). The possible cases here are :

1- (P, P, P, P), 2-(P,P,P,I), 3-(P,P,I,I), 4-(P,I,I,I), 5-(I,I,I,I).

In the first case if all the four solutions are pure then taking equal volumes of all the four bottles will get the result to dispatch or not to dispatch.

In the second case if 3 bottles are pure and one impure taking equal volumes of all four bottles and testings will confirm the impurity and hence cannot be dispatched.

In the third case if 2 bottles are pure and two are impure taking equal volumes of all four bottles and testing will confirm the impurity and hence cannot be dispatched.

In the fourth case when only one bottle is pure taking equal volumes of all four bottles will confirm the impurity and hence cannot be dispatched.

In the fifth case if all four bottles are impure taking equal volumes of the four bottles will confirm the impurity and hence cannot be dispatched.

In all the cases a single test is enough to determine if the lot is to be dispatched or not.

27. **2**

The percentage concentration of the impure solution is 80 percent.

When equal volumes of all four solutions are mixed.

Considering 10 ml of each we have impurity to be 2ml/40ml. The impurity concentration is less than 10 percent and hence cannot be recognized.

Similarly when equal volumes of one impure and 2 pure solutions are mixed.

The impurity in the solution is 2ml/30ml which is less than 10 percent and hence cannot be recognized.

Hence for detecting the impure solution we must use equal volumes of 2 solutions at a time.

Considering the three pure solutions to be P and the impure solution to be I.

P, P, P, I.

Considering equal volumes of solution from the bottle one bottle of P, and I. Testing this would recognize the impurity.

After this consider one bottle among the other 2 P bottles which are left and test this with one among the previously tested P, I.

If the one considered is I it will detect the impurity and confirms the bottle to be I.

If the one considered is P it will fail to detect the impurity and hence the other bottle will be I.

Hence a minimum of two tests are required to identify the bottle with the impurity.

28. **D**

The bottles could possibly be :

Case - 1 Pure, Impure, Impure, Impure.

Case-2, Pure , Pure, Impure, Impure.

Since the concentration in the impure bottle is 85 percent.

In case 1 when equal volumes from all the bottles are considered and mixed. The test result detects the impurity..

Since the overall concentration of impurity is greater than 10 percent.

Considering 10 ml from all four bottles.

The impure concentration is 4.5ml/40ml which is greater than 10.(15ml*3 = 4.5ml) (Impurity is detected)

For case 2 when all four bottles are considered. The case here has 2 pure and 2 impure bottles.

When equal volumes from all four bottles are mixed. The resultant concentration of impurity when 10 ml from each of the four solutions is considered :

The impure concentration is 3ml/40ml which is less than 10 percent.. (1.5ml*2 = 3ml). (Impurity is not detected.)

Hence in one possibility the impurity is detected and not detected in the other case. A single test is enough based on the results of which the number of pure and the number of impure bottles can be identified.

29. **D**

The total project month is the number of months Abani, Bahni, Danni, and Tinni individually worked for all the projects combined :

Abani - 2+2+5 = 9 months

Bahni - 2+4+3 = 9 months

Danni - 3+3+2+1 = 9 months

Tinni - 2+2+3+2 = 9 months.

The total employee month for all the five projects is the sum of the total employee-month is the sum of the number of months four employees worked in this project.

Project -1 = 2+2+2 = 6 months

Project -2 = 3+2 = 5 months

Project - 3 = 2+4+3 = 9 months.

Project - 4 = 5+2+3 = 10 months.

Project - 5 = 3+1+2 = 6 months.

Only statement 1 is true.

30. **A**

Abani, Banni, and Danni did not work on multiple projects simultaneously in a month

Tinni was the only person who worked on multiple projects which are project 4 and project 5 in the month of september.

31. **D**

Considering the information provided :

For project 1 : 3 months.

Project - 2: 3 months.

Project - 3: 5 months.

Project - 4: 5 months.

Project - 5: 4 months.

Among the given options option D is true which is project 3, project 4.

31. **D**

Considering the information provided :

For project 1 : 3 months.

Project - 2: 3 months.

Project - 3: 5 months.

Project - 4: 5 months.

Project - 5: 4 months.

Among the given options option D is true which is project 3, project 4.

32. **C**

The annual completion index for different people is :

The weightage average of the completion percentage assigned from the different projects, with the weights being the corresponding number of months (s)he worked in these projects.

For Abani :

$\frac{((100 \cdot 2)+(100 \cdot 2)+(80 \cdot 5))}{2+2+5} = \frac{800}{9}$

For Bahni :

$\frac{((100 \cdot 2)+(75 \cdot 4)+(90 \cdot 3))}{2+3+4} = \frac{770}{9}$

For Danni :

$\frac{((90 \cdot 3)+(100 \cdot 3)+(100 \cdot 2)+(100 \cdot 1))}{2+3+2+1} = \frac{870}{9}$

For Tinni :

$\frac{((80 \cdot 2)+(100 \cdot 2)+(100 \cdot 3)+(100 \cdot 2))}{2+2+3+2} = \frac{860}{9}$

The descending order for the four people is :

Danni, Tinni, Abani, Bahni.

Explanation [33 - 38]:

Let us arrange the players in the order in which they throw in each round.

Round 1: Here the players throw in order of their initial seeds so the order is as follows:

Throw	Player
1	P1
2	P2
3	P3
4	P4
5	P5
6	P6
7	P7
8	P8
9	P9
10	P10

So, their rank at the start of Round 2 is in order of their throws in the first round. Also, we need to consider the same order for people having invalid throws.

Round 2: P2, P4, P8, P10 had the same relative rankings since they all have invalid throws, that is, 0 metres. Rest are arranged as per their throw distances.

Throw	Round 1	Round 2
1	P1	P7
2	P2	P5
3	P3	P9
4	P4	P1
5	P5	P6
6	P6	P3
7	P7	P2
8	P8	P4
9	P9	P8
10	P10	P10

Now, in round 2, only P8 and P10 had valid throws. Hence, their order will change at the start of Round 3, however, the remaining order stays the same. That is, P8 and P10 will move up in the table and occupy some higher places, whereas some of the others may move down consequently.

33. **C**

Round 3: In Round 3, we can see that P1 improved his score from 82.9 to 88.6. The other 2 participants did not improve their scores. Also after Round 3, P8 and P10 qualify, where one of P8 or P10 is at the sixth position. So at the end of Round 3, we can say that P6, P3, P2, and P4 are at the bottom 4 positions(ranks). One of P8 or P10 is at the sixth position. P1 > P7 > P5 > P9.

So at the end of round 3, the ranks are as follows:

P1
P7
P5
P9
P8/P10
P6
P3
P2
P4

The other person between P8/P10 can go anywhere between Rank 1 and Rank 5.

Now let us consider the two players who got a double. Doubles happen in the transition between rounds.

1 -> 2 - Not possible

2 -> 3 - Possible if P10 reaches Rank 1 after round 2.

3 -> 4 - P8/P10 who is the last among qualifying will be the first to throw. So, here it definitely happens.

4 - > 5 AND 5 - > 6 not possible.

So, after Round 2, definitely, P10 reaches the top of the ranking. P8 is at the bottom. Hence, after Round 3, P10 either retains rank 1 or P1 surpasses him and P10 becomes Rank 2.

So, two combinations are possible at the end of Round 3:

P1 - 88.6 + x

P7 - 87.2 + x

P5 - 86.4 + x

P9 - 84.1 + x

The differences do not satisfy the condition. Hence, case 1 is invalidated.

Case 2: Here, P1 definitely wins a medal, and P10 does not. So, two of P7, P5 and P9 jumps above P10. Now, if

we have three different people increasing their scores or distances in each of the three rounds, again we would not get a difference of 1 among the Gold, Silver and Bronze medallists. Hence, one of them increases his score twice and the other increases his score twice and none of them is P1.

Let us take the cases where P1 is individually the G, S and B medallists.

Case 1: P1 is a G medallist.

P1 - 88.6

The silver medallist is 87.6 and the bronze medallist is 86.6 metres. However, P10 has thrown for a distance that is greater than 87.2 metres. Hence, in this case, he would be the B medallist. Hence, this is not the right case.

Case 2: P1 is the S medallist.

P1 - 88.6

G - 89.6

B - 87.6

Now, if we see the differences

89.6 - 87.2 = 2.4

87.6 - 86.4 = 1.2

This satisfies the condition that P7 has increased his score twice to become the gold winner and P5 has increased it once to become the bronze winner.

Hence, P1 - Silver

P7 - Gold

P5 - Bronze

Hence, P8 and P10 got the doubles.

34. **D**

ently.

Round 3: In Round 3, we can see that P1 improved his score from 82.9 to 88.6. The other 2 participants did not improve their scores. Also after Round 3, P8 and P10 qualify, where one of P8 or P10 is at the sixth position. So at the end of Round 3, we can say that P6, P3, P2, and P4 are at the bottom 4 positions(ranks). One of P8 or P10 is at the sixth position. P1 > P7 > P5 > P9.

So at the end of round 3, the ranks are as follows:

P1
P7
P5
P9
P8/P10
P6
P3
P2
P4

The other person between P8/P10 can go anywhere between Rank 1 and Rank 5.

Now let us consider the two players who got a double. Doubles happen in the transition between rounds.

1 -> 2 - Not possible

2 -> 3 - Possible if P10 reaches Rank 1 after round 2.

3 -> 4 - P8/P10 who is the last among qualifying will be the first to throw. So, here it definitely happens.

4 - > 5 AND 5 - > 6 not possible.

So, after Round 2, definitely, P10 reaches the top of the ranking. P8 is at the bottom. Hence, after Round 3, P10

either retains rank 1 or P1 surpasses him and P10 becomes Rank 2.

So, two combinations are possible at the end of Round 3:

Rank after Round 3	
Case 1	Case 2
P10	P1
P1	P10
P7	P7
P5	P5
P9	P9
P8	P8

Now, we know that in each of the rounds in phase 2, only one player improves his score. Also, P8 and P10 cannot win medals. Hence, in case 1, three of P1, P7, P5 and P9 will improve their scores by x and reach the top 3 positions. However, the top 3 positions' distances are in AP.

P1 - 88.6 + x

P7 - 87.2 + x

P5 - 86.4 + x

P9 - 84.1 + x

The differences do not satisfy the condition. Hence, case 1 is invalidated.

Case 2: Here, P1 definitely wins a medal, and P10 does not. So, two of P7, P5 and P9 jumps above P10. Now, if we have three different people increasing their scores or distances in each of the three rounds, again we would not get a difference of 1 among the Gold, Silver and Bronze medallists. Hence, one of them increases his score twice and the other increases his score twice and none of them is P1.

Let us take the cases where P1 is individually the G, S and B medallists.

Case 1: P1 is a G medallist.

P1 - 88.6

The silver medallist is 87.6 and the bronze medallist is 86.6 metres. However, P10 has thrown for a distance that is greater than 87.2 metres. Hence, in this case, he would be the B medallist. Hence, this is not the right case.

Case 2: P1 is the S medallist.

P1 - 88.6

G - 89.6

B - 87.6

Now, if we see the differences

89.6 - 87.2 = 2.4

87.6 - 86.4 = 1.2

This satisfies the condition that P7 has increased his score twice to become the gold winner and P5 has increased it once to become the bronze winner.

Hence, P1 - Silver

P7 - Gold

P5 - Bronze

Hence, P1 won the silver medal.

35. **A**

ently.

Round 3: In Round 3, we can see that P1 improved his score from 82.9 to 88.6. The other 2 participants did not improve their scores. Also after Round 3, P8 and P10 qualify, where one of P8 or P10 is at the sixth position. So at the end of Round 3, we can say that P6, P3, P2, and P4 are at the bottom 4 positions(ranks). One of P8 or P10 is at the sixth position. P1 > P7 > P5 > P9.

So at the end of round 3, the ranks are as follows:

P1
P7
P5
P9
P8/P10
P6
P3
P2
P4

The other person between P8/P10 can go anywhere between Rank 1 and Rank 5.

Now let us consider the two players who got a double. Doubles happen in the transition between rounds.

1 -> 2 - Not possible

2 -> 3 - Possible if P10 reaches Rank 1 after round 2.

3 -> 4 - P8/P10 who is the last among qualifying will be the first to throw. So, here it definitely happens.

4 - > 5 AND 5 - > 6 not possible.

So, after Round 2, definitely, P10 reaches the top of the ranking. P8 is at the bottom. Hence, after Round 3, P10 either retains rank 1 or P1 surpasses him and P10 becomes Rank 2.

So, two combinations are possible at the end of Round 3:

Rank after Round 3	
Case 1	Case 2
P10	P1
P1	P10
P7	P7
P5	P5
P9	P9
P8	P8

Now, we know that in each of the rounds in phase 2, only one player improves his score. Also, P8 and P10 cannot win medals. Hence, in case 1, three of P1, P7, P5 and P9 will improve their scores by x and reach the top 3 positions. However, the top 3 positions' distances are in AP.

P1 - 88.6 + x

P7 - 87.2 + x

P5 - 86.4 + x

P9 - 84.1 + x

The differences do not satisfy the condition. Hence, case 1 is invalidated.

Case 2: Here, P1 definitely wins a medal, and P10 does not. So, two of P7, P5 and P9 jumps above P10. Now, if we have three different people increasing their scores or distances in each of the three rounds, again we would not get a difference of 1 among the Gold, Silver and Bronze medallists. Hence, one of them increases his score twice and the other increases his score twice and none of them is P1.

Let us take the cases where P1 is individually the G, S and B medallists.

Case 1: P1 is a G medallist.

P1 - 88.6

The silver medallist is 87.6 and the bronze medallist is 86.6 metres. However, P10 has thrown for a distance that is greater than 87.2 metres. Hence, in this case, he would be the B medallist. Hence, this is not the right case.

Case 2: P1 is the S medallist.

P1 - 88.6

G - 89.6

B - 87.6

Now, if we see the differences

89.6 - 87.2 = 2.4

87.6 - 86.4 = 1.2

This satisfies the condition that P7 has increased his score twice to become the gold winner and P5 has increased it once to become the bronze winner.

Hence, P1 - Silver

P7 - Gold

P5 - Bronze

P7 the gold winner had already received rank 1 at the end of Round 5. Hence, he was the last one to throw in the tournament.

36. **C**
ently.

Round 3: In Round 3, we can see that P1 improved his score from 82.9 to 88.6. The other 2 participants did not improve their scores. Also after Round 3, P8 and P10 qualify, where one of P8 or P10 is at the sixth position. So at the end of Round 3, we can say that P6, P3, P2, and P4 are at the bottom 4 positions(ranks). One of P8 or P10 is at the sixth position. P1 > P7 > P5 > P9.

So at the end of round 3, the ranks are as follows:

P1
P7
P5
P9
P8/P10
P6
P3
P2
P4

The other person between P8/P10 can go anywhere between Rank 1 and Rank 5.

Now let us consider the two players who got a double. Doubles happen in the transition between rounds.

1 -> 2 - Not possible

2 -> 3 - Possible if P10 reaches Rank 1 after round 2.

3 -> 4 - P8/P10 who is the last among qualifying will be the first to throw. So, here it definitely happens.

4 - > 5 AND 5 - > 6 not possible.

So, after Round 2, definitely, P10 reaches the top of the ranking. P8 is at the bottom. Hence, after Round 3, P10 either retains rank 1 or P1 surpasses him and P10 becomes Rank 2.

So, two combinations are possible at the end of Round 3:

Rank after Round 3	
Case 1	Case 2
P10	P1
P1	P10
P7	P7
P5	P5
P9	P9
P8	P8

Now, we know that in each of the rounds in phase 2, only one player improves his score. Also, P8 and P10 cannot win medals. Hence, in case 1, three of P1, P7, P5 and P9 will improve their scores by x and reach the top 3 positions. However, the top 3 positions' distances are in AP.

P1 - 88.6 + x

P7 - 87.2 + x

P5 - 86.4 + x

P9 - 84.1 + x

The differences do not satisfy the condition. Hence, case 1 is invalidated.

Case 2: Here, P1 definitely wins a medal, and P10 does not. So, two of P7, P5 and P9 jumps above P10. Now, if we have three different people increasing their scores or distances in each of the three rounds, again we would not get a difference of 1 among the Gold, Silver and Bronze medallists. Hence, one of them increases his score twice and the other increases his score twice and none of them is P1.

Let us take the cases where P1 is individually the G, S and B medallists.

Case 1: P1 is a G medallist.

P1 - 88.6

The silver medallist is 87.6 and the bronze medallist is 86.6 metres. However, P10 has thrown for a distance that is greater than 87.2 metres. Hence, in this case, he would be the B medallist. Hence, this is not the right case.

Case 2: P1 is the S medallist.

P1 - 88.6

G - 89.6

B - 87.6

Now, if we see the differences

89.6 - 87.2 = 2.4

87.6 - 86.4 = 1.2

This satisfies the condition that P7 has increased his score twice to become the gold winner and P5 has increased it once to become the bronze winner.

Hence, P1 - Silver

P7 - Gold

P5 - Bronze

P1 - 88.6 m.

37. **C**
ently.

Round 3: In Round 3, we can see that P1 improved his score from 82.9 to 88.6. The other 2 participants did not improve their scores. Also after Round 3, P8 and P10 qualify, where one of P8 or P10 is at the sixth position. So at the end of Round 3, we can say that P6, P3, P2, and P4 are at the bottom 4 positions(ranks). One of P8 or P10 is at the sixth position. P1 > P7 > P5 > P9.

So at the end of round 3, the ranks are as follows:

P1
P7
P5
P9
P8/P10
P6
P3
P2
P4

The other person between P8/P10 can go anywhere between Rank 1 and Rank 5.

Now let us consider the two players who got a double. Doubles happen in the transition between rounds.

1 -> 2 - Not possible

2 -> 3 - Possible if P10 reaches Rank 1 after round 2.

3 -> 4 - P8/P10 who is the last among qualifying will be the first to throw. So, here it definitely happens.

4 - > 5 AND 5 - > 6 not possible.

So, after Round 2, definitely, P10 reaches the top of the ranking. P8 is at the bottom. Hence, after Round 3, P10 either retains rank 1 or P1 surpasses him and P10 becomes Rank 2.

So, two combinations are possible at the end of Round 3:

Rank after Round 3	
Case 1	Case 2
P10	P1
P1	P10
P7	P7
P5	P5
P9	P9
P8	P8

Now, we know that in each of the rounds in phase 2, only one player improves his score. Also, P8 and P10 cannot win medals. Hence, in case 1, three of P1, P7, P5 and P9 will improve their scores by x and reach the top 3 positions. However, the top 3 positions' distances are in AP.

P1 - 88.6 + x

P7 - 87.2 + x

P5 - 86.4 + x

P9 - 84.1 + x

The differences do not satisfy the condition. Hence, case 1 is invalidated.

Case 2: Here, P1 definitely wins a medal, and P10 does not. So, two of P7, P5 and P9 jumps above P10. Now, if we have three different people increasing their scores or distances in each of the three rounds, again we would not get a difference of 1 among the Gold, Silver and Bronze medallists. Hence, one of them increases his score twice and the other increases his score twice and none of them is P1.

Let us take the cases where P1 is individually the G, S and B medallists.

Case 1: P1 is a G medallist.

P1 - 88.6

The silver medallist is 87.6 and the bronze medallist is 86.6 metres. However, P10 has thrown for a distance that is greater than 87.2 metres. Hence, in this case, he would be the B medallist. Hence, this is not the right case.

Case 2: P1 is the S medallist.

P1 - 88.6

G - 89.6

B - 87.6

Now, if we see the differences

89.6 - 87.2 = 2.4

87.6 - 86.4 = 1.2

This satisfies the condition that P7 has increased his score twice to become the gold winner and P5 has increased it once to become the bronze winner.

Hence, P1 - Silver

P7 - Gold

P5 - Bronze

P8 comes between P9 and P6.

Hence, 82. 5 < P8 < 84.1

P8 = 82.7

38. **C**
ently.

Round 3: In Round 3, we can see that P1 improved his score from 82.9 to 88.6. The other 2 participants did not improve their scores. Also after Round 3, P8 and P10 qualify, where one of P8 or P10 is at the sixth position. So at the end of Round 3, we can say that P6, P3, P2, and P4 are at the bottom 4 positions(ranks). One of P8 or P10 is at the sixth position. P1 > P7 > P5 > P9.

So at the end of round 3, the ranks are as follows:

P1
P7
P5
P9
P8/P10
P6
P3
P2
P4

The other person between P8/P10 can go anywhere between Rank 1 and Rank 5.

Now let us consider the two players who got a double. Doubles happen in the transition between rounds.

1 -> 2 - Not possible

2 -> 3 - Possible if P10 reaches Rank 1 after round 2.

3 -> 4 - P8/P10 who is the last among qualifying will be the first to throw. So, here it definitely happens.

4 - > 5 AND 5 - > 6 not possible.

So, after Round 2, definitely, P10 reaches the top of the ranking. P8 is at the bottom. Hence, after Round 3, P10 either retains rank 1 or P1 surpasses him and P10 becomes Rank 2.

So, two combinations are possible at the end of Round 3:

Rank after Round 3	
Case 1	Case 2
P10	P1
P1	P10
P7	P7
P5	P5
P9	P9
P8	P8

Now, we know that in each of the rounds in phase 2, only one player improves his score. Also, P8 and P10 cannot win medals. Hence, in case 1, three of P1, P7, P5 and P9 will improve their scores by x and reach the top 3 positions. However, the top 3 positions' distances are in AP.

P1 - 88.6 + x

P7 - 87.2 + x

P5 - 86.4 + x

P9 - 84.1 + x

The differences do not satisfy the condition. Hence, case 1 is invalidated.

Case 2: Here, P1 definitely wins a medal, and P10 does not. So, two of P7, P5 and P9 jumps above P10. Now, if we have three different people increasing their scores or distances in each of the three rounds, again we would not get a difference of 1 among the Gold, Silver and Bronze medallists. Hence, one of them increases his score twice and the other increases his score twice and none of them is P1.

Let us take the cases where P1 is individually the G, S and B medallists.

Case 1: P1 is a G medallist.

P1 - 88.6

The silver medallist is 87.6 and the bronze medallist is 86.6 metres. However, P10 has thrown for a distance that is greater than 87.2 metres. Hence, in this case, he would be the B medallist. Hence, this is not the right case.

Case 2: P1 is the S medallist.

P1 - 88.6

G - 89.6

B - 87.6

Now, if we see the differences

89.6 - 87.2 = 2.4

87.6 - 86.4 = 1.2

This satisfies the condition that P7 has increased his score twice to become the gold winner and P5 has increased it once to become the bronze winner.

Hence, P1 - Silver

P7 - Gold

P5 - Bronze

P7 improved by a total of 2.4.

Explanation [39 - 44]:
For a question created by externals(SME), the minimum number of reviews required is two and the maximum number of reviews is three to confirm the acceptance or the rejection.

For a question created by anyone among Amal, Bimal, Komal a question can be reviewed after one review or two reviews.

The information provided states :

Q02, Q06, Q09, Q11, and Q12 were rejected. Q01, Q03, Q04, Q05, Q07, Q08, Q10, Q13 were accepted.

For the questions :

Amal - Q02, Q03, Q04, Q06, Q08, Q10, Q11, and Q13.
Bimal - Q02, Q04, Q06, Q07, Q08, Q09, Q12, and Q13.

Komal - Q01, Q02, Q03, Q04, Q05, Q07, Q08, Q09, Q11, and Q12.

Q01 is reviewed by only Komal and is accepted hence Bimal must have prepared the question as it was accepted in a single review. (Bimal)

Q02-is reviewed by Amal, Bimal, and Komal and was rejected this has a possibility of being prepared by an external person and faced rejection by one among Amal and Bimal and Komal. (SME).

Q03-Was accepted and reviewed by Amal, Komal and hence must have been prepared by Bimal(Bimal).

Q04- Accepted and reviewed by the three of them and hence must have been prepared by an external expert. (SME).

Q05-Only reviewed by Komal and is accepted and hence must be prepared by Bimal. (Bimal)

Q06-Rejected and reviewed by Amal and Bimal. Hence could have been prepared by Komal or External and rejected by Bimal and Amal. (Komal/SME).

Q07-Accepted and reviewed by Bimal and Komal. Hence must have been prepared by Amal. (Amal).

Q08- Reviewed by Amal, Bimal, and Komal and is accepted. Hence must have been prepared by SME. (SME)

Q09- Reviewed by Bimal and Komal and is rejected. It must have been prepared by Amal and was rejected by both of them. (Amal).

Q10- Was reviewed by Amal and was accepted. Must have been prepared by Komal. (Komal)

Q11- Reviewed by Amal and Komal and was rejected. Must have been prepared by Bimal and rejected by both Amal and Komal. (Bimal)

Q12- Reviewed by Bimal and Komal and was rejected. Must have been prepared by Amal and was rejected by both Bimal and Komal. (Amal).

Q13- Reviewed by Amal and Bimal and was accepted. The question could have been prepared by Komal or SME. (Komal/SME).

39. **3**

Amal definitely prepared questions Q07, Q09, Q12.

40. **1**

Q10 was definitely prepared by Komal.

41. **3**

Q02, Q04, Q08 were prepared SME

42. **B**

Q02-is reviewed by Amal, Bimal, and Komal and was rejected this has a possibility of being prepared by an external person and faced rejection by one among Amal and Bimal and Komal. (SME).

Q03-Was accepted and reviewed by Amal, Komal and hence must have been prepared by Bimal(Bimal).

Q04- Accepted and reviewed by the three of them and hence must have been prepared by an external expert. (SME).

Q05-Only reviewed by Komal and is accepted and hence must be prepared by Bimal. (Bimal)

Q06-Rejected and reviewed by Amal and Bimal. Hence could have been prepared by Komal or External and rejected by Bimal and Amal. (Komal/SME).

Q07-Accepted and reviewed by Bimal and Komal. Hence must have been prepared by Amal. (Amal).

Q08- Reviewed by Amal, Bimal, and Komal and is accepted. Hence must have been prepared by SME. (SME)

Q09- Reviewed by Bimal and Komal and is rejected. It must have been prepared by Amal and was rejected by both of them. (Amal).

Q10- Was reviewed by Amal and was accepted. Must have been prepared by Komal. (Komal)

Q11- Reviewed by Amal and Komal and was rejected. Must have been prepared by Bimal and rejected by both Amal and Komal. (Bimal)

Q12- Reviewed by Bimal and Komal and was rejected. Must have been prepared by Amal and was rejected by both Bimal and Komal. (Amal).

Q13- Reviewed by Amal and Bimal and was accepted. The question could have been prepared by Komal or SME. (Komal/SME).

Q06 irrespective of the question prepared by Komal/SME Bimal must reject the question.

Q07, Q09, Q12 are prepared by Amal and were reviewed by Bimal first and Komal next for this to happen Bimal must reject these questions.

Hence a total of four questions were rejected by Bimal.

43. **D**

Amal reviewed the questions :

Q02, Q03, Q04, Q06, Q08, Q10, Q11, and Q13.

For Q2 - Amal can either approve or reject the question.

For Q3- Amal must approve the question.

For Q4 -Amal can either approve or reject the question.

For Q06 - Amal must reject the question.

For Q08 - Amal can either approve or reject the question.

For Q10 - Amal must approve the question.

For Q11 - Amal must reject the question.

For Q13- Amal can either approve or reject the question.

The approval ratio has a minimum of 2 questions only Q3, Q10, and a maximum of 6 questions Q02, Q3, Q04, Q08, Q10, Q13.

Hence 2/8 = 0.25 to 6/8 = 0.75

44. **C**

Amal could have possibly created the questions :

Q07, Q09, Q12 of which all three of them were reviewed by two people each, and hence they must have been rejected by the first reviewer.

Bimal could have created the questions :

Q01, Q03, Q05, Q 11.

Q01, Q05 are reviewed only by Komal and hence did not have any rejection.

Q03, Q11 faced at least one rejection.

Hence a total of five questions.