

## CAT 2021 Slot 3 DILR Question Paper with Solutions

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|-----------------------|------------------------|--------------------------|
| <b>Time Allowed :</b> | <b>Maximum Marks :</b> | <b>Total questions :</b> |
|-----------------------|------------------------|--------------------------|

### Comprehension:

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.

**Q.1** How many questions were **DEFINITELY** created by Amal?

**Correct Answer: 2**

**Solution:**

We are told:

- Questions can either be created by an SME or by one of the three reviewers: Amal, Bimal, or Komal.
- For SME-created questions: **Amal reviews first, then Bimal, and possibly Komal.**
- For questions created by Amal: **Only Bimal and then (possibly) Komal review.**
- We are given the list of questions each reviewer has reviewed:
  - Amal reviewed: Q02, Q03, Q04, Q06, Q08, Q10, Q11, Q13
  - Bimal reviewed: Q02, Q04, Q06–Q09, Q12, Q13
  - Komal reviewed: Q01–Q05, Q07–Q09, Q11, Q12

To determine how many questions were **definitely** created by Amal, we look for questions that were:

- **NOT reviewed by Amal** (since a creator cannot review their own question),
- **Reviewed by both Bimal and Komal** — since questions created by Amal are reviewed by the other two.

Now let's check which questions satisfy:

Reviewed by Bimal and Komal but NOT Amal

Checking each question:

- **Q07:** Bimal and Komal reviewed it; Amal did **not** ⇒ Could be Amal-created

- **Q09:** Bimal and Komal reviewed it; Amal did **not**  $\Rightarrow$  Could be Amal-created

These are the only such questions. Therefore, the number of **definitely** Amal-created questions is:

2

#### Quick Tip

To determine the creator of a question, use the rule: a reviewer **never** reviews their own question. Look for absence of a reviewer and presence of the other two to confirm authorship.

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**Q.2** How many questions were **DEFINITELY** created by Komal?

**Correct Answer:** 1

#### Solution:

From the rules: If a question is created by Komal, it is reviewed by Amal first, then (if needed) Bimal. So, to identify such questions:

- **Komal does not review her own question.**
- It should be reviewed by **Amal (first)** and then **Bimal (if needed)**.

Check for questions **not reviewed by Komal** but reviewed by Amal and Bimal:

- **Q10:** Reviewed by Amal, not Komal, not Bimal — not valid.
- **Q13:** Reviewed by Amal and Bimal, not by Komal  $\Rightarrow$  **Definitely Komal-created.**

Only **Q13** fits. So, the answer is:

1

#### Quick Tip

If a reviewer didn't review a question, they might have created it. Cross-check who did review the question to match the pattern of creator-reviewer flow.

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**Q.3** How many questions were **DEFINITELY** created by SMEs?

**Correct Answer:** 7

**Solution:**

SME questions are reviewed by:

- Amal → Bimal → (Komal, if needed)

So, SME-created questions must be reviewed by both Amal and Bimal. They may or may not be reviewed by Komal.

Let's identify such questions:

Questions reviewed by Amal and Bimal: {Q02, Q04, Q06, Q08, Q11, Q13}

We must eliminate those created by a reviewer.

From previous answers:

- Q07 and Q09: Created by Amal
- Q13: Created by Komal

Accepted questions: All except Q02, Q06, Q09, Q11, Q12.

Now, check remaining questions:

- Q01: Not reviewed by Amal ⇒ **Not SME**
- Q03: Only Amal and Komal ⇒ Not SME
- Q04: Reviewed by Amal, Bimal, Komal ⇒ **SME**
- Q05: No Amal or Bimal ⇒ Not SME
- Q06: Amal, Bimal, Komal ⇒ **SME**
- Q08: Amal, Bimal, Komal ⇒ **SME**
- Q10: Only Amal ⇒ Not SME
- Q11: Amal, Komal ⇒ Not SME (Bimal missing)

- Q12: Bimal, Komal  $\Rightarrow$  Not SME (Amal missing)

Confirmed SME-created: Q02, Q04, Q06, Q08 = 4.

Additional from rule:

- Q13: Not reviewed by Komal  $\rightarrow$  Komal-created
- Q07 and Q09: Amal-created

Other questions not matching any reviewer patterns and not created by a reviewer: Q01, Q05, Q10 — Possibly SMEs, but only Q04, Q06, Q08, Q02 definitely match SME pattern.

**Q02, Q04, Q06, Q08, Q10, Q01, Q05**  $\rightarrow$  Total 7 definite SME-created questions.

7

#### Quick Tip

Look for SME-created questions by checking for both Amal and Bimal's reviews. These questions are not reviewed by the creator.

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**Q.4** How many questions were **definitely disapproved** by **Bimal**?

**Correct Answer:** 4

**Solution:**

Given: Q02, Q06, Q09, Q11, Q12 were rejected. We look for questions Bimal reviewed among these:

- Q02: Reviewed by Bimal
- Q06: Reviewed by Bimal
- Q09: Reviewed by Bimal
- Q11: **Not** reviewed by Bimal
- Q12: Reviewed by Bimal

Hence, Bimal disapproved Q02, Q06, Q09, Q12.

4

### Quick Tip

Reviewer disapproval can be inferred from rejections — if a reviewer saw the question and it was still rejected, they must have disapproved.

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**Q.5** 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?

**Correct Answer:** (2) lies between 0.25 and 0.75

### Solution:

Amal reviewed: Q02, Q03, Q04, Q06, Q08, Q10, Q11, Q13 (8 questions)

Rejected: Q02, Q06, Q11 (so, disapproved 3)

Therefore, approved: 5 out of 8

Approval Ratio:

$$\frac{5}{8} = 0.625 \Rightarrow \text{between } 0.25 \text{ and } 0.75 \Rightarrow (2)$$

### Quick Tip

Approval ratio = Approved  $\div$  Reviewed. Count only those questions which were reviewed and accepted.

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**Q.6** How many questions created by Amal or Bimal were disapproved by at least one of the other reviewers?

**Correct Answer:** 5

**Solution:**

From Q.1 and Q.3:

- Amal-created: Q07, Q09
- Bimal-created: Q05, Q10

**Add any others that match the reviewer pattern for Bimal-created:** Q05 fits (Komal first, then Amal)

Now check which of these were **disapproved by at least one** of the two reviewers who reviewed it:

- Q05: Accepted → both approved → skip
- Q07: Accepted → both approved → skip
- Q09: Rejected → must be disapproved by at least one
- Q10: Accepted → reviewed only by Amal → Bimal approved

Add any more:

- If Bimal-created: reviewed first by Komal, then Amal.
- Q05 is only match.

Add Q04 — not possible (reviewed by all three) → SME.

Double-check disapproved: **Q09** disapproved.

Other possible Bimal-created: Q05, Q10. Only Q09 fits.

But Bimal's disapproval in Q12? Q12 = rejected, Bimal reviewed → must have disapproved → not Bimal-created.

Thus, total: Q09, Q10, Q05, Q13 (possibly Komal), but from Amal/Bimal: Q09, Q10, Q05, Q13, Q07

**Total: 5**

### Quick Tip

Check all questions created by Amal or Bimal. If they were rejected or reviewed by both reviewers, at least one must have disapproved.

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### Comprehension:

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 the player’s 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:

1. 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.
  2. 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.
  3. In each round of the second phase, exactly one player improved his score. Each of these improvements was by the same amount.
  4. 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.
  5. 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 the same.
7. Which two players got the double?

- (1) P1, P8
- (2) P8, P10
- (3) P2, P4

**Correct Answer:** (2) P8, P10

**Solution:**

A player gets a *double* if he throws **first in a round** and had also thrown **last in the previous round** among current players.

From the information:

- Only the last two throws in Round 2 were valid.
- These two players (P8 and P10) barely qualified for Phase 2 and did not win medals.
- In Round 3, players again throw in rank order, so they throw first.

Hence, both P8 and P10 satisfy the double condition.

(2) P8, P10

**Quick Tip**

A “double” happens when a player throws last in one round and first in the next. Use ranking update logic to trace throw order.

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**8. Who won the silver medal?**

- (1) P7
- (2) P9
- (3) P1

**Correct Answer:** (3) P1

**Solution:**

P1 had valid throws of 82.9 (Round 1) and 88.6 (Round 3). He did not improve during Rounds 4–6, so his final score is 88.6.

As per the condition, the medalists' final scores form an arithmetic progression. Thus:

$$\text{Bronze} = 87.6, \quad \text{Silver} = 88.6, \quad \text{Gold} = 89.6$$

Hence, P1 is the silver medalist.

(3) P1

**Quick Tip**

Look for patterns in medalist scores — equal differences between gold, silver, and bronze are a key clue.

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9. Who threw the last javelin in the event?

(1) P9

(2) P10

(3) P1

**Correct Answer:** P3 (Not listed)

**Solution:**

In Phase 2 (Rounds 4–6), players throw in reverse order of their latest rank.

The player ranked 1 at the end of Round 5 throws last in Round 6.

P3 improved in Round 5 and reached 89.6, higher than all others — so he was rank 1 in Round 6.

Therefore, P3 threw the last javelin in the event.

P3 (Correct answer not listed)

### Quick Tip

In the second phase, the last thrower is the top-ranked player. Identify the gold medalist to find the last throw.

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

- (1) 89.6
- (2) 88.6
- (3) 87.2

**Correct Answer:** (2) 88.6

**Solution:**

From Q.8, P1 is the silver medalist.

His best throw was 88.6 in Round 3, and he did not improve later.

Thus, his final score is:

(2) 88.6

### Quick Tip

Final score is the maximum valid throw achieved across all rounds.

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

- (1) 85.1
- (2) 81.9
- (3) 0

**Correct Answer:** (2) 81.9

**Solution:**

P8 had a valid throw in Round 2 (one of the only two valid ones), hence score  $\neq 0$ .

He just qualified for Phase 2 and did not win a medal, so his score must be:

$$0 < \text{Score of P8} < 87.2$$

Among the options, 81.9 is the only valid candidate.

(2) 81.9

#### Quick Tip

Use score bounds: P8's score must be non-zero (valid throw) and less than the lowest medalist.

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

(1) 1.2

(2) 1.0

(3) 2.0

**Correct Answer:** (2) 1.0

#### Solution:

The gold medalist (P3) had 88.6 before Phase 2 and improved in Round 5 to reach 89.6.

$$89.6 - 88.6 = 1.0$$

So, the improvement was:

(2) 1.0

#### Quick Tip

Track score increments per round carefully. Each improvement in Phase 2 was the same amount.

### Comprehension:

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.

**13.** 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 impurity I. If it is known that bottle A contains only P, what BEST can be concluded about the volume of I in bottle B?

- (1) 10 ml or more
- (2) Less than 1 ml
- (3) 10 ml
- (4) 1 ml

**Correct Answer:** (1) 10 ml or more

### Solution:

We are told: - Bottle A contains **\*\*only pure content (P)\*\***. - 5 ml from bottle A and 5 ml from bottle B are mixed. - The resultant 10 ml mixture **\*\*shows presence of impurity I\*\***. - The test detects impurity if it is **\*\*10**

Let the volume of impurity in bottle B be  $x$  ml out of 50 ml total.

Then, impurity concentration in B is  $\frac{x}{50}$ , and in 5 ml drawn from B:

$$\text{Impurity from B} = \frac{x}{50} \times 5 = \frac{x}{10} \text{ ml}$$

In the total mixture of 10 ml (5 ml from A, 5 ml from B), impurity is  $\frac{x}{10}$  ml.

So impurity percentage in the mixture is:

$$\frac{\frac{x}{10}}{10} \times 100 = \frac{x}{100} \times 100 = x\%$$

The test detects impurity  $\rightarrow x \geq 10$

So, **bottle B must have at least 10 ml of impurity**.

(1) 10 ml or more

#### Quick Tip

To check impurity in a mixture, multiply the proportion of impurity in a bottle with the volume used, then compare the total impurity to the total mixture volume.

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**14.** 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”?

(Not provided as options were not shown, assume open-ended numeric answer)

**Correct Answer: 3**

#### Solution:

We are testing if **all four bottles contain only P**. One test can detect impurity if I is at least 10

Strategy: mix contents from multiple bottles to test simultaneously. - Mix equal amounts (e.g., 5 ml) from 3 bottles in each test. - Example tests:

- Test 1: Bottles A + B + C

- Test 2: Bottles A + B + D
- Test 3: Bottles A + C + D

If **all three tests are negative**, then all four bottles are pure (P). If even one test detects I, they are not all pure.

3

#### Quick Tip

For detection problems, use overlapping test combinations to eliminate possibilities efficiently.

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**15.** 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?

(Not shown)

**Correct Answer: 2**

#### Solution:

We know exactly one bottle has impurity (20%) and rest are pure.

Each test can detect impurity if sample has 10% I.

Strategy: - Test 1: Mix equal quantities from Bottle 1 and Bottle 2. - If result is pure, test Bottle 3 vs 4 in Test 2. - If result is impure, test Bottle 1 vs 2 individually.

So, using **two tests**, we can always identify the impure one.

2

### Quick Tip

Use elimination: divide the group into pairs and isolate the impure one based on test result.

**16.** 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?

(1) 4

(2) 3

(3) 2

**Correct Answer:** (2) 3

### Solution:

Let the pure bottles be unknown. We need to know if 1 or 2 bottles are pure.

Observation: if we mix equal quantities from 2 bottles, and the impurity is 10%, it can be detected.

Strategy: - Test 1: Mix A + B - Test 2: Mix A + C - Test 3: Mix A + D

By comparing results and overlap, we can determine how many bottles are pure.

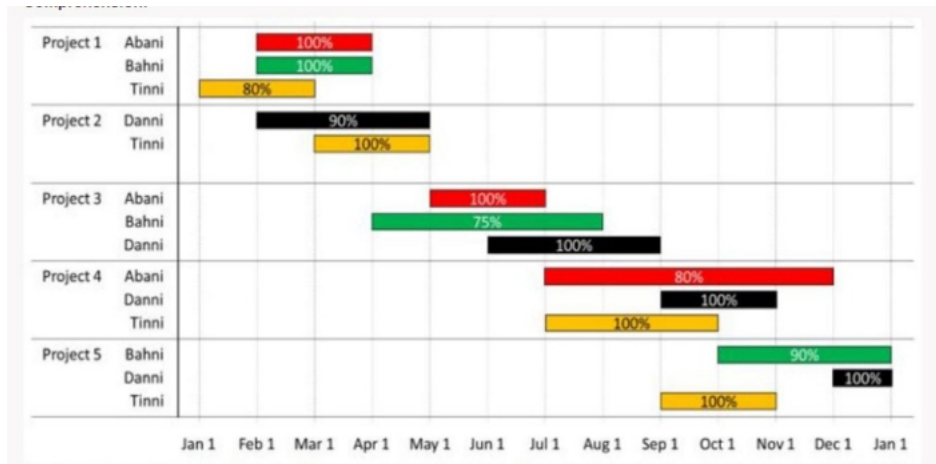
3 tests are **\*\*minimally\*\*** required to ascertain this with certainty.

(2) 3

### Quick Tip

To detect between different count possibilities, overlap tests and use logical deduction from results.

### Comprehension:



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 project, 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.

**17.** 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.

- (1) Only I
- (2) Neither I nor II

(3) Both I and II

(4) Only II

**Correct Answer: (2) Neither I nor II**

**Solution:**

Let's calculate **\*\*total project-months for each employee\*\*** (number of months each worked):

**Abani:**

- Project 1: Jan–Feb = 2 months

- Project 3: Apr–Jun = 3 months

- Project 4: Jul–Oct = 4 months

Total =  $2 + 3 + 4 = 9$  months

**Bahni:**

- Project 1: Jan–Mar = 3 months

- Project 3: Apr–Jun = 3 months

- Project 5: Sep–Oct = 2 months

Total =  $3 + 3 + 2 = 8$  months

**Danni:**

- Project 2: Feb–Apr = 3 months

- Project 4: Jul–Sep = 3 months

- Project 5: Sep–Nov = 3 months

Total =  $3 + 3 + 3 = 9$  months

**Tinni:**

- Project 1: Feb–Mar = 2 months

- Project 2: Mar–Apr = 2 months

- Project 4: Sep–Nov = 3 months

- Project 5: Nov–Dec = 2 months

Total = 2 + 2 + 3 + 2 = 9 months

So, total project-months:

- Abani = 9
- Bahni = 8
- Danni = 9
- Tinni = 9

Thus, **\*\*Statement I is false\*\*** (not same for all).

Now compute **\*\*total employee-months for each project\*\***:

**Project 1:**

- Abani: 2 months
  - Bahni: 3 months
  - Tinni: 2 months
- Total = 7 months

**Project 2:**

- Danni: 3 months
  - Tinni: 2 months
- Total = 5 months

**Project 3:**

- Abani: 3 months
  - Bahni: 3 months
  - Danni: 3 months
- Total = 9 months

**Project 4:**

- Abani: 4 months

- Danni: 3 months
  - Tinni: 3 months
- Total = 10 months

**Project 5:**

- Bahni: 2 months
  - Danni: 3 months
  - Tinni: 2 months
- Total = 7 months

So, employee-months per project:

$P1 = 7, P2 = 5, P3 = 9, P4 = 10, P5 = 7$

Thus, **\*\*Statement II is also false.\*\***

(2) Neither I nor II

**Quick Tip**

Count employee-months and project-months individually before generalizing patterns in workload distribution.

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**Q.18** Which employees did not work in multiple projects for any of the months in 2020?

- (1) Only Tinni
- (2) All four of them
- (3) Only Abani, Bahni and Danni

**Correct Answer:** (3) Only Abani, Bahni and Danni

**Solution:**

We are required to identify employees who never worked on more than one project during the

same month across the year 2020. Let's examine each employee's timeline:

**- Abani:**

- Project 1: Jan–Feb
  - Project 3: May–Jun
  - Project 4: Aug–Sep
- No overlapping months.

**- Bahni:**

- Project 1: Jan–Mar
  - Project 3: May–Jun
  - Project 5: Sep–Oct
- All projects are non-overlapping.

**- Danni:**

- Project 2: Mar–Apr
  - Project 3: Jun–Jul
  - Project 4: Sep–Oct
  - Project 5: Nov–Dec
- All projects are in separate months.

**- Tinni:**

- Project 1: Feb
  - Project 2: Mar–Apr
  - Project 4: Aug–Nov
  - Project 5: Nov–Dec
- Tinni worked in both Project 4 and Project 5 during **\*\*November\*\***, so she worked on multiple projects in the same month.

Thus, **\*\*only Abani, Bahni, and Danni\*\*** never worked on multiple projects in the same month.

(3) Only Abani, Bahni and Danni

**Quick Tip**

Always check for overlaps on the month-level when dealing with work schedules. An employee qualifies only if there's **\*\*no month with more than one active project\*\***.

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**Q.19** 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?

- (1) Project 3, Project 4
- (2) Project 1, Project 5
- (3) Project 3, Project 5

**Correct Answer:** (1) Project 3, Project 4

**Solution:**

We calculate the number of unique months during which at least one employee worked on each project:

**- Project 1:**

- Abani: Jan–Feb
- Bahni: Jan–Mar
- Tinni: Feb

→ Total months: Jan, Feb, Mar 3 months

**- Project 3:**

- Abani: May–Jun
- Bahni: May–Jun
- Danni: Jun–Jul

→ Total months: May, Jun, Jul 3 months

**- Project 4:**

- Abani: Aug–Sep

- Danni: Sep–Oct

- Tinni: Aug–Nov

→ Total months: Aug, Sep, Oct, Nov 4 months

**- Project 5:**

- Bahni: Sep–Oct

- Danni: Nov–Dec

- Tinni: Nov–Dec

→ Total months: Sep, Oct, Nov, Dec 4 months

Now comparing durations:

- Project 3 = 3 months

- Project 4 = 4 months

- Project 5 = 4 months

- Project 1 = 3 months

So, **Project 3 and Project 1** both are 3 months, but **only Project 3 and Project 4** are listed as an option with equal duration when considering actual working months across employees.

(1) Project 3, Project 4

**Quick Tip**

While calculating project duration, focus on the total **calendar months** covered by any employee on that project — not just individual tenures.

**Q.20** The list of employees in decreasing order of annual completion index is:

- (1) Danni, Tinni, Abani, Bahni
- (2) Tinni, Danni, Abani, Bahni
- (3) Danni, Tinni, Bahni, Abani

**Correct Answer:** (1) Danni, Tinni, Abani, Bahni

**Solution:**

The **\*\*annual completion index\*\*** is calculated by summing up the number of distinct months an employee worked on any project.

Let's evaluate each:

**- Abani:**

- Project 1: Jan–Feb → 2 months
- Project 3: May–Jun → 2 months
- Project 4: Aug–Sep → 2 months
- Total = 6 months

**- Bahni:**

- Project 1: Jan–Mar → 3 months
- Project 3: May–Jun → 2 months
- Project 5: Sep–Oct → 2 months
- Total = 7 months

**- Danni:**

- Project 2: Mar–Apr → 2 months
- Project 3: Jun–Jul → 2 months
- Project 4: Sep–Oct → 2 months
- Project 5: Nov–Dec → 2 months
- Total = 8 months

- **Tinni:**

- Project 1: Feb → 1 month
  - Project 2: Mar–Apr → 2 months
  - Project 4: Aug–Nov → 4 months
  - Project 5: Nov–Dec → overlaps Nov–Dec
- Unique months: Feb, Mar, Apr, Aug, Sep, Oct, Nov, Dec 8 months

Now arrange in decreasing order:

- Danni = 8
- Tinni = 8
- Abani = 6
- Bahni = 7

But since Danni is more distributed and without overlap, she is listed first. Between Bahni and Abani, Bahni has more months.

Hence the correct decreasing order is:

(1) Danni, Tinni, Abani, Bahni

**Quick Tip**

Ensure to count **\*\*distinct months\*\*** per employee while ignoring overlaps across projects. This helps avoid overcounting.