

Loksewa Notes: Mental Ability and Reasoning with Worked Examples

Mental ability questions look scary, but most of them come from a dozen patterns. Learn the pattern, practise ten questions of each, and this section becomes the most predictable part of your paper. Below are the patterns with one worked example each.

Question styles differ between levels and notices. Use this as a base and then practise with past papers of the exact post you are applying for.

1. Number series

Ask three things: is the gap constant, is it multiplying, or is the gap itself changing?

- **Constant gap:** 4, 9, 14, 19, ? The gap is 5, so the answer is 24.
- **Growing gap:** 2, 3, 5, 8, 12, ? The gaps are 1, 2, 3, 4, so the next gap is 5 and the answer is 17.
- **Multiplying:** 3, 6, 12, 24, ? Each term doubles, so the answer is 48.
- **Squares and cubes:** 1, 4, 9, 16, ? is 25. Learn squares to 25 and cubes to 10.

2. Percentage

- $\text{Percentage} = (\text{part} / \text{whole}) \times 100$.
- **Increase then decrease:** a 20% rise followed by a 20% fall does not return to the start. Start 100, rise to 120, fall by 20% of 120 (24) to reach 96, a net loss of 4%.
- **Quick values:** 50% is half, 25% is a quarter, 10% is move the decimal, 12.5% is one eighth.

Example: A price of Rs 800 is raised by 15%. New price = $800 + 15\% \text{ of } 800 = 800 + 120 = \text{Rs } 920$.

3. Ratio and proportion

- To share an amount in ratio a:b, divide it by (a + b), then multiply by a and by b.
- **Example:** Share Rs 1,200 in the ratio 3:5. Total parts = 8; one part = 150; the shares are Rs 450 and Rs 750.

4. Average

- $\text{Average} = \text{sum of items} / \text{number of items}$.

- **Example:** The average of 5 numbers is 20. A sixth number, 32, joins. New average = $(100 + 32) / 6 = 22$.

5. Simple interest

- Interest = $(\text{Principal} \times \text{Rate} \times \text{Time}) / 100$, with the rate per year and time in years.
- **Example:** Rs 5,000 at 10% for 3 years: $5,000 \times 10 \times 3 / 100 = \text{Rs } 1,500$; the total is Rs 6,500.

6. Time and work

- If A does a job in a days, A does $1/a$ of it per day. Add the daily shares to find the combined time.
- **Example:** A takes 12 days and B takes 6 days. Together they do $1/12 + 1/6 = 3/12 = 1/4$ per day, so they finish in 4 days.

7. Speed, distance and time

- Distance = speed $\times$ time. To convert km/h to m/s multiply by $5/18$.
- **Example:** A bus covers 180 km in 4 hours. Speed = 45 km/h.

8. Direction sense

Draw it. Mark North up, then follow each step on paper. Many people fail not because the idea is hard but because they try to do it in their head.

Example: A walks 6 m north, turns right and walks 8 m. The straight distance from the start is the hypotenuse of a 6-8 right triangle: 10 m.

9. Coding and decoding

- Write the alphabet positions: A=1, B=2, ... Z=26. Check whether each letter shifts by the same number.
- **Example:** If CAT is coded as DBU (each letter moves one forward), then DOG is EPH.

10. Ranking and order

- Total in a line = (rank from one end) + (rank from the other end) - 1.
- **Example:** Ram is 7th from the top and 12th from the bottom. Total = $7 + 12 - 1 = 18$.

How to practise

1. Spend one week per pattern: study the method, solve 10 questions, review your errors.
2. Time yourself. In an MCQ paper you often have about a minute per question, so skip and return rather than stall.
3. Keep an error notebook: write the question, your wrong step and the right step.
4. Check negative marking in the notice before you guess.

Practice questions

1. Next in the series 5, 10, 20, 40, ?
2. What is 30% of Rs 2,500?
3. Share Rs 900 in the ratio 2:7.
4. Pipe A fills a tank in 10 hours and pipe B in 15 hours. How long together?

Answers: 1) 80. 2) Rs 750. 3) Rs 200 and Rs 700. 4) $1/10 + 1/15 = 5/30 = 1/6$ per hour, so 6 hours.

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