

Now I have all the content. Let me prepare a comprehensive, well-structured 15-mark answer for you. Here is your complete 15-mark answer, structured and ready to write in your exam:

Answer: Scaling — Definition and Types

Definition of Scaling

A **scale** is a measuring instrument. **Scaling** is the process of constructing measuring instruments by assigning numbers or values to objects, persons, or events. It converts qualitative facts (called attributes) into a quantitative series (called variables), making them comparable in a standardized way.

For example, when we say a person has a "high" or "low" income, we are using qualitative language. Scaling helps us assign actual numbers to these attributes so they can be studied scientifically.

Types of Scales (Four Types)

1. Nominal Scale (Weakest Level)

Definition: The simplest form of measurement that only **classifies** people or objects into distinct categories. The numbers used are just labels — they carry no mathematical meaning and cannot be ranked or compared in terms of distance.

Key Features:

- Only classifies — no order or ranking
- Categories are mutually exclusive and exhaustive
- Only arithmetic operation possible: **counting**
- Measure of central tendency: **Mode**
- Statistical test: **Chi-square test**

Examples:

- Gender: Male = 1, Female = 2 (the numbers are just codes, not ranks)
 - Blood Group: A, B, AB, O
 - Religion: Hindu, Muslim, Christian, Sikh
 - Cricket jersey numbers: Virat Kohli = 18, Rohit Sharma = 45 — used only for identification, not comparison
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2. Ordinal Scale

Definition: A scale that not only **classifies** but also **ranks** the categories in a meaningful order. However, the **distance or gap between ranks is not equal or known**. We know who is greater or lesser but not by how much.

Key Features:

- Classifies and ranks (greater than / less than)
- Distance between categories is unequal and unknown
- Mathematical operations are not possible
- Measure of central tendency: **Median and Percentile**
- Non-parametric statistical methods used

Examples:

- Class rank: 1st, 2nd, 3rd — we know 1st is better than 2nd, but the exact score difference is unknown
 - Socioeconomic status: Low = 1, Middle = 2, High = 3
 - Movie ratings: Poor, Average, Good, Excellent
 - Military ranks: Sepoy → Havaldar → Captain → General (order is clear, but gap is not equal)
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3. Interval Scale

Definition: A scale in which categories can be classified, ranked, and the **distance between any two points is equal and exactly known**. However, it has an **arbitrary zero** — zero does not mean the complete absence of the property. Ratios (like "twice as much") cannot be meaningfully made.

Key Features:

- Equal and known distance between all scale points
- Zero is arbitrary (not absolute)
- **Addition and subtraction** are allowed; multiplication and division are NOT
- Measure of central tendency: **Mean and Standard Deviation**
- Statistical tests: t-test, z-test, Product Moment Correlation

Examples:

- Temperature in Celsius or Fahrenheit: 0°C does not mean "no heat"; 40°C is not "twice as hot" as 20°C
 - IQ Score: IQ of 0 does not mean zero intelligence
 - Calendar Years: Year 2000 is not "twice" Year 1000
 - Likert Scale in surveys: Strongly Disagree=1 to Strongly Agree=5
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4. Ratio Scale (Strongest Level)

Definition: The most precise and powerful level of measurement. It has all properties of an interval scale plus a **true and absolute zero** — meaning zero indicates the

complete absence of the property being measured. Ratios are meaningful, and all mathematical operations are possible.

Key Features:

- Absolute zero (zero = total absence of the attribute)
- All four operations: $+$, $-$, $\times$, $\div$ are allowed
- Ratios are meaningful: "40 kg is four times 10 kg"
- All statistical techniques can be applied
- Rarely used in social sciences (difficult to construct)

Examples:

- Weight: 0 kg = no weight at all; 80 kg is exactly twice 40 kg
- Height: 0 cm = no height; 180 cm is twice 90 cm
- Income: ₹0 = no income; ₹60,000 is three times ₹20,000
- Distance: 0 km = no distance; 100 km is five times 20 km

Conclusion

To sum up, as we move from **Nominal** → **Ordinal** → **Interval** → **Ratio**, the level of measurement becomes increasingly powerful. Each scale adds a new property — ranking, equal gaps, and finally a true zero — allowing more complex mathematical and statistical operations. The choice of scale depends on the nature of the variable and the type of analysis required in the research.

Exam Tip: Remember the progression as **NOIR** — Name (Nominal) → Order (Ordinal) → Interval → Real zero (Ratio). Each step up gives you more analytical power.