

ANSWER KEY & MARKING SCHEME · CBSE CLASS 11**Organisation of Data (Statistics for Economics)**

Economics · Chapter 3 · Use this with the Board Paper · Companion to Quick Drill

HOW TO USE

Attempt the Board Paper first (closed-book, full time). Then come here. For 2-mark+ questions, compare your answer to the model. For 3-4 mark questions, also consult the **Topper Templates** below — these show the exact step-by-step structure that scores full marks per CBSE marking-scheme conventions.

MODEL ANSWERS · BOARD PAPER**Section A — Very Short Answer (1 mark x 5)****Q1. Name the four bases of classification of data. [1 mark]**

Ans: Geographical (spatial), chronological (temporal), qualitative (by attribute) and quantitative (by variable).

Q2. Give one example of a continuous variable. [1 mark]

Ans: Height of a person (or weight, time, temperature) — any variable that can take fractional values. [Any one valid example accepted.]

Q3. In the exclusive series 20–30, 30–40, which class does the value 30 belong to? [1 mark]

Ans: The class 30–40, because in the exclusive method the upper limit is excluded.

Q4. Find the mid-value of the class 40–50. [1 mark]

Ans: Mid-value = $(40 + 50) \div 2 = 45$.

Q5. What is meant by the magnitude of a class interval? [1 mark]

Ans: The magnitude (class width/size) is the difference between the upper and lower limits of a class, e.g., for 30–40 it is $40 - 30 = 10$.

Section B — Short Answer I (3 marks x 3)**Q6. Distinguish between a discrete and a continuous variable with one example of each. [3 marks]**

Ans: A DISCRETE variable takes only certain exact, separate values with gaps between them and cannot take fractional values, e.g., the number of children in a family (0, 1, 2 — never 2.5). A CONTINUOUS variable can take ANY value within a range, including fractions, e.g., the height of a person (162.4 cm is valid). The test is whether in-between fractional values are possible, not the size of the numbers; discrete data is shown as a frequency array and continuous data as a grouped frequency distribution.

Q7. Distinguish between the inclusive and the exclusive method of classification. [3 marks]

Ans: In the EXCLUSIVE method the upper limit of a class becomes the lower limit of the next class (10–20, 20–30) and the upper limit is EXCLUDED (a value of 20 goes to 20–30); there is no gap, so it suits continuous data. In the INCLUSIVE method BOTH limits are included (10–19, 20–29) and there is a GAP between the upper limit of one class and the lower limit of the next; it is convenient for discrete data. To use the inclusive series in calculations it is converted to exclusive boundaries by the adjustment.

Q8. Convert the following inclusive series into an exclusive (true-limit) series: 20–29, 30–39, 40–49 with frequencies 5, 8, 4. [3 marks]

Ans: Gap = lower limit of next class – upper limit of present class = $30 - 29 = 1$; half the gap = 0.5. Subtract 0.5 from each lower limit and add 0.5 to each upper limit. Exclusive series: 19.5–29.5 ($f = 5$), 29.5–39.5 ($f = 8$), 39.5–49.5 ($f = 4$). Frequencies remain unchanged; the classes now touch with no gap.

Q9. Explain the four bases on which data can be classified, with one example of each. [4 marks]

Ans: (1) GEOGRAPHICAL (spatial) — by place/location, e.g., state-wise population. (2) CHRONOLOGICAL (temporal) — by time, e.g., year-wise GDP (a time series). (3) QUALITATIVE — by an attribute that cannot be measured, e.g., population classified as literate/illiterate or male/female. (4) QUANTITATIVE — by a measurable variable (discrete or continuous), e.g., students grouped by marks into class intervals. Classification on these bases reveals similarities and differences and makes comparison possible.

Q10. Distinguish between class limits and class boundaries, and explain the terms mid-value and magnitude. [4 marks]

Ans: CLASS LIMITS are the two end-values written in a class — the lower and upper limits (20 and 29 in the inclusive class 20–29). CLASS BOUNDARIES (true limits) are the values obtained after the adjustment that removes the gap, used to treat the data as continuous (19.5 and 29.5 for 20–29); in an EXCLUSIVE series limits and boundaries coincide because there is no gap. MID-VALUE (class mark) = (lower limit + upper limit) ÷ 2, e.g., (20+30)/2 = 25, and it represents the whole class in later calculations. MAGNITUDE (width) = upper limit – lower limit, e.g., 30 – 20 = 10.

Q11. What is meant by 'loss of information' in classification? Also distinguish a univariate from a bivariate frequency distribution. [4 marks]

Ans: LOSS OF INFORMATION: once individual observations are grouped into a class such as 20–30, their exact values (21, 27, 29...) are no longer visible; for all further calculation each item is treated as the mid-value (25). So grouping condenses and clarifies the data but discards the detail of each original figure. A UNIVARIATE frequency distribution involves only ONE variable (e.g., students by marks), while a BIVARIATE frequency distribution involves TWO variables shown together in a two-way table (e.g., families by income and expenditure), which lets us study the relationship between the two variables.

Q12. Construct a frequency distribution for the following marks of 30 students using tally marks and an exclusive series of magnitude 10. Data: 23, 45, 12, 34, 56, 28, 41, 19, 37, 50, 22, 48, 31, 15, 39, 44, 27, 33, 52, 18, 25, 47, 36, 29, 42, 11, 38, 49, 24, 30. [4 marks]

Ans: Range = 56 – 11 = 45. Take five exclusive classes of width 10 (lower limit included, upper limit excluded). Tallying each value once: 10–20 → 12,19,15,18,11 → frequency 5; 20–30 → 23,28,22,27,25,29,24 → frequency 7; 30–40 → 34,37,31,39,33,36,38,30 → frequency 8 (note 30 goes to 30–40); 40–50 → 45,41,48,44,47,42,49 → frequency 7; 50–60 → 56,50,52 → frequency 3. Table — Class Interval | Frequency: 10–20 | 5, 20–30 | 7, 30–40 | 8, 40–50 | 7, 50–60 | 3. CHECK: 5 + 7 + 8 + 7 + 3 = 30 = N. The total equals the number of students, so the distribution is correct.

★ TOPPER ANSWER TEMPLATES

3 TEMPLATES · MEMORISE THE FORMAT

★ TOPPER TEMPLATE — 5-6 mark: 'Construct a frequency distribution from the given raw data using tally marks.'

Most school papers + SQP

Step 1 [1 mark]	Find range & choose classes	First find the RANGE = highest value – lowest value. Decide the number of classes and the class MAGNITUDE (width) so that classes are equal and convenient, and write the class intervals using the EXCLUSIVE method (e.g., 10–20, 20–30, ...), stating that the lower limit is included and the upper limit excluded.
Step 2 [2 marks]	Tally each observation	Go through the raw data ONCE, placing one TALLY MARK against the correct class for each value. Group tallies in bundles of five (the fifth crosses the previous four) for easy counting. Be careful with boundary values: a value equal to an upper limit (e.g., 20) goes to the NEXT class (20–30), not the previous one.
Step 3 [1 mark]	Write frequencies & total	Count the tallies in each class to get the class FREQUENCY, write it in the frequency column, and total the frequencies. The total MUST equal the number of observations (N); show this check explicitly.
Step 4 [1 mark]	Present the neat table	Present the final answer as a clean three-column table — Class Interval Tally Marks Frequency — with the total row. A tidy, correctly-totalled table secures full marks.

COMMON LOSS OF MARKS:

- Putting a boundary value (equal to an upper limit) in the wrong class.
- Frequencies not adding up to N — always show the total check.
- Forgetting the tally-marks column when the question explicitly asks for tally marks.
- Using unequal class widths without reason.

★ TOPPER TEMPLATE — 3-4 mark: 'Distinguish between class limits and class boundaries / find mid-value & magnitude.'

Annual

Step 1 [1 mark]	Class limits	CLASS LIMITS are the two end-values actually WRITTEN in a class — the LOWER limit and the UPPER limit (e.g., in 20–29 they are 20 and 29). They are used to write and read the class.
Step 2 [1 mark]	Class boundaries	CLASS BOUNDARIES (true limits) are the values got AFTER the adjustment that removes the gap between inclusive classes — got by subtracting half the gap from the lower limit and adding it to the upper limit (20–29 becomes 19.5–29.5). They allow the data to be treated as continuous.
Step 3 [1 mark]	Mid-value	MID-VALUE (class mark) = (lower limit + upper limit) ÷ 2. For 20–30 it is (20+30)/2 = 25; it represents the whole class in later calculations.
Step 4 [1 mark]	Magnitude + when they coincide	MAGNITUDE (width) = upper limit – lower limit of a class (e.g., 30 – 20 = 10). NOTE: in an EXCLUSIVE series, limits and boundaries are the SAME because there is no gap; they differ only in an INCLUSIVE series.

COMMON LOSS OF MARKS:

- Saying limits and boundaries are always different — in an exclusive series they coincide.
- Computing mid-value from boundaries instead of the written limits when limits are asked.
- Confusing magnitude (width) with mid-value.

★ TOPPER TEMPLATE — 4-mark: 'Distinguish between the inclusive and exclusive method; convert the series to exclusive.'

Annual

Step 1 [1 mark]	Exclusive method	In the EXCLUSIVE method classes are written so the UPPER limit of one class is the LOWER limit of the next (10–20, 20–30). The upper limit is EXCLUDED: a value of 20 goes into 20–30. There is NO gap between classes, so it suits continuous data.
Step 2 [1 mark]	Inclusive method	In the INCLUSIVE method BOTH limits are INCLUDED in the class (10–19, 20–29) and there is a GAP between the upper limit of one class (19) and the lower limit of the next (20). It is convenient for discrete data.
Step 3 [1 mark]	The adjustment rule	To convert inclusive to exclusive, find the GAP = (lower limit of next class – upper limit of present class); take HALF of it; SUBTRACT half from each lower limit and ADD half to each upper limit. Frequencies are unchanged.
Step 4 [1 mark]	Worked conversion	For 20–29, 30–39: gap = 30 – 29 = 1, half = 0.5. So 20–29 → 19.5–29.5 and 30–39 → 29.5–39.5. Each class now joins the next with no gap — the exclusive (true-limit) series.

COMMON LOSS OF MARKS:

- Stating the methods but omitting the adjustment when conversion is asked.
- Using the wrong half (e.g., subtracting 1 instead of 0.5).
- Saying frequencies change during the adjustment — they do not.

MARKING SCHEME — GENERAL NOTES

- In the frequency-table question, full marks require the tally/working, correct frequencies (5, 7, 8, 7, 3) AND the explicit total check $\Sigma f = 30 = N$; a value of 30 placed in 20–30 instead of 30–40 is a –1 error.
- For 'distinguish' questions, each correct contrast point with a one-line explanation earns its mark; merely defining one side caps at half.
- In the conversion question, the half-gap of 0.5 and unchanged frequencies (5, 8, 4) are both required; using 1 instead of 0.5 loses a mark.
- Mid-value must be computed as $(L+U)/2$ and magnitude as $(U-L)$; confusing the two is penalised.
- Accept any valid example in place of those given, provided it correctly illustrates the concept.