

| Question   | Scheme                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                | Marks  | AOs  |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|--------|------|
| 2(a)       | IQR = 26.6 – 19.4 [= 7.2]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                | B1     | 2.1  |
|            | 19.4 – 1.5 × ‘7.2’ [= 8.6]    or    26.6 + 1.5 × ‘7.2’ [= 37.4]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                | M1     | 1.1b |
|            | Plotting one upper whisker to 32.5 <b>and</b><br>one lower whisker to 8.6 or 9.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                | A1     | 1.1b |
|            | Plotting 7.6 and 8.1 as the only two outliers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                | A1     | 1.1b |
|            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                | (4)    |      |
| (b)        | October (since it is the month with the coldest temperatures<br>between May and October in Beijing)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                | B1     | 2.4  |
|            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                | (1)    |      |
| (c)        | $[\sigma =]\sqrt{\frac{4952.906}{184}}$ or    e.g. $[\sigma =]\sqrt{\frac{S_{xx}}{n}} = 5.188...$ [=5.19*]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                | B1cso* | 1.1b |
|            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                | (1)    |      |
| (d)        | $z = (\pm) 1.28(16)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | $[P_{90} =]29.251...$ or $[P_{10} =]15.948...$ | B1     | 3.1b |
|            | $2 \times 1.2816 \times 5.19$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ‘29.251...’ – ‘15.948...’                      | M1     | 1.1b |
|            | = awrt <b>13.3</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                | A1     | 1.1b |
|            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                | (3)    |      |
| (e)        | Daily mean <u>wind speed</u> /Beaufort conversion since it is <u>qualitative</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                | B1     | 2.4  |
|            | <u>Rainfall</u> since it is not symmetric/lots of days with 0 rainfall                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                | B1     | 2.4  |
|            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                | (2)    |      |
| (11 marks) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                |        |      |
| Notes      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                |        |      |
| (a)        | <b>B1:</b> for a correct calculation for the IQR (implied by 10.8 <b>or</b> 8.6 <b>or</b> 37.4 seen)<br><b>M1:</b> for a complete method for either lower outlier limit or upper outlier limit<br>(allow ft on their IQR)    (may be implied by the 1 <sup>st</sup> A1 or a lower whisker at 8.6)<br><b>A1:</b> both whiskers plotted correctly    (allow ½ square tolerance)<br><b>A1:</b> only two outliers plotted, 7.6 and 8.1 (must be disconnected from whisker)<br><b>NOTE:</b> A fully correct box plot with no incorrect working scores 4/4                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                |        |      |
| (c)        | <b>B1cso*:</b> Correct expression with square root <b>or</b> correct formula and 5.188 or better<br>Allow a complete correct method finding $\sum x^2 =$ awrt 98720 and $\sigma = \sqrt{\frac{98715.9...}{184} - \left(\frac{4153.6}{184}\right)^2}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                |        |      |
| (d)        | <b>B1:</b> Identifying z-value for 10th or 90th percentile (allow awrt (±) 1.28)<br>or for identifying $[P_{90} =]29.251...$ (awrt 29.3) or $[P_{10} =]15.948...$ (awrt 15.9)<br>(This may be implied by a correct answer awrt 13.3)<br><b>M1:</b> for $2 \times z \times 5.19$ where $1 < z < 2$<br>or for their $P_{90} - P_{10}$ where $25 < P_{90} < 35$ and $10 < P_{10} < 20$<br><b>A1:</b> awrt 13.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                |        |      |
| (e)        | <b>B1:</b> for one variable identified and a correct supporting reason<br><b>B1:</b> for two variables identified and a correct supporting reason for each<br>Allow any two of the following: <ul style="list-style-type: none"><li>• <u>Wind speed/Beaufort</u> since the data is <u>non-numeric</u> (o.e.). They need not mention Beaufort provided there is a description of the data as non-numeric    (Do not allow wind direction/wind gust)</li><li>• <u>Rainfall</u> as not symmetric/is skewed/is not bell shaped/lots of 0s /many days with no rain/mean≠mode or median</li><li>• <u>Date</u> since each data value appears once/it is uniformly distributed</li><li>• Daily mean <u>pressure</u> since it is not symmetric/is skewed/not bell shaped</li><li>• Daily mean <u>wind speed</u> since it is not symmetric/is skewed/not bell shaped</li></ul> Do not allow ‘not continuous’ or ‘discrete’ as a supporting reason.<br>Ignore extraneous non-contradicting statements |                                                |        |      |