

Commentary on candidate evidence

The candidate evidence has achieved the following marks for each question of this course assessment component – question paper.

Candidate 1

Question 1(a)(i)

The candidate was awarded **3 marks**:

- The distance was measured to be 76cm, which is within the accepted range. **(1 mark)**
- There is an appropriate starting point. **(1 mark)**
- The route follows both on and off-road sections. **(1 mark)**
- There were no marks awarded for route suitability; the route crosses woodland areas not on paths, streams and fences. **(0 marks)**

Question 1(a)(ii)

The candidate was awarded **5 marks**:

- The candidate states that their start and finish location was chosen as there is nearby parking for spectators. **(1 mark)**
- They state that there is a jetty allowing swimmers to exit. **(1 mark)**
- They state that there is a nearby picnic site for audience and food vans to park up. **(1 mark)**
- The candidate states ‘there is also open space that can be used to add extra parking, bike storage, more food vans and portapottys’. **(1 mark)**
- The candidate states ‘right where the race begins is open...allowing no destruction has to be made’. This is vague. The candidate states that the route will have on and off-road sections and suggest this will offer different textures/surfaces. **(1 mark)**

The rest of the answer is not relevant. The candidate has provided reasons not to choose the route.

Question 1(a)(iii)

The candidate was awarded **4 marks**:

- The candidate states bringing more tourists to the area allowing increased sales. **(1 mark)**
- They state that the event bringing hundreds of tourists may encourage improvements. **(1 mark)** The candidate exemplifies this with a list of possibilities, though we think 'local toilets' are unlikely.
- The candidate states that local hotels will benefit in the third paragraph. **(1 mark)**
- In the fourth paragraph, the candidate discusses the idea of encouraging more water sports. This isn't developed properly as facilities for that would be required.
- The candidate suggests that the race will bring job opportunities to locals. **(1 mark)**
- In the final paragraph, the candidate suggests that the cycle hire may benefit (1 mark) however, this is bracketed off because the candidate has already reached the maximum marks available for this question.

Question 1(b)

The candidate was awarded **1 mark**:

- In their opening sentence, the candidate states that the dam may impact noise pollution. This is not correct; perhaps during construction, but not now.
- In the second paragraph, the candidate correctly suggests that flooded land means farmers crops would struggle to survive, and that less land means less yield which means they would lose money. **(1 mark)**
- The final paragraph suggests 'other flooded areas.' There are no marks awarded here because there are no other flooded areas.

Question 2 (a)(i) & (ii)

The candidate was awarded **6 marks**:

Width

- In the first paragraph, the candidate states that the tape measure is held from bank to bank. **(1 mark) (i)**
- The candidate states that it must be held tightly and straight across. A carat is placed here for an evaluative point; the candidate does not say why. The same thing is repeated in the fifth paragraph on the next page.

Depth

- In the second paragraph, the candidate states that the width is divided by 10. This is linked to the third paragraph of the answer where the candidate states 'a depth reading can be taken...with a meter stick being held still and touching the river bed' **(1 mark) (i)**
- In the second paragraph, the candidate states 'This is systematic sampling and should give data that represents the whole section well. **(1 mark) (ii)**
- In the sixth paragraph, the candidate was awarded a mark for stating 'you must stand downstream of the meter stick as to not impact the reading' **(1 mark) (ii)**

Velocity

- In the fourth paragraph, the candidate states 'To gather data on velocity, 3 readings should be taken at points calculated to be evenly spaced'. It is unclear as to what the candidate means here, so no marks were awarded.
- The rest of the fourth paragraph is a list of equipment. No marks were awarded.
- The candidate states in the fifth paragraph 'The tape measure must be held tightly in the exact same position for the duration of the investigation of the site. This ensures the data at each sample point was taken where it should have been'. No marks were awarded because it is not clear what measurement is being referred to. The assumption is width, but width was already awarded a mark for the first paragraph.

- In the seventh paragraph, the candidate states 'stand as out of the way as possible'. No marks were awarded because we don't know what to stand out of the way of.
- The candidate states in the eighth paragraph that the flotation device may get stuck. An evaluative mark was awarded. **(1 mark) (ii)**
- The ninth paragraph was not clear and did not relate to the question, so no marks were awarded.
- The final paragraph was awarded another evaluative mark because the candidate talks about taking repeats of readings, then calculating averages. **(1 mark) (ii)**

Question 2(b)

The candidate was awarded **2 marks**:

- A mark was awarded at the end of the first paragraph for the idea of slipping/suitable footwear and better grip. **(1 mark)**
- A mark was awarded at the end of the second paragraph for correctly suggesting dressing appropriately to avoid the cold. **(1 mark)**
- A mark could have been awarded at the third paragraph for the idea of first aid kits/someone with training however, this was bracketed off because the candidate has already achieved the maximum marks available.

Question 3(a)(i)

The candidate was awarded **2 marks**:

- No marks were awarded for the first two sentences because they are not precise.
- The first mark was awarded at 'every 300m' for the idea of transects being an effective way to measure change by using systematic intervals. **(1 mark)**
- A second mark was awarded for the idea of transects being unsuitable because a small area is covered compared to the size of the city. **(1 mark)**
- A carat was awarded at 'They appear to be non-biased however, their location could miss out large factors in the rest of the area'

- The next sentence about features being missed because the line is so small is repetition in part of the second mark and therefore no further marks were awarded.
- The last 4 lines discuss a belt transect. This could apply to land use, but not to noise levels.

Question 3(a)(ii)

The candidate was awarded **4 marks**:

- A mark was awarded at the end of the first paragraph for the idea of the CBD having the highest number of vehicles producing noise from exhausts, engines and beeping horns. **(1 mark)**
- A mark was awarded for the first sentence in the second paragraph 'Site 4 is on a motorway which explains the abrupt increase in noise levels (82dB). **(1 mark)**
- The next sentence 'this is because car's engines are loudest here as they are travelling fast' is repetition of the first mark and therefore no further mark was awarded.
- The final part of the second paragraph is repetition of the second mark and therefore, no further marks were awarded.
- The third paragraph is reversal of the first mark. 'Suggesting a school playground...beside an Academy' is not a reason for noise levels and therefore, no, mark was awarded.
- The first part of the fourth paragraph is again reversal of the first mark. However, at the end of the paragraph the candidate states 'The data could be collected on a weekday when most kids were at school and adults at work which would explain the quiet park'. A mark was awarded here. **(1 mark)**
- The candidate repeats the second mark in the middle of the fifth paragraph 'This is because it is beside a main road'. The final part of the paragraph is somewhat confusing as the candidate doesn't explain why 34 pedestrians would be in the residential area and so, no marks were awarded.
- The final paragraph largely repeats previous points. However, the candidate then includes a section about trains being loud when they pass, but lines are quiet

otherwise suggesting the data was collected when no trains passed. A mark was awarded here. **(1 mark)**

Question 3(b)(i)

The candidate correctly states the null hypothesis. **(1 mark)**

Question 3(b)(ii)

The candidate was awarded **3 marks**:

- The candidate was awarded a mark for correctly identifying that 'there is a negative relationship' **(1 mark)**
- A second mark was awarded in the second paragraph where the candidate states '0.65 is greater than 0.63...which means the results of the Spearman's Rank Correlation Coefficient are 99% significant'. **(1 mark)**
- The final mark was awarded for correctly rejecting the null hypothesis. **(1 mark)**

Question 3(b)(iii)

The candidate was awarded **3 marks**:

- The first mark was awarded in the first paragraph where the candidate states 'Spearman's Rank Correlation Coefficient is a way to determine if there is a relationship between two variables.' **(1 mark)**
- Though the candidate mentions ranking values here, the second mark was awarded in the second paragraph for the idea of SRCC being easier to work with and therefore being less time consuming. **(1 mark)**
- The third mark was awarded in the final paragraph where the candidate suggests that SRCC is 'unsuitable because it offers less accurate results than Pearson's due to it using ranks instead of actual values.' **(1 mark)**

Candidate 2

Question 1(a)(i)

The candidate was awarded **4 marks**:

- The distance measured was correct. **(1 mark)**
- There is an appropriate starting location. **(1mark)**
- The route includes both on and off-road sections. **(1 mark)**
- The route indicated was appropriate. **(1 marks)**

Question 1(a)(ii)

The candidate was awarded **8 marks**:

- The first mark was awarded for an appropriate start location. On the second line, the candidate states 'could more easily exit the water' **(1 mark)**.
- The second mark was awarded where the candidate discusses a car park where competitors and spectators could park before the race **(1 mark)**.
- The candidate discusses the picnic site where competitors could eat before the race – the third mark was awarded at the word 'race' **(1 mark)**.
- The next sentence about picnic sites is repetition of a previous point and was therefore awarded no marks.
- The following point about a greater distribution of spectators is valid, but the candidate makes a similar and better point later in the answer and was therefore awarded no marks for this instance.
- A fourth mark was awarded for the idea of competitors not needing to travel far to get back to their cars/families **(1 mark)**.
- A fifth mark was awarded for the next point about access to food at the public house where spectators and competitors could eat. The candidate could have clarified when competitors could eat ie after the race, but the point stands **(1 mark)**.

- The point about toilets isn't really connected to the route choice, and the final point at the bottom of the page seems contradictory therefore no marks were awarded here.
- A sixth mark was awarded for the idea of minimising disruption – 'less roads will need closed for the event' **(1 mark)**.
- A seventh mark for the idea of access and travel from larger cities like London and Birmingham was awarded at the end of the paragraph **(1 mark)**.
- An eighth mark was awarded for 'spectators to cheer on competitors as they finish the race' **(1 mark)**. The preceding point about a sprint finish on a flat road is combined with the 'challenging sections' at the bottom of the page for a ninth mark however, this is bracketed off because the candidate has already achieved full marks.
- In the final part of the answer, the candidate repeats the previous point and again repeats the idea of cheering competitors on therefore, no further marks were awarded.

Question 1(a)(iii)

The candidate was awarded **4 marks**:

- The first mark was awarded at 'spending money in local restaurants' **(1 mark)**.
- The second mark was awarded at 'more visitors which will increase their profit' **(1 mark)**.
- The candidate makes a detailed point about visitors returning and a third mark was awarded here **(1 mark)**.
- A fourth mark was awarded at 'local people could be hired to help staff the event, for example young people could be paid to help with water stations and checkpoints along the route' **(1 mark)**.
- The candidate has now reached full marks however, a bracketed fifth mark was awarded at 'the race could encourage local people either to get fit to compete in the race or use the routes more often which would boost local physical and possibly mental health.'

- A bracketed sixth mark was awarded at ‘the event could create a stronger sense of community in the area as locals join together to organise and support the event and its competitors’.
- No marks were awarded for the final paragraph as there is no evidence that there is stigma connected to the prison being in the area. There may be anecdotal evidence of that elsewhere, but equally, evidence of positive effects also exists.

Question 1(b)

The candidate was awarded **4 marks**:

- The first mark was awarded at ‘This could negatively impact local animal and plant species and have a devastating effect on the local biodiversity’ (**1 mark**).
- A carat was placed at the end of the next sentence about a decrease in economic activity. The idea is correct, but the candidate hasn’t developed the point.
- A second mark was awarded for the idea of the reservoir being an unsuitable habitat for many aquatic species because it is man made and therefore unnatural (**1 mark**). The opposite is also true in that reservoirs also create new habitats and support specific aquatic and bird species, but we are only looking for negative answers.
- A third mark was awarded for the idea of the cost involved in re-routing the electricity pylons (**1 mark**). The candidate mentions ‘financial disruption for local businesses’ but does not develop the point and so no further mark can be awarded.
- The next point repeats the idea of habitat loss and was therefore not awarded any further mark.
- A fourth mark was awarded for the idea of farmers being displaced with the loss of staff and potentially shutting down (**1 mark**).
- The following point about local restaurants needing to search further afield for fresh produce is valid, though it’s unlikely that every item on their menus was sourced from the area within the reservoir outline. The link to the local economy being detrimentally affected therefore seems far-fetched therefore, no further marks were awarded.

- The candidate repeats the idea of habitat loss and has already achieved full marks for the answer therefore no further mark was awarded.
- A fifth, and bracketed mark, was awarded at the end of the answer where the candidate discusses the air pollution caused by construction.

Question 2 (a)(i) & (ii)

The candidate was awarded **8 marks**:

- A mark was awarded at 'The width of the river should be taken as a measurement in metres from the very edge of the bank on one side to the very edge of the bank on the other' **(1 mark)**. (i)
- A mark was awarded for 'The measuring tape should be held at the surface of the river and not at an angle to ensure accurate and reliable measurements' **(1 mark)**. (ii)
- The candidate starts discussing the wetted perimeter; this should be bracketed off as it is not relevant.
- A mark was awarded for 'The flow meter should be placed in the centre of the river, underwater at a set distance below the surface each time to ensure validity' **(1 mark)**. (ii)
- A mark was awarded for the next sentence that states 'The flow meter should face up the river (against the flow) and the value for the velocity should be read and recorded' **(1 mark)**. (i)
- The candidate starts discussing surface flow measurements. This is combined with a point later in the answer for a mark.
- A mark was awarded at 'To increase reliability, the metre stick should be placed so the thin side is against the river flow, so it doesn't disrupt the flow' **(1 mark)**. (ii)
- A mark was awarded for the next description of measuring how long it takes the ping pong ball to reach from the first pole to the second pole This is a development of the candidate's answer at the bottom of the previous page. **(1 mark)**. (i)
- Though the candidate does not include the standard $\text{speed} = \text{distance over time}$ equation, they were awarded a mark for suggesting human error could occur

when stopping and starting the stopwatch, so the journey should be videoed and analysed to get a more accurate reading **(1 mark)**. (ii)

- A mark was awarded for suggesting the test should be carried out at least 3 times to increase reliability and get an average **(1 mark)**. (ii)
- The candidate has reached the maximum of 5 marks for part (ii) and has therefore now achieved full marks for this answer.
- The sentence at the bottom of page repeats the previous point and was therefore awarded no further mark.
- The candidate starts discussing how depth should be measured, but stops short of saying 'how', so a carat is placed here.
- The candidate discusses intervals for depth data, but this repeats previous points therefore, no mark was awarded.
- A bracketed mark was awarded at 'They should use a measuring stick...to measure from the surface of the river down to the river bed'. The mark was awarded in combination with the carat at the start of the paragraph about depth.
- A bracketed mark was awarded for the calculation of discharge.
- The rest of the paragraph is repeated from previous points and was therefore awarded no further mark.
- The candidate discusses systematic sampling along the river, but this should be bracketed off because it does not measure discharge.
- The final part of the answer repeats previous points about measuring enough times to ensure reliability and is therefore awarded no further mark.

Question 2(b)

The candidate was awarded **2 marks**:

- A mark was awarded for 'Avoiding very deep or fast flowing areas of river will protect students, as powerful water carries the risk of drowning' **(1 mark)**.
- A mark was awarded at 'It may be more suitable to carry out fieldwork during summer when the water is warmer, so less potential risk for cold water shock and river levels may be lower' **(1 mark)**. The candidate has now achieved full marks for this answer.

- A bracketed mark was awarded for the idea of conducting fieldwork close to roads and footpaths to access students if problems occur.
- The last couple of sentences discussing appropriate footwear and checking the weather require carats because they are valid points but are not properly explained.

Question 3 (a)(i)

The candidate was awarded **4 marks**:

- A carat is placed at the end of the first sentence because there isn't enough information.
- A mark was awarded where the candidate states that using a transect to gather data means a large area of land can be covered but more quickly **(1 mark)**.
- A mark was awarded for the idea of comparing the base map directly to land uses **(1 mark)**.
- The candidate discusses systematic sampling. A mark was awarded at the end of the sentence for collecting data at regular intervals along the transect **(1 mark)**.
- The next point is combined with the carat from the first sentence, and a mark was awarded for the idea of transects showing changes in noise levels from the CBD to the suburbs **(1 mark)**. The candidate has now reached full marks for this answer.
- The next sentence about comparing CBD and the suburbs is repetition of the previous point and was therefore awarded no further mark.
- A bracketed mark was awarded where the candidate discusses transects going into dangerous/inaccessible areas and therefore, not being able to collect data.
- The candidate reverses an earlier point and suggests it could be very time consuming – no mark was awarded here.
- The final part of the answer is repetition of previous points and therefore, no further marks were awarded.
- The candidate discusses plotting onto a base map and being easy to set up on the very last page of the exam script. This is vague, and no further marks were awarded.

Question 3(a)(ii)

The candidate was awarded **8 marks**:

- A mark was awarded for the reduction in car noise and horns honking **(1 mark)**.
- The following sentence about pedestrian crossings making noise is not correct and therefore, no mark was awarded.
- A mark was awarded for the idea of the greatest noise levels being in the city centre (site 1) because it has the most traffic **(1 mark)**.
- The next sentence discusses large vehicles but not noise, so no marks were awarded.
- A carat is placed after the sentence about site 8 and businesses around the hospital. The candidate hasn't developed the reasons for more noise.
- A mark was awarded for the idea of 'gentle sounds of nature' in the suburbs **(1 mark)**.
- A mark was awarded for 'The increase in noise levels at site 14 could be because it is right next to a road junction, so there are more vehicles' **(1 mark)**.
- A mark was awarded for the next sentence that states 'There is also a school nearby which could be loud due to groups of children if the data was collected at the end of a school day' **(1 mark)**.
- The candidate discusses site 4, but this is a repeat point of the explanation for site 14 and therefore, no mark was awarded.
- A mark was awarded for the idea of people in a residential area being inside their homes and not on the streets lowering noise pollution **(1 mark)**.
- The candidate discusses site 11 being less noisy because there is a mosque nearby. Though this is unlikely as they are generally quite sociable areas during the day, the candidate could have developed their idea here and so no mark was awarded.
- A mark was awarded for stating 'Fast vehicles on the A57 motorway will cause more noise at site 4 than slower moving cars on smaller roads like next to site 9' **(1 mark)**. The link to speed is important here - noise from engines, tyres and wind is higher at speed.
- A carat was placed at the end of the sentence about a railway line next to site 3. The candidate doesn't develop their reasons as to why there is noise.

- The candidate repeats previous points when discussing site 2 being next to a busy road. However, they develop these points by stating ‘there are more popular attractions in the CBD like the Exhibition Centre which people will drive to to see’ meaning a mark could be awarded (**1 mark**). The candidate has now achieved full marks for this answer.
- The sentence at the bottom of the page doesn’t explain why there is less noise as open space increases and therefore, no further mark was awarded.
- On the second last page of the answer booklet, there is a repeated point about noise levels being highest because there are many cars and therefore no mark was awarded.
- A bracketed mark was awarded for the idea of data being recorded during rush hour, which would amplify the effect of traffic.
- There is a repeated point about sites 18 and 17 and proximity to the road and therefore no mark was awarded.
- The candidate discusses the university being pedestrianised and therefore being quieter- that isn’t obvious from the data, or the map so no marks were awarded.
- The candidate then discusses site 9 and the environment being quieter for academic focus, but no real reasons are explained and therefore, no mark was awarded.
- The candidate doesn’t develop the reasons for noise at the athletic grounds, so no mark was awarded.
- A bracketed mark was awarded for the idea of sudden noises like ambulances outside the hospital increasing noise pollution.
- The added paragraph on the last page of the answer booklet doesn’t really develop any new ideas, so no marks were awarded.

Question 3(b)(i)

The candidate was awarded **1 mark**:

- The candidate correctly states the null hypothesis and was awarded a mark (**1 mark**).

Question 3(b)(ii)

The candidate was awarded **3 marks**:

- The candidate was awarded a mark for stating 'the calculated value of 0.65 is greater than the critical value of 0.63 at 99% significance' **(1 mark)**.
- The candidate was awarded a mark for the second part of the first sentence where they state, 'the null hypothesis should be rejected' **(1 mark)**.
- A further mark was awarded where the candidate states 'it can be stated with 99% certainty that results did not occur by chance' **(1 mark)**. The candidate has now achieved full marks.
- A bracketed mark was awarded at 'There is a fairly strong negative correlation between distance from the CBD and noise levels.'
- A further bracketed mark was awarded where the candidate states 'the value of -0.63 is closer to -1 than 0, and -1 is perfect negative correlation'.
- The candidate then discusses accepting the alternative hypothesis at 99% certainty. This is reversal of rejecting the null hypothesis at 99% certainty and so no further mark was awarded.
- The candidate then repeats the point about 99% certainty of there being a negative correlation therefore, no further mark was awarded.
- The candidate states that 'This result should be compared to a scatter graph of the data to confirm the result'. It should really be the other way round – the scatter graph shows the possibility of a relationship with Spearman's Rank being used to test the strength and direction of that relationship therefore, no further mark was awarded.
- The candidate states that 'further research should still be carried out'. A carat was placed here because the candidate needs to link it to the lack of perfection in the correlation.

Question 3(b)(iii)

The candidate was awarded **4 marks**:

- The candidate was awarded a mark for stating 'Spearman's Rank is useful for relationships that may be non-linear like noise levels and distance' **(1 mark)**.
- The candidate was awarded a second mark for stating that 'Spearman's is less affected by extreme values' **(1 mark)**.
- A carat was placed after 'However ranking data also makes Spearman's less accurate' as the candidate develops this later in the answer.
- A third mark was awarded for stating 'Spearman's is easier and quicker to calculate than Pearson's...(PPMC)' **(1 mark)**.
- A fourth mark was awarded for stating 'However Spearman's isn't as strong a statistical test as PPMC, because it uses ranked data' **(1 mark)**. The candidate has now achieved full marks.
- A bracketed mark was awarded where the candidate discusses comparing the calculated value to critical values and concluding with a degree of certainty the chance of a relationship.
- A bracketed mark was awarded for the idea of determining 'if where there is a positive or negative correlation between noise levels and distance from CBD'.
- A bracketed mark was awarded for 'Spearman's Rank is suitable for this data because there are 2 variables being compared'.
- A bracketed mark was awarded for stating 'There are also more than 10 data points which increases the accuracy of the statistical test'.
- The next point is repetition of a previous point and was therefore awarded no further mark.
- The candidate then discusses comparing the value to a scatter graph to confirm the result. No marks were awarded here. A scatter graph is a visual representation of the relationship, and Spearman's Rank measures the strength and direction of that relationship. Comparing the two to 'confirm the result' doesn't make sense.
- The following point about linear regression should be bracketed off as this is not relevant to the answer.

- The final point at the bottom of the page receives no marks because it is repetition.