(f) Name **two** abiotic factors in this river system that might be altered by human activity. Explain how these changes could affect the ecosystem. (6 marks)

Description	Marks
Three marks for each abiotic factor. Maximum six marks.	
Names a feasible abiotic factor	1
Explains clearly how the changes impact on the ecosystem	2
States some relevant information about how the changes impact on the ecosystem	1
Total	**6**
Answers may include, but are not limited to the following: • temperature decrease in aquatic organisms that are not temperature tolerant • pH decrease in aquatic organisms that are not pH tolerant • water levels due to damming or irrigation usage increase in aquatic organisms that favour still water decrease in aquatic organisms that favour flowing water • salinity reduction in non-salt tolerant plants, reduction in non-salt tolerant aquatic animals migration of salt tolerant organisms from estuary into river system • nutrient levels encourage growth of algae, eutrophication, etc. • turbidity impact on photosynthetic organisms, energy in ecosystem.	

(d) With climate change Arctic sea ice has declined (melting into the ocean) and carbon dioxide levels have increased. Explain how the changes to these two abiotic factors affect the survival of coldwater fish that live in the Arctic region. (4 marks)

Description	Marks
Explanation includes:	
Melting ice increases water temperature	1
Carbon dioxide level will change the pH on the water	1
Outlines that coldwater fish will react to this change (e.g. move location, die)	2
States some valid information that coldwater fish survival will be will be impacted on	1
Total	**4**
Answer could include: Climate change has caused the sea ice to melt. This water will be at a higher temperature that the ocean, hence water temperature will increase. The carbon dioxide from the atmosphere will dissolve into the water and lower the pH of the water. These changes will impact on the coldwater fish as their environment will change. The fish may move their location. Warmwater fish may now come into their environment and compete for food source. Change in pH levels may affect their reproduction. Any of these will impact on their survival. Accept other relevant answers.	