Student ID:

1. **Which header file is required to use vectors in C++?**  
   A. <vector>  
   B. <array>  
   C. <list>  
   D. <deque>
2. **Which function is used to add an element to the end of a vector?**  
   A. add\_back()  
   B. push\_back()  
   C. insert\_back()  
   D. append()
3. **What is the purpose of the at() function in a vector?**  
   A. To add elements at the end  
   B. To remove elements from the vector  
   C. To access and modify elements at a given index  
   D. To sort the vector
4. **What does the cbegin() function return?**  
   A. A non-const iterator to the beginning  
   B. A constant iterator to the beginning  
   C. A reverse iterator to the beginning  
   D. A pointer to the vector
5. **Why is the auto keyword often used when declaring iterators?**  
   A. It increases the execution speed of the loop  
   B. It automatically deduces the iterator type  
   C. It prevents modification of vector elements  
   D. It reserves memory for the vector

**2. True or False**

1. **Vectors in C++ have a dynamic size, meaning they can grow or shrink during program execution.**  
   (True / False)
2. **The pop\_back() function removes the first element of the vector.**  
   (True / False)
3. **Using cbegin() allows you to modify the vector elements.**  
   (True / False)

**3. Fill in the Blanks**

1. A vector in C++ is a \_\_\_\_\_\_\_\_\_\_ container that can grow dynamically.
2. The function \_\_\_\_\_\_\_\_\_\_ is used to add elements to the end of a vector.
3. To access an element at a specific index in a vector, the \_\_\_\_\_\_\_\_\_\_ function is used.

**4. Code Completion**

Complete the following C++ code by filling in the blanks:

#include <iostream>

#include <vector>

using namespace std;

int main() {

vector<int> numbers;

// Add numbers 1 to 5 to the vector

for (int i = 1; i <= 5; i++) {

numbers.\_\_\_\_\_\_\_\_(i);

}

// Access and print the third element

cout << "Third element: " << numbers.\_\_\_\_\_\_\_\_(2) << endl;

// Remove the last element from the vector

numbers.\_\_\_\_\_\_\_\_();

return 0;

}

**5. Code Writing Exercises**

**Exercise 5.1: Iterating Over a Vector**

Write a complete C++ program that:

* Creates a vector of integers.
* Adds the numbers from 1 to 10 into the vector.
* Uses a **range-based for loop** to print all the elements of the vector.

*Ensure you include the proper header files and use the correct vector functions.*

**Exercise 5.2: FizzBuzz Problem Using Vectors**

Write a complete C++ program to solve the FizzBuzz problem as follows:

* For numbers from 1 to 15, check each number:
  + Print "Fizz" if the number is divisible by 3.
  + Print "Buzz" if the number is divisible by 5.
  + Print "FizzBuzz" if the number is divisible by both 3 and 5.
  + Otherwise, print the number itself.

*You may use a vector to store the numbers if you wish, but it is not mandatory. The focus should be on applying conditional logic as discussed in the lecture.*