



COLLEGE OF ENGINEERING, SCIENCE & TECHNOLOGY

SCHOOL OF ELECTRICAL & ELECTRONICS
ENGINEERING

TRADE DIPLOMA IN ELECTRICAL ENGINEERING

FINAL EXAMINATION -TRIMESTER 2 – 2017

QUESTION PAPER
EEE 562

ENGINEERING SOFTWARE

Maximum Marks 100(Time Allowed 3:10 mins)

Instructions

1. There are Three (3) sections (A - C). **All sections are compulsory.**
 2. Write your answers legibly in the answer booklet provided.
 3. A **time of three (3) hours** is allowed to complete this paper. **Extra 10 minutes** allowed to read the paper.
 4. You may use **blue or black ball pen** to write your answers.
 5. **Insert all written foolscaps, graph paper, drawing paper, etc.** in their correct sequence and secure with string provided.
 6. Write your **student identification** number on each page used.
 7. **Begin each answer on a fresh new page** and use **both sides** of the sheets.
 8. **No GSM mobiles or smartphones** allowed during the examination
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Section A**Multiple-Choice****[20 Marks]****Question 1.**

Which of the below mentioned sorting algorithm are not stable?

- A. Selection sort
- B. Bubble Sort
- C. Merge Sort
- D. Insertion Sort

Question 2.

Which of the following algorithm does not divide the list –

- A. Linear search
- B. Binary search
- C. Merge sort
- D. Quick sort

Question 3.

Binary search algorithm cannot be applied to

- A. Sorted linked list
- B. Sorted binary trees
- C. Sorted linear array
- D. Pointer array

Question 4.

Two main measures for the efficiency of an algorithm are

- A. Processor and memory
- B. Complexity and capacity
- C. Time and space
- D. Data and space

Question 5.

The time factor when determining the efficiency of algorithm is measured by

- A. Counting microseconds
- B. Counting the number of key operations
- C. Counting the number of statements
- D. Counting the kilobytes of algorithm

Question 6.

Which of the following case does not exist in complexity theory

- A. Best case
- B. Worst case
- C. Average case
- D. Null case

Question 7.

The worst case occur in linear search algorithm when

- A. Item is somewhere in the middle of the array
- B. Item is not in the array at all
- C. Item is the last element in the array
- D. Item is the last element in the array or is not there at all

Question 8.

The complexity of the average case of an algorithm is

- A. Much more complicated to analyze than of worst case
- B. Much more simpler to analyze than that of worst case
- C. Sometimes more complicated and some other times simpler than that of worst case
- D. None of the above

Question 9.

The complexity of linear search algorithm is

- A. $O(n)$
- B. $O(\log n)$
- C. $O(n^2)$
- D. $O(n \log n)$

Question 10.

The complexity of merge sort algorithm is

- A. $O(n)$
- B. $O(\log n)$
- C. $O(n^2)$
- D. $O(n \log n)$

Question 11.

In C++, a function contained within a class is called

- A. A member function
- B. An operator
- C. A class function
- D. A method

Question 12.

In a class definition, data or functions designated private are accessible

- A. To any function in the program
- B. Only if you know the password
- C. To member functions of that class
- D. Only to public members of the class

Question 13.

A member function can always access the data

- A. In the object of which it is a member
- B. In the class of which it is a member
- C. In any object of the class of which it is a member
- D. In the public part of its class.

Question 14.

Classes are useful because they

- A. Are removed from memory when not in use.
- B. Permit data to be hidden from other classes.
- C. Bring together all aspects of an entity in one place.
- D. Can closely model objects in the real world.

Question 15.

Which of the following is true about const member functions?

- A. const members can be invoked on both const as well as non-const objects
- B. const members can be invoked only on const objects and not on non-const objects
- C. non-const members can be invoked on const objects as well as non-const objects
- D. Can modify *const* nor *non-const* member data.

Question 16.

Inheritance is a way to

- A. Make general classes into more specific classes.
- B. Pass arguments to objects of classes.
- C. Add features to existing classes without rewriting them.
- D. Improve data hiding and encapsulation.

Question 17.

Advantages of inheritance include

- A. Providing class growth through natural selection
- B. Facilitating class libraries
- C. Avoiding the rewriting of code.
- D. Providing a useful conceptual framework.

Question 18.

To inherit from class_ keyword is used.

- A. Inherit
- B. extends
- C. uses
- D. implements

Question 19.

When method is overridden, then by subclass object which class's method is called

- A. Super class
- B. Subclass
- C. Both
- D. Nor A either B

Question 20.

Overloads methods _____

- A. Are a group of methods with the same name
- B. Have the same number and type of arguments
- C. Make life simpler for programmer
- D. May fail unexpectedly due to stress.

Section B

Short Answer Questions [50 Marks]

Question 1.

In your own words, define the term **class**?

[1 mark]

Question 2.

In your own words, explain the term **Algorithm**?

[1 mark]

Question 3.

Evaluate the time complexity for function A () and briefly explain how it affects the growth of input size.

[3 mark]

```
A(){
    int i;
    for (i = 1 to n)
        cout <<"good luck"<< endl ;
}
```

Question 4.

Determine the complexity of the given function (order of growth)

[3 mark]

```
A ()
{
    int l, j, k, n;
    for ( i= 1, i <=n, i++)
    {
        for ( j= 1, j <= i, j++)
        {
            for ( k= 1, k <= 100, k++)
            {
                cout << "Good luck" << endl;
            }
        }
    }
}
```

Question 5.

Define the term Polymorphism in your own? [1 mark]

Question 6.

Define the term instance in your own? [1 mark]

Question 7.

A function named pFile () is to receive a file name as a reference to an *ifstream* object. What declaration are required to pass a file name to pFile ()? [2 mark]

Question 8.

Write a class definition that creates a class called leverage with one private data member, crowbar, of type int and one public function whose declaration is void pry(). [2 mark]

Question 9.

Specify when a constructor is executed automatically? [2 mark]

Question 10.

If three objects of a class are defined, how many copies of that class's data items are stored in memory? How many copies of its member functions? [1 mark]

Question 11.

What is the significance of empty parentheses in a function declaration? [2 mark]

Question 12.

How many values can be returned from a function? [1 mark]

Question 13.

Write a program to calculate the wavelength in meters of an electromagnetic wave when the velocity of light is given as 3×10^8 m/s and the user has to enter the frequency in MHz [10 mark]

Question 14.

Write a program that accepts values of two resistors in Ω from the user and calculates the series and parallel resistance of the two values. Display the results as "RS =Ohms" and "RP =Ohms". [10 Marks]

Question 15.

Explain the Hardware Architecture of a Personal Computer with block diagram and brief description of each of the functional block. [10 Marks]

Section C

Programming

[30 Marks]

Question 1.

Imagine the tollbooth at MHCC car park. Cars passing by the booth are expected to pay a 50 cent toll. Mostly they do, but sometimes a car goes by without paying. The tollbooth keeps track of the number of cars that have gone by, and of the total amount of money collected.

Model this tollbooth with a class called tollBooth. The two data items are a type unsigned *int* to hold the total number of cars, and a type double to hold the total amount of money collected. A constructor initializes both of these to 0. A member function called payingCar() increments the car total and adds 0.50 to the cash total. Another function, called nopayCar(), increments the car total but adds nothing to the cash total. Finally, a member function called display() displays the two totals. Make appropriate member functions const.

Write a program to test this class. This program should allow the user to push one key to count a paying car, and another to count a nonpaying car. Pushing the Esc key should cause the program to print out the total cars and total cash and then exit.

The End

