



MACHAKOS UNIVERSITY

University Examinations for 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

.....YEAR SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (.....)

SMA 191: INTRODUCTION TO PROGRAMMING

DATE:

TIME:

INSTRUCTIONS

Answer **question ONE** and **any other TWO** questions.

QUESTION ONE (Compulsory 30 marks)

- a) Show how to declare the following in a program
- i. Income of an employee. (2 marks)
 - ii. Name of a politician (1 mark)
 - iii. Number of words in a dictionary. (1 mark)
 - iv. Daily collection of rainfall data in millimetres for the whole month. (2 marks)
 - v. A collection of mixed simple data types (2 marks)
- b) Explain the use of the following in computer programming:
- i. Compiler (1 mark)
 - ii. Debugger (1 mark)
 - iii. Assembler (1 mark)
 - iv. Algorithm (2 marks)
- c) What is the significance of a large memory size in a computer (3 marks)
- d) Describe the programming process (3 marks)

Write a programming statement to represent the following narrative: Compute and print the weekly pay for a worker. All workers are paid an hourly rate and salary is based on hours times rate. Any work done in excess of 40 hours, is paid at 1.5 times the normal rate. (5 marks)

- e) Convert the following expressions to a programming statement:
- $\sqrt{x^2 + y^2}$ (2 marks)
 - $e^x + m^n$ (2 marks)
 - $(\sqrt{x^2 - 4ac}) / 2a$ (2 marks)

QUESTION TWO (20 marks)

- Give two examples of system software and explain their use (4 marks)
- Using a diagram explain the Von Neumann architecture of a computer system (6 marks)
- Consider the following programming statements.

```
int x = 2, n = 6, p = 1;
for (int i = 1; i <= n; ++i){
    p = p * x;
    cout << p << endl;}}
```

 - What is the output value? (3 marks)
 - Express the output value as a function of x (2 marks)
 - Draw a flow chart diagram to represent the program above (5 marks)

QUESTION THREE (20 MARKS)

- What is the importance of data types in programming (3 marks)
- Distinguish between simple and structured data types(use examples to show how they are used in programming) (5 marks)
- Given a quadratic equation of the form $ax^2 + bx + c = 0$ where $a > 0$ draw a flow-chart for the solution of the equation (6 marks)
- Use any three programming statements to describe decision making in programming (6 marks)

QUESTION FOUR (20 MARKS)

- What is a function in computer programming (1 mark)
- Write a function/method to find the greatest among two integers (4 marks)
- Create a program that receives two integers from the keyboard and uses the function/method to display the greatest number (5 marks)
- Given the following program code:

```
float p = 1.0; int n = 33; int x=2;
```

```
for (int i=1; i<=n; i++) {
```

```
if (n%2 == 1) p = p * x;
```

```
cout << p << endl;}
```

- i. What kind of a control structure is it? (1 mark)
- ii. Rewrite the above code using a while...statement (4 marks)
- iii. Draw a flow diagram to represent these structure (5 marks)

QUESTION FIVE (20 MARKS)

- a) Use the table below to construct a nested if statement to print the string of characters given the conditions (6 marks)

	P>=Q	P<Q
X>Y	Cow	Goat
X<=Y	Donkey	Horse

- b) Using examples, explain the main principles of object oriented programming (8 marks)
- c) Compare object oriented programming to structural programming techniques (6 marks)