



MACHAKOS UNIVERSITY

University Examinations for 2016/2017

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FIRST/SECOND YEAR FIRST/SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

SUPPLEMENTARY/SPECIAL EXAMINATION

EMM 201/EEE 102/ECV 102: COMPUTER PROGRAMMING 1

DATE: 1/9/2017

TIME: 8:30 – 10:30 AM

INSTRUCTIONS

This paper consists of FIVE questions

Answer question one and other two questions in this paper

QUESTION ONE (30 MARKS)

- a) Differentiate between the following concepts
- Syntax errors and semantic errors.
 - Interpreters and compilers
 - Pseudo code and flowchart (6 marks)
- b) Briefly discuss the core features of the following programming languages giving an example of each:
- Low level programming languages.
 - High level programming languages. (4 marks)
- c) Jessie is a lecturer and wants to grade students for his programming unit.
Write a program to request the lecturer to input the student marks then the program returns the grade for the marks given the grading system as follows.

MARKS	70-100	60-69	50-59	40-49	0-39
GRADE	A	B	C	D	F

(8 marks)

- d) With help sample codes explain the following concepts as used in C language
- i Compiler directive (2 marks)
 - ii Escape codes (2 marks)
 - iii Symbolic Constant (2 marks)
- e) Consider the loop program given below:

```
main()
{
  int i=0, sum=0;
  while (i<=9)
  {
    printf("%d \n", i);
    i++;
    sum+=i;
  }
  printf("sum=%d\n", sum);
}
```

Explain what the program does and write the output of the program. (6 marks)

QUESTION TWO

- a) “C language is a general purpose programming language”. Explain the statement. (2 marks)
- b) With help of code segments, explain the following concepts:
- i Formal arguments (3 marks)
 - ii Switch case labels (3 marks)
 - iii Binary operators (3 marks)
- c) Using examples differentiate between *direct and indirect constants*. (4 marks)
- d) State the rules for naming variables in C/C++ language. (4 marks)

QUESTION THREE

- a) A program is required to calculate interest earned from principal amount deposited in a bank for a given period of time. The interest rate depends on the principal amount deposited is as follows:

Principal Amount	Interest Rate Per Annum
Below 50,000	10%
50,000 and above	20%

The user first inputs the principal amount and duration in years. The program should:
 Compute and display the interest amount earned and total amount after the expiry period.
 The details should also save the results on the database

HINT Interest = $P \times R \times T / 100$

Required:

- i Design pseudo code for above program. (6 marks)
- ii Design a flowchart for above program (6 marks)
- iii Write the program code for the above program. (6 marks)
- b) Draw the following flowchart symbols: (2 marks)
 - i. Process
 - ii. Decision/branch

QUESTION FOUR

- a) With help of an example, explain the concept *operator precedence*. (4 marks)
- b) Write a function that uses *function prototype* to calculate area of rectangle. The function accepts two arguments representing dimensions for length and width. (6 marks)
- c) The gross salary of an employee at Mombasa Botique is based on a kshs. 10,000 basic salary and commission as a percentage of sales as follows:

Monthly Sales Amount	Commission Rate
Above kshs. 40,000	30%
Between kshs. 20,000 and kshs. 40,000	25%
Below kshs. 20,000	20%

Write a program that would be used to calculate and display the commission amount and total salary for the employee. The user inputs the monthly sales amount first. (6 marks)

- d) With help of sample code, explain the following concepts.
 - i. Function header (2 marks)
 - ii. Return data type (2 marks)
 - iii. Formal arguments (2 marks)

QUESTION FIVE

- a) i) Design a flowchart for a program that reads in the age of a person and outputs an appropriate message based on;
- If age<18 print “You are a minor”
- If age>=18 print “You are an adult” (6 marks)
- ii) Write the program code for the above flowchart. (6 marks)
- b) Using example, explain the concept of *operator precedence*. (4 marks)
- Explain the following operators. Use example to show their usage in programming
- i. */ (2 marks)
- ii. != (2 marks)