

**MOSHOD ABIOLA POLYTECHNIC, ABEOKUTA**  
**DEPARTMENT OF COMPUTER SCIENCE**  
**2023/2024 1ST SEMESTER EXAMINATIONS**

Course Code: COM 212  
Course Title: INTRODUCTION TO SYSTEM PROGRAMMING  
No. of Units: 2 UNITS Time Allowed: 2hrs  
Class(es) writing the Paper: ND II COMPUTER SCIENCE (F/T & PT)

**SECTION A (THEORY)**

Instructions: Attempt any THREE questions

- 1a. i) Distinguish between System Programming and Application Programming. (6 marks)  
ii) Identify four challenges that are peculiar to System Programming. (4 marks)  
iii) Highlight three major requirements that are expected of a System Programmer. (6 marks)
- b. Write four major characteristics of System Programming. (4 marks)
- 2a. Describe the stored Program Concept of John Von Neumann (5 marks)
- b. Write short notes on the following:  
i) Computer BIOS (2 marks)      ii) Operating System (2 marks)  
iii) Utility Software (2 marks)      iv) Loader (2 marks)  
v) Linkers (2 marks)
- c. Write five functions of a Compiler. (5 marks)
3. With the aid of a suitable diagram, describe the layouts of the following hardware:  
i) Central Processing Unit (10 marks)  
ii) Instruction format (10 marks)
- 4a. Describe Compilation Process, using appropriate sketches where necessary. (16 marks)
- b. Consider the instruction 2D004A executes;  
i) What does the instruction perform? (1 mark)  
ii) What is the Opcode? (1 mark)  
iii) What is the Register Specifier? (1 mark)  
iv) What is the Address Mode Specifier in binary? (1 mark)  
v) What is the Operand Specifier in binary? (1 mark)
- c. If a Pep/5 computer has the values EF20 and 603D in the register and the memory [004A] respectively. Describe what will happen and what the final content of the register and the memory [004A] will be after the execution of the instruction above? (4 marks)
- 5a. Describe the general format of an assembly language statement. (5 marks)
- b. Write ( i) a machine language program (in binary and hexadecimal) to display "Ade" on an output device and (ii) an assembly program, Use direct addressing to designate the operands. (15 marks)

**END**



**SECTION B: (Alternative to Practical) Attempt only ONE question from this section**

**COM212 PRACTICAL QUESTION.**

**Question One**

- 1ai. State Von Neumann rule of Program Counter (PC) in Machine/Assembly Language. (3marks)
- 1aii. Write an assembly program to compute and display the following expression:  $2+6-4$ . (3marks)
- 1aiii. Write a machine language to print "Hello". (3marks)
- 1bi. Suppose Pep/5 computer has the following values in the memory locations as:

A : 19AC

X : FE20

Mem [0A3F] : FF00

Mem [0A41] : 103D

(5marks)

What are the values in the memory locations after each of the following instructions is executed?

- i. 190A3F      ii. 5D0A41      iii. 38      (6marks)

**Question Two**

1. Suppose Pep/5 computer has the following values in the memory locations as:

A : 3AF0

X : 42C1

Mem [F291] : E21C

Mem [30F2] : 97AB

(5marks)

- 2b. What are the values in the memory locations after each of the following instructions is executed?

- i. 5AF291      ii. 2730F2      (4marks)

2. Write pseudocode to describe Von Neumann concept of Program Counter (PC). (4marks)

3. Write a machine language to compute and display the following infix:  $2+6-4$  (4marks)

4. Write an assembly language to print the word "maY" in inverted order. (3marks)