"Investing in Africa's future"

COLLEGE OF BUSINESS, PEACE, LEADERSHIP AND GOVERNANCE

NCSC 100: PROBLEM SOLVING TECHNIQUES

END OF FIRST SEMESTER EXAMINATIONS

NOVEMBER 2022

LECTURER: Dr Agrippah Kandiero

TIME: 3 HOURS

Answer questions as specified in each section.
Total possible mark is **100.**

Start **each** question on a new page in your answer booklet.

The marks allocated to **each** question are shown at the end of the section.

Avoid zero-intelligible content and answer in expanded bullet point form.

Credit will be awarded for logical, systematic and neat presentations.

PAPER 1 THEORETICAL EXAM – **ANSWER ALL QUESTIONS**

Using vivid practical examples define and illustrate the following program solving tools and techniques

1. The PAC   [5]
2. The IPO Chart   [5]
3. The Coupling Diagram   [5]
4. The Data Dictionary   [5]
5. The Algorithm   [5]
6. The Flowchart   [5]
7. The Pseudocode   [5]
8. UML   [5]

PAPER B- **ANSWER 2 QUESTIONS**

Question 1 [30 Marks]
Set up a logical expression for the following policy on using a company credit
card. The card may be used if the
a. Balance plus sales amount is less than the maximum allowable amount.   [5]
b. Last payment was less than 45 days ago.   [5]
c. Credit card has not expired   [5]
d. Illustrate using a flowchart   [5]

Question 2 [30 Marks]

Use the problem solving tools developed in this course to illustrate the complete solution for the problem below:

Problem: Mary Smith is looking for the bank that will give the most return on her money over the next five years. She has $2,000 to put into a savings account. The standard equation to calculate principal plus interest at the end of a period of time is

$$Amount = P * (1 + I/M)^{\wedge}(N * M)$$

where P = Principal (amount of money to invest, in this case $2,000)
I = Interest (percentage rate the bank pays to the investor)
N = Number of Years (time for which the principal is invested)
M = Compound Interval (the number of times per year the interest is calculated and added to the principal)

Question 3 [30 Marks]

The flowchart figure 6.4 below illustrates the solution is straight through logic illustrate and alternative solution in either positive logic or negative logic distinguish between the two
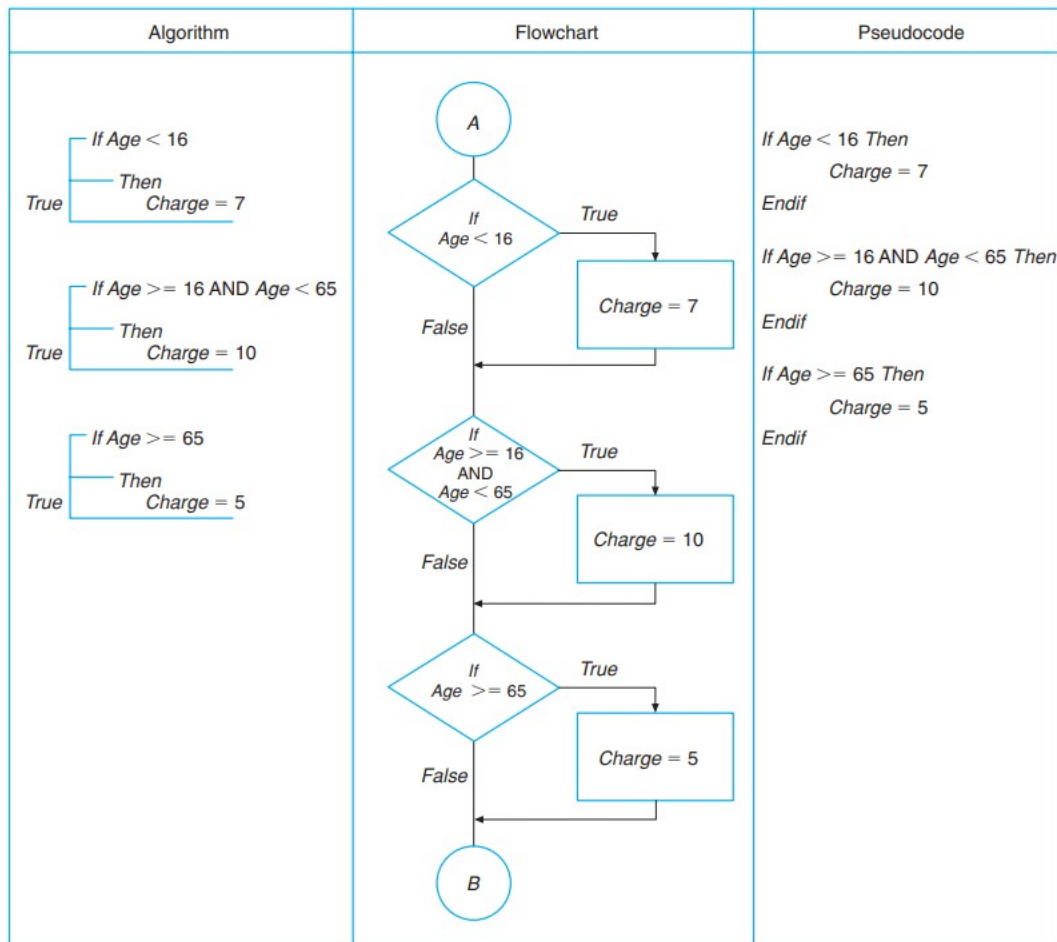
Algorithm	Flowchart	Pseudocode

Algorithm:

If Age < 16
  Then
True   Charge = 7

If Age >= 16 AND Age < 65
  Then
True   Charge = 10

If Age >= 65
  Then
True   Charge = 5

Flowchart:

A

If Age < 16 — True → Charge = 7
False

If Age >= 16 AND Age < 65 — True → Charge = 10
False

If Age >= 65 — True → Charge = 5
False

B

Pseudocode:

If Age < 16 Then
    Charge = 7
Endif

If Age >= 16 AND Age < 65 Then
    Charge = 10
Endif

If Age >= 65 Then
    Charge = 5
Endif

Figure 6.4   Straight-Through Logic—Example 1

Question 4 [30 Marks]

Develop a complete solution to compute simple payroll. Apply all the tools discussed in this course solving this problem.

END PAPER