

PHYS 823
PHYS 921

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF MASTER OF SCIENCE [COMPUTER
SCIENCE AND MATHEMATICS OPTION]

PHYS 823-COMPUTER APPLICATIONS IN PHYSICS RESEARCH
PHYS 921-COMPUTER APPLICATIONS IN RESEARCH

STREAMS: MSC (SCI) BSC (COMP SCI & MATHS)

TIME: 3 HOURS

DAY/DATE: THURSDAY 08/04/2018

2.30 P.M. – 5. 30 P.M.

INSTRUCTIONS

- Answer question 1 in section A and any other **TWO** from section B
- Marks are awarded for clear and concise answers
- Note that only Question **ONE** (Section A) and the first **TWO** attempted questions in section B will be marked.

SECTION A-COMPULSORY

QUESTION ONE-30 MARKS

- (a) While stating the role of an algorithm in computer based systems design, give **THREE** of its desirable features **[4 Marks]**
- (b) Using a diagram, illustrate the five steps of processing a high level language program **[6 Marks]**
- (c) Write a script that prompts a user to enter his/her name, reads it and prints it on the screen **[4 Marks]**
- (d) Compilation is a key step when writing a computer program. Explain **TWO** reasons for compiling a high level language program **[4 marks]**
- (e) Using an example in each case, explain **TWO** logic operators used in C programming **[4 marks]**
- (f) Explain what a high level programming language is. Give **FOUR** examples of such Programming languages. **[4 marks]**

- (g) Explain **TWO** ways of representing comments in C programming. [4 marks]

SECTION B-ANSWER ANY TWO QUESTIONS FROM THIS SECTION

QUESTION TWO [15 MARKS]

- (a) While outlining what a loop is, explain the use of **THREE** loops in C programming language [6 marks]
- (b) State **TWO** ways of presenting an algorithm [2 Marks]
- (c) Write a C program that prints the first 20 numbers of Fibonacci series [7 Marks]

QUESTION THREE [15 MARKS]

A solution is required to find the single root for the equation $y = x^2 - 2x - 1$ on the interval $x = -2$ to 2 .

- (i) Identify the input and output required in order to solve the problem [2 Marks]
- (ii) Draw a flowchart to the design of the algorithm that solves the problem [7 Marks]
- (iii) Implement the flowchart using C programming language [6 Marks]

QUESTION FOUR [15 MARKS]

- (a) Use the spreadsheet data shown below to answer questions that follow:

	A	B	C	D
1	τ	ω	θ	P
2	20	5	30	
3	40	7	60	
4	50	6	90	
5	70	8	120	
6	60	4	150	
7	100	7	180	
8	130	6	210	
9	150	9	240	
10	90	9	270	
11	80	11	300	
$P = \tau\omega \cos \theta$				

- (i) What formulae would you enter in cell D2 to compute the value of P [3 Marks]
- (ii) Explain how you would draw a x-y graph of P against $\cos \theta$ [6 Marks]

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- (b) Write Linux commands to perform the following tasks.
- i) Displays/prints output ‘**Hello**’ on the screen **[2 Marks]**
 - ii) Prints the full path name of current working directory to the standard output **[2 Marks]**
- Marks]**
- iii) Displays a file content **[2 Marks]**

QUESTION FIVE [15 MARKS]

Create scripts in Linux that perform the following functions.

- (i) Ask the user for a filename and then open it for editing **[5 Marks]**
 - ii) Displays number 1 to 10 automatically **[5 Marks]**
 - iii) Takes an input from the user, and then it will create a file named after the user's input **[5 Marks]**
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