CHUKA UNIVERSITY

UNIVERSITY EXAMINATIONS

SECOND YEAR SEMETER TWO EXAMINATION FOR THE AWARD OF BACHELOR OF SCIENCE DEGREE IN APPLIED COMPUTER SCIENCE

ACSC 111: PRINCIPLES OF COMPUTER SYSTEM MANAGEMENT

STREAM: B.SCAPPLIED COMP. SCI (Y1S2) **TIME: 2 HOURS**

DAY/DATE: FRIDAY 26/03/2021 **2.30 P.M. – 4.30 P.M**

INSTRUCTIONS: ANSWER QUESTION 1 AND ANY OTHER TWO

- **Answer QUESTION ONE and any other TWO questions.**
- **This is a CLOSED BOOK exam. No reference materials are allowed in the exam room.**
- **No mobile phone allowed in the exam room *(make sure to switch it off and leave it with the invigilator if you carried one).***
- **Write your answers legibly and use your time wisely**

SECTION A (COMPULSORY)

Question One (Compulsory) [30 marks]

a) What is a computer port? **[2 Marks]**

b) Outline the advantages of SATA over PATA. **[4 Marks]**

c) Briefly explain any four features of the USB interface [**4 Marks**]

d) Differentiate between BIOS and CMOS. [**4 Marks]**

e) Discuss the major causes of PC downgrade. [**6 Marks]**

f) Describe the main functions that the motherboard BIOS provides. **[6 Marks]**

g) Discuss the main types of form factors in the market today. **[4 Marks]**

SECTION B (Answer any TWO questions from this section)

Question Two [20 marks]

a) Discuss the strategies that can be employed to fix software problems. [**6 Marks]**

b) Explain any three types of backups. [**6 Marks]**

c) Using a well labeled diagram, discuss the chipset, its components and functions. [**6 Marks**]

d) Explain any **Two** types of ports **[2 Marks]**

Question Three [20 marks]

a) Discuss the types of hardware technologies used inside a hard drive. **[6 Marks]**

b) Discuss the preventive measures one should consider in maintaining Windows. **[6 Marks]**

c) Explain the different hardware used by local networks. **[6 Marks]**

d) What is a form factor? **[2 Marks]**

Question Four [20 marks]

a) Your friend just bought a brand new laptop with no software installed. He would like to have both LINUX and WINDOWS operating systems in the laptop. Illustrate how you would perform this task from beginning to end.

(i) Mention how you would prepare the hard drives. **[4 Marks]**

(ii) Outline the procedure of installing the Windows operating system. **[8 Marks]**

(iii) Outline the procedure of installing the LINUX operating system. **[8 Marks]**

Question Five [20 marks]

a) Describe any three third party tools commonly used to optimize PC performance. **[6 Marks]**

b) Your immediate boss would like to know the advanced specifications of some computers the company recently bought. Explain two commands you would run in a windows environment to perform his task and what they exactly display. **[6 Marks]**

c) Using examples, discuss the commonly used commands to troubleshoot a computer network. **[8 Marks]**

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RESIT/SPECIAL EXAMINATION

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN COMPUTER SCIENCE

ACMP 225: WEB PROGRAMMING AND ADMINISTRATION

STREAMS: **TIME: 2 HOURS**

DAY/DATE: TUESDAY 02/11/2021 **8.30 A.M – 10.30 A.M**

INSTRUCTIONS:

QUESTION ONE [30 MARKS]

a) Explain the importance of web standards in web design and development. [2 Marks]

b) List and describe any four W3C standards important to web designers and developers. [8 Mark]

c) A string "Web Programming and Administration" is to be displayed as a Heading 2 with a text color of blue and with a line passing across the string. Write the HTML code to implement this. [3 Marks]

d) Explain the concept of DHTML in web programming. [4 Marks]

e) Giving an example present and explain the structure of a CSS rule. [4 Marks]

f) Write the full meaning of the following abbreviations:

i. HTML. [2 Marks]

ii. CSS. [2 Marks]

iii. XML. [2 Marks]

g) Write a JavaScript program that welcomes visitors to a website when the index page loads. [3 Marks]

SECTION B ANSWER ANY TWO QUESTIONS FROM THIS SECTION QUESTION TWO [20 MARKS]

a) A driving school only accepts students who are aged eighteen and above. Write a PHP program that tests age and responds with an appropriate message. [4 Marks]

b) You are designing a Registration form for a Student Management System. Describe in detail how you would apply each of Schneidermann's rules of interface design in the design of the form. [8 Marks]

c) Write a JavaScript code that through a function alerts users when they are about to leave a web page and then goes ahead to ask the user for a confirmation whether to leave the page or not. [8 Marks]

QUESTION THREE [20 MARKS]

a) Highlight the role of Ajax in web development. [3 Marks]

b) "System status should be visible".

i. Explain what is meant by this heuristic. [2 Marks]

ii. Give examples of how you could design your web application to meet this heuristic. [4 Marks]

Using HTML and PHP code, write a program to find Area of any circle. [6 Marks]

d) Write MySQL code to create a user named Admin with a password adminadmin on a machine Localhost. (5 marks)

QUESTION FOUR [20 MARKS]

a) Headings 1, 2 and 3 are to be bold, of font type Arial, white in color and have a black background. All paragraphs are to be blue in color and of size 36 points. The background color of the web page is to be pink. Implement this in a web page using:

i. Inline CSS styles. [4 Marks]

ii. ii. External CSS styles. [5 Marks]

iii. iii. Internal CSS styles (4 marks)

b) Discuss the impact of the following colors when used in a website:

i. Blue. [3 Marks]

ii. Grey. [2 Marks]

iii. Orange (2 marks)

QUESTION FIVE [20 MARKS]

a) Explain the difference between the HTTP get and the HTTP post methods of sending form data to a server. (6 Marks).

b) Differentiate the following terms (6marks)

i. Server side scripting from client-side scripting

ii. Thin client from fat client iii. Java and javascript

c) Write PHP code to send the student details on the form from the text boxes to a database called “UniDB” in a table named “TblStudents” (8marks)

CHUKA  **UNIVERSITY**

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN ACTUARIAL SCIENCE

ACMT 413: RISK MODELING

STREAMS: BSC **TIME: 2 HOURS**

DAY/DATE: THURSDAY 23/09/2021 **2.30 P.M – 4.30 P.M.**

INSTRUCTIONS:

QUESTION ONE (30 MARKS) COMPULSORY)

A) List and explain two major statistical paradigms and give two examples each. (6 marks)

B) What are the two assumptions that are based on Emperical Bayes Credibility Theory model I? (4 marks)

C) Write down formulae in terms of M_k for the mean, variance and coefficient of skewness of random variable x_i, representing individual claim sizes (6 marks)

D) State the Lundeberg's inequality (2 marks)

E) An annual aggregate claim amount from a risk has a compound poison distribution with posion parameter 10. Individual claim amounts are uniformly distributed on (0, 2000). The insurer of the risk has affected excess of loss reinsurance with retention level 1,600. Calculate

i) Mean (3 marks)

ii) Variance (3 marks)

iii) Coefficient of skeweness of both the insurer and reinsurer's aggregate claims under the reinsurance arrangement (3 marks)

What are the criteria that have to be met for a risk to be insurable? (3 marks)

QUESTION TWO (20 MARKS)

a) List an explain attributes of short term insurance contract (3 marks)

b) A compound distribution S is such that P (N=0) = 0.6, P (N=1) = 0.3 and P (N=2) =0.1 Claim amount are either for 1, unit or 2 units, each with probability 0.5. Derive the distribution function of S. (5 marks)

c) The table below shows the aggregate claim amounts in Kshs. *m*) for Jubilee insurance for a period of 5 years. Fill in the missing entries and calculate E [m(θ)] and Var [m(θ)] E(s^2 (θ)] using EBCT I model.

d)

TOTAL CLAIM AMOUNT

	Years(J)					x_1	$\frac{1}{4}\sum_{j=1}^{5}(x_{ij}-x_i)^2$
Country	1	2	3	4	5		
1	48	53	42	50	59	50.4	39.3
2	64	71	64	73	70	68.4	17.3
3	85	54	76	65	90	74.0	213.5
4	44	52	69	55	71	?	?

(12 marks)

QUESTION THREE (20 MARKS

a) Describe three situations where an insurer might determine a premium rate by combining data for a risk with collateral data. (3 marks)

b) A stastician wishes to find a Bayesian estimate of the mean of an exponential distribution with density function $f(x) = {}^{1}/\mu\ e^{-x}/\mu$. he is proposing to use a prior distribution of the form

$$\text{Prior } (\mu) = \frac{\theta \propto e^{-\theta/\mu}}{\mu^{\alpha+1}\sqrt{\propto}} \quad \mu>0$$

You are given the mean to be $\theta / \propto_{-1}$

i) Write down the likehood function for μ based on the random samples of value x_1, $x_2 \ldots x_n$ from the exponential distribution. (2 marks)

ii) Find the form of the posterior distribution for μ and hence show that on expression for the Bayesian estimate for μ

$$\mu = \frac{\theta+\Sigma x_2}{n+\propto-1}$$ (5 marks)

iii) Show that the Bayesian estimate for μ can be written in the form of credibility estimate. Write down the formula for credibility factor (5 marks)

iv) The statistician now decides that he will use a prior distribution of this form with parameters θ=40 and ∝=1.5. His sample data have statistics n=100, Σx= 9,826 and Σx_1^2= 1,200,000. Find the posterior estimate for u and the value of credibility factor. (5 marks)

QUESTION FOUR (20 MARKS)

a) If X~ poison (d) and y~ poison (u) are independent random variables. Fin the probability function of Z=x+y. using convolutions. (4 marks)

b) Find the expression of MGF (Moment Generating Function) of a claim amount if the number of claims has a bin (100, 0.01) distribution and the individual claim size are gamma (10,0.2). Find the mean and variance of the aggregate claim amount. (6 marks)

c) What is proportional reinsurance. (2 marks)

d) List and explain approaches to credibility theory. (8 marks)

QUESTION FIVE (20 MARKS)

A) The aggregate claims from a risk have a compound poison distribution with parameter μ. individual claim amount (Kshs.) have a pareto distribution with parameter ∝=3 and λ=1,000. The insurer of the risk calculates the premium using a premium loading factor of 0.02. The insurer is considering effecting excess of loss reinsurance with retention

limit of Kshs. 1,000. The reinsurance premium will be calculated using a premium loading factor of 0.3. the insurer profit is defined to be the premium charged by the insurer less than reinsurance premium and less the claims paid by the insurer, net of reinsurance,

i. Show that the insurer expected profit before reinsurance is 100μ.

ii. Calculate the insurers expected profit after affecting the reinsurance, and hence find the percentage reduction in the insurer expected profit.

iii. Calculate the percentage reduction of the standard deviation of the insurer profit or a result of affecting reinsurance. (20 marks)

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RSITY EXAMINATION

RESIT/SPECIAL EXAMINATIONS

FIRST YEAR EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN APPLIED COMPUTER SCIENCE

ACSC 101: INTRODUCTION TO INFORMATION TECHNOLOGY

STREAMS: BSC(APPLIED COMP SCI) **TIME: 2 HOURS**

DAY/DATE: MONDAY 01/02/2021 **8.30 A.M – 10.30 A.M**

INSTRUCTIONS:

Answer QUESTION ONE and any other TWO questions.

This is a CLOSED BOOK exam. No reference materials are allowed in the exam room.

No mobile phone is allowed in the exam room ***(make sure to switch it off and leave it with the invigilator if you carried one).***

Write your answers legibly and use your time wisely

QUESTION ONE (30 MARKS) COMPULSORY

a) Define the following terms: (6 marks)

(i) Computer systems

(ii) Bit

(iii)Internet

b) Differentiate between the following: (4 marks)

i) Computer Software and Computer hardware

Systems software and application software

c) Provide a definition of application software, and provide three examples of this type of software.

(4 marks)

d) Describe the following terms as used in spreadsheet:

i. Cell (2 marks)

ii. Formula bar (2 marks)

e) Explain three types of operating systems giving an example in each case (6 marks)

f) Discuss the three major types of computer network, citing the differences in each type.

(6 marks)

QUESTION TWO (20 MARKS)

a) Using a well labeled diagram, explain the role of the various functional components of a computer. (10 marks)

b) Discuss five output and five input devices in a computer, giving their main functions.

(10 marks)

QUESTION THREE (20 MARKS)

a) Kenya Airport Authority, a state corporation, intends to buy human resource management software. Explain any two factors they should consider when selecting the software.

(4 marks)

b) Explain the three components of central processing unit (CPU). (6 marks)

c) With the aid of sketches, describe two-page orientation options. (4 marks)

d) State two ways of reducing eye strain when using a computer. (2 marks)

e) Distinguish between spreadsheet and worksheet as applied in spreadsheet programs

(4 marks)

QUESTION FOUR (20 MARKS)

a) Discuss any THREE social impacts of the internet. (6 marks)

b) Define the term computer virus, hence explain any three common types. (6 marks)

c) You are the head of a local Network consulting company. Your company has won a contract to design and develop a network for a middle level college in Chuka. Explain four benefits the college will gain by implementing the network.
(8 marks)

QUESTION FIVE (20 MARKS)

a) Describe two types of page breaks available in typical word processing program.
(4 marks)

b) Distinguish between cut and paste features as applied in word processing programs.
(4 marks)

c) Study the following extract created using word processing program and then answer the question that follows

Introduction

ognitive science is the scientific study of intelligence and intelligent systems with particular reference to intelligent behaviour in computing.

C*Cognitive science* is an interdisciplinary course encompassing cognitive psychology, linguistics, artificial intelligence, neuroscience, philosophy, and other fields as well, with the common goal of understanding the nature of human thought.

The Heritage Illustrated Dictionary defines cognition as

- The mental process or faculty by which knowledge is acquired.
- That which comes to be known, as through perception, reasoning, or intuition; knowledge

Therefore, we can see that cognitive science encompasses many disciplines of study like **neuroscience** for the study of the brain and **nervous** system, **psychology** for learning, **information processing** and so on.

Identify *eight* formatting features applied in the extract. (4 marks)

d) Explain the term defragmentation as used in computer systems. (2 marks)

e) Under what circumstance would the keyboard numeric pad be used when entering data in the computer. (2 marks)

f) Differentiate between special-purpose and general-purpose computers giving a place where each is likely to be found. (4 marks)

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UNIVERSITY EXAMINATIONS

RESIT /SPECIAL

EXAMINATION FOR THE AWARD OF DEGREE OF BACHEOLOR OF SCIENCE IN APPLIED COMPUTER SCIENCE

ACSC 101: INTRODUCTION TO INFORMATION TECHNOLOGY

STREAMS: BSC (ACSC) **TIME: 2 HOURS**

DAY/DATE: TUESDAY 10/8/2021 **8.30 A.M. – 10.30 A.M.**

INSTRUCTIONS: Answer ALL questions in section A and any other TWO in section B.

SECTION A (COMPULSORY - ANSWER ALL QUESTIONS IN THIS SECTION)

QUESTION ONE (30 MARKS)

(a) Using the computer block diagram explain four basic functions of a computer system. (7 marks)

(b) Discuss the operations of any two types of computer viruses. (4 marks)

(c) Discuss three characteristics of computers (6 marks)

(d) Outline at least four key features of fourth and fifth computing generations. (4 marks)

(e) Explain the three categories of computers according to their functionalities. (6 marks)

(f) Define the term Protocol as applied in computer networks and outline the functions of a communication protocol. (3 marks)

SECTION B: CHOOSE ONLY TWO QUESTIONS FROM THIS SECTION

QUESTION TWO (20 MARKS)

a). State and explain **four** different types of computer registers. (8 marks)

b). List and explain four Components of a communication network: (8 marks)

c). Discuss **two** fundamental categories of Computer software using suitable examples for each. (4 marks)

QUESTION THREE (20 MARKS)

(a) Computers have different uses in a business setting. Using relevant examples, discuss their various uses in a busy business setup. (10 marks)

(b) Discuss the various applications of internet in our society today. (10 marks)

QUESTION THREE (20 MARKS)

a). Explain the purpose of EACH of the following elements of a computer system: (6 marks)

i. Accumulator
ii. ALU
iii. Control unit
iv. Data bus
v. RAM
vi. ROM

b) Discuss the following forms of computer networks: LAN; WAN and MAN. (5 marks)

c). Describe Star topology, Bus topology and Mesh network topologies, giving their advantages and limitations. (9 marks)

QUESTION FIVE (20 MARKS)

a) The bus subsystem consists of three main parts. Name and explain the parts. (6 marks)

b) List and explain any three types of computer operating systems. (6 marks)

c) Using appropriate examples distinguish between input and output devices. (8 marks)

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UNIVERSITY EXAMINATION

RESIT/SPECIAL EXAMINATION

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN APPLIED COMPUTER SCIENCE

ACSC 101: INTRODUCTION TO INFORMATION TECHNOLOGY

STREAMS: **TIME: 2 HOURS**

DAY/DATE: WEDNESDAY 03/11/2021 **8.30 A.M – 10.30 A.M**

INSTRUCTIONS

Answer Question 1 and Any Other Two.

SECTION A: Answer all questions in this section
QUESTION ONE (30 Marks)

a) Digital computers represent data as a sequence of bits (0s or 1s). Explain the reason behind this phenomenon. **[3 marks]**
b) Describe the idea behind the organization of computer memory in a hierarchy. **[3 marks]**
c) Identify the main functions of a computer. **[2 marks]**
d) Clearly distinguish between **OLAP** and **OLTP** giving an example for each. **[4 marks]**
e) Outline the salient features of an efficient Transaction Processing System. **[5 marks]**
f) Using clear examples, explain the focus of IT Management in organizations. **[3 marks]**
g) The computing revolution has led to the automation of almost all industrial processes today. Briefly discuss any **TWO** modern automation tools. **[4 marks]**
h) Describe the purpose of Queries in database management system. **[3 marks]**
i) Outline any **THREE** reasons for building computer networks. **[3 marks]**

SECTION B (Answer any TWO questions from this section)

Question Two (20 marks)

a) Giving examples, clearly distinguish between **BATCH** and **REAL TIME** data processing modes. **[6 Marks]**
b) Outline the advantages of databases. **[4 marks]**
c) With the aid of a diagram, describe the logical architecture of a computer system. **[6 marks]**
d) Differentiate between the operating system and utility programs. **[4 marks]**

Question Three (20 marks)

a) Giving reasons, explain the most appropriate scheme of acquiring business management software such as Payroll Systems. **[4 marks]**
b) Describe **TWO** major features each for Spreadsheet applications and Word Processors that make them suitable for their functions. **[4 marks]**
c) Citing examples, explain any three functions of IT. **[6 marks]**
d) Discuss the functional differences between DSS and TPS. **[6 marks]**

Question Four (20 marks)

a) Distinguish between Tables, Forms and Records as used in DBMS. **[6 marks]**
b) Explain the stored program concept clearly highlighting the function of each hardware involved in this concept. **[6 marks]**
c) Differentiate between network Protocols and Topologies as used in computer networks giving **TWO** examples for each. **[4 marks]**
d) Differentiate between **DATA** and **ADDRESS** lines of the system bus. **[4 marks]**

Question Five (20 marks)

a) Giving examples discuss the difference between magnetic and semi-conductor technology in the production of memory devices. **[6 marks]**
b) High performance computing and the internet have seen the development of IT based solutions reshaping modern business approaches. Discuss any **TWO** such solutions. **[4 marks]**
c) Differentiate between the Binary and Hexa-Decimal number formats and how they are used in modern computers. **[6 marks]**
d) Outline the differences between main and auxiliary memory. **[4 marks]**

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UNIVERSITY EXAMINATIONS

RESIT/SPECIAL EXAMINATION

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN APPLIED COMPUTER SCIENCE

ACSC 102: INTRODUCTION TO DIGITAL LOGIC

STREAMS: BSC ACSC **TIME: 2 HOURS**

DAY/DATE: TUESDAY 02/11/2021 **8.30 A.M – 10.30 A.M.**

INSTRUCTIONS:

- Answer Question ONE and any other TWO questions.
- Do not write on this question paper.

Question One (Compulsory) [30 marks]

(a) Discuss three important achievements from the earliest to the latest generation of computer systems. [3 marks]

(b) Discuss three major differences between main memory and the hard disk. [3 marks]

(c) Discuss the role of the following registers in the processor.
- (i). Program counter [1 mark]
- (ii). Memory buffer register [1 mark]
- (iii). Instruction register [1 mark]

(d) Find the sum of 37_{10} and -13_{10} in binary using the two's complement arithmetic. Use 8 bits to represent the binary numbers. [3 marks]

(e) Construct a truth table for the Boolean expression shown below. [6 marks]

$$\bar{x}\,\bar{y}\,(y + \overline{xy})$$

(f) Perform the following number system conversions.
- (i) 101001.11_2 to Decimal system. [3 marks]
- (ii) 397.375_{10} to Binary system. [3 marks]

(g) Draw the combinational circuit that directly implements the following Boolean function. [6 marks]

$$F(x,y,z) = xz + (\overline{\bar{x}y} + \bar{z})$$

Question Two [20 marks]

(a) Simplify the Boolean function using Boolean identities. Show the Boolean identities used in each step. [5 marks]

$$F(x, y, z) = \bar{x}\bar{y}\bar{z} + \bar{x}y\bar{z} + x\bar{y}\bar{z} + xy\bar{z}$$

(b) Discuss the advantages and disadvantages (if any) of the following cache mapping functions. Explain how the two functions compare. [6 marks]

(i) Direct mapping
(ii) Set associative mapping

(c) Design a truth table for a three –input exclusive-**OR (XOR)** operation. Design its implementation using AND, OR and NOT gates. [9 marks]

Question Three [20 marks]

(a) Discuss performance balance in the design of computer systems. [5 marks]

(b) Perform the following number conversions

(i) 253.75_{10} to binary (base 2) [3 marks]
(ii) $67F0_{16}$ to octal (base 8) [3 marks]

(c) A three-input digital circuit gives a TRUE output when a majority (i.e. 2 or more) of the inputs is TRUE. Develop a truth table for the output and then draw the logic diagram for the circuit implementation using AND, OR and NOT gates. [9 marks]

Question Four [20 marks]

(a) Discuss the flow of program execution in the event of a raised interrupt when interrupts are enabled. [5 marks]

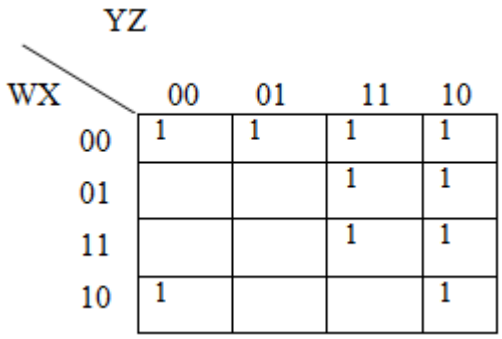
(b) Explain the similarities and differences between RAM and ROM [6 marks]

(c) Discuss the computer memory hierarchy. Show why this arrangement is the best so far as used in the design of computer systems. Use an appropriate diagram for illustration. [9 marks]

Question Five [20 marks]

(a) Draw a logic circuit implementation for the following Boolean function.
$f(x,y,z) = xz + (\overline{xy + z}) + x\bar{y}z$ [5 marks]

(b) Get the simplified version of the Boolean function represented in the Kmap shown below. Design a logic diagram for the simplified function. [6 marks]



(c) Discuss the following memory access modes. Give the memory devices involved in each case. [9 marks]

(i) Random access
(ii) Direct access
(iii) Sequential access

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UNIVERSITY EXAMINATIONS

RESIT/SPECIAL

FOR THE WARD OF BACHELOR OF SCIENCE IN APPLIED COMPUTER SCIENCE

ACSC 102: INTRODUCTION TO DIGITAL LOGIC

STREAMS: B.Sc. (APPLIED COMP.SCI) Y1S1 **TIME: 2 HOURS**

DAY/DATE: MONDAY 01/02/2021 **11.30 A.M. – 1.30 P.M.**

INSTRUCTION: Answer question ONE and any other TWO questions.

QUESTION ONE (30 MARKS)

(a) Explain the impact of cache misses (both read and write misses) on the general computer performance. (3 marks)

(b) Perform the following number system conversion.
597.485_{10} to Binary system. (3 marks)

(c) Construct a truth table for the Boolean expression shown below. (4 marks)

$$x(\overline{yz} + x\bar{y})$$

(d) Briefly explain the fetch-execute cycle in instruction execution. (4 marks)

(e) Explain the role of Program Counter and Accumulator during instruction execution. (4 marks)

(f) Draw the combinational circuit that directly implements the following Boolean function. (4 marks)

$$F(x,y,z) = xz + (\overline{\bar{x}y} + \bar{z})$$

(g) Simplify the Boolean function using Boolean identities. Show the Boolean identities used in each step. (4 marks)

$$F(x, y, z) = \bar{x}\bar{y}\bar{z} + \bar{x}y\bar{z} + x\bar{y}\bar{z} + xy\bar{z}$$

(h) Find the sum of 39_{10} and -17_{10} in binary using the two's complement arithmetic. Use 8 bits to represent the binary numbers. (4 marks)

QUESTION TWO (20 MARKS)

(a) Explain the purpose of interrupts in processor performance. (3 marks)

(b) Design a truth table for a three –input exclusive-**OR (XOR)** operation. Design its implementation using AND, OR and NOT gates. (9 marks)

(c) Get the simplified version of the Boolean function represented in the Kmap shown below. Design a logic diagram for the simplified function. (8 marks)

WX \ YZ	00	01	11	10
00	1	1	1	1
01	1		1	1
11			1	1
10	1			1

QUESTION THREE (20 MARKS)

(a) Explain what is cache coherency? (2 marks)

(b) Create a Kmap and then simplify the following function. (8 marks)

$$F(w,x,y,z) = \bar{y}x + w\bar{y} + \bar{w}xy + \bar{w}\bar{x}y\bar{z} + w\bar{x}y\bar{z}$$

(c) A three-input digital circuit gives a TRUE output when a majority (i.e. 2 or more) of the inputs is TRUE. Develop a truth table for the output and then draw the logic diagram for the circuit implementation using AND, OR and NOT gates. (10 marks)

QUESTION FOUR (20 MARKS)

(a) Show that $(X + Y)(X + \bar{Y})(\bar{X} + Z) = XZ$ using Boolean identities. (7 marks)

(b) Describe the four major internal structural components of a computer system. Use a well labeled diagram to illustrate their interconnection. (7 marks)

(c) Describe the following cache write policies. (6 marks)
- (i) write-through
- (ii) Write-back

QUESTION FIVE (20 MARKS)

(a) Discuss three types of memory access techniques used in main memory and secondary memory devices. (6 marks)

(b) Discuss the flow of program execution in the event of a raised interrupt when interrupts are enabled. Use an appropriate diagrams to illustrate your answer. (8 marks)

(c) Perform the following number conversions:

i) 243.25_{10} to base 4 (3 marks)

ii) $8FEA2_{16}$ to binary (3 marks)

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UNIVERSITY EXAMINATION
RESIT/SUPPLEMENTARY / SPECIAL EXAMINATIONS
EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF APPLIED COMPUTER SCIENCE

ACSC 102: INTRODUCTION TO DIGITAL LOGIC

STREAMS: **TIME: 2 HOURS**

DAY/DATE: TUESDAY 10/08/2021 **8.30 A.M - 10.30 A.M.**

CANDIDATE INSTRUCTIONS

1. Answer **all questions** in section A and any other **two questions** from section B.
2. No Reference Material is allowed in the exam Room.
3. All Mobile phones should be switched off in the exam room.

SECTION A (COMPULSORY)

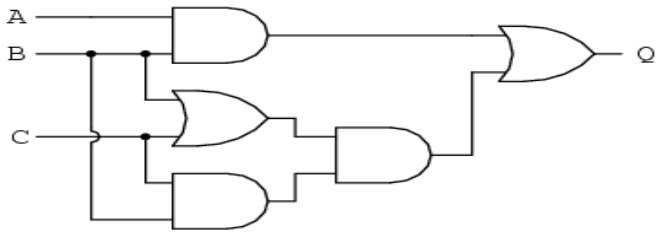
QUESTION 1(COMPULSORY) [30 MARKS]

a) Explain three basic types of registers found in a computer CPU (3 marks)

b) Use Karnaughmap to minimize the equation below (5 marks)

$$Z = f(A,B,C) = \overline{A}B + B\overline{C} + BC + A\overline{B}\,\overline{C}$$

c) Below is a digital circuit. Use it to answer the questions below: -



i) Write output Q. (2 marks)

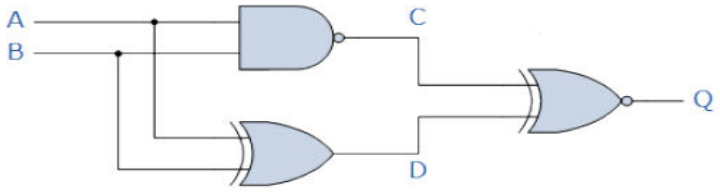
ii) Simplify output Q of the above circuit (show the simplification process) (3 marks)

iii) Draw a resultant circuit after the simplification. (2 marks)

d) Perform the following decimal arithmetic using binary $136_{10} + 345_{10}$ (4 marks)

e) Differentiate between serial and parallel port, naming a device that can be connected to each port. (5 marks)

f) Below is a circuit. Use it to answer the questions that follow:-



i) Write the truth table of the circuit above (4 marks)

ii) From the truth table, can the circuit be minimized? If so draw the minimized circuit. (2 marks)

SECTION B (Answer **two question** from this section)

QUESTION 2 [20 MARKS]

a) Use truth table to prove the following Boolean algebra.

i) $A + \bar{A}\,B = A + B$ (4 marks)

ii) $A + A\,B = A$ (4 marks)

b) There are various adapter cards that can be connected onto a computer. Outline FIVE such cards and their functions. (10 marks)

c) Explain Two characteristics of RAM (2 marks)

QUESTION 3 [20 MARKS]

a) With reference to decoders

i) Using an example of a digital device, explain the function of a decoder (3 marks)

ii) Draw a circuit diagram of a 2 to 4 decoder (5 marks)

iii) Draw a truth table of the above decoder (4 marks)

b) Convert binary 1110001_2 into Decimal (3 marks)

c) Outline FIVE digital output devices of a computer (5 marks)

QUESTION 4 [20 MARKS]

a) Computers have evolved from the 1^{st} generation to the current 5^{th} Generation. Explain the electrical/processing technology that was used in each generation. (10 marks)

b) A certain student claimed that a NOT gate cannot take more than one input at a time. Is the statement true? Discuss? (4 marks)

c) Explain the following Boolean laws using an example each case

i) Involution (2 marks)

ii) Commutative (2 marks)

iii) Complementary (2 marks)

QUESTION 5 [20 MARKS]

a) Explain the importance of Karnaugh map in Digital electronics (2 marks)

b) Convert 362.35_8 into a decimal number (4 marks)

c) Draw the symbol and truth table of FOUR basic logic gates (8 marks)

d) Outline FOUR differences between digital and analogue electronics (4 marks)

e) Draw a truth table of an XNOR with two inputs (2 marks)

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RESIT/SPECIAL EXAMINATIONS

SECOND YEAR EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN APPLIED COMPUTER SCIENCE

ACSC 111: PRINCIPLES OF COMPUTER SYSTEM MANAGEMENT

STREAMS **TIME: 2 HOURS**

DAY/DATE: TUESDAY 04/05/2021 **8.30 A.M – 10.30 A.M**

INSTRUCTIONS:

Answer Question 1 and Any Other Two.

- **Answer QUESTION ONE and any other TWO questions.**
- **This is a CLOSED BOOK exam. No reference materials are allowed in the exam room.**
- **No mobile phone allowed in the exam room *(make sure to switch it off and leave it with the invigilator if you carried one).***
- **Write your answers legibly and use your time wisely**

SECTION A (COMPULSORY)

Question One (Compulsory) [30 marks]

a) Describe any three common ports in a typical PC. [6 Marks]

b) Outline the purpose BIOS and CMOS in a PC. [4 Marks]

c) Outline 6 major causes of PC performance downgrade. [6 marks]

d) Explain TWO types of cables connecting drives to the motherboard. [4 Marks]

e) Using a diagram, explain the NTFS file system. [6 Marks]

f) Describe 4 major components in a system unit. [4 Marks]

SECTION B (Answer any TWO questions from this section)

Question Two [20 marks]

a) Discuss the main folder locations Windows OS uses for storage of registry values and other windows data. [10 Marks]

b) Using a well labeled diagram, discuss the chipset, its components and functions. [10 Marks]

Question Three [20 marks]

a) Discuss the types of hardware technologies used inside a hard drive. [6 Marks]

b) Discuss the major tools used to manage Windows components and services. [8 Marks]

c) Explain the different hardware used by local networks. [6 Marks]

Question Four [20 marks]

a) Explain the 6 steps most experts use to troubleshoot hardware and software problems. [12 Marks]

b) Discuss the main types of form factors in the market today. [8 Marks]

Question Five [20 marks]

a) Describe the main functions that the motherboard BIOS provides. [9 Marks]

b) Discuss the various types of RAM modules. [8 Marks]

c) Outline three preventive measures to consider in maintaining Windows. [3 Marks]

CHUKA UNIVERSITY

UNIVERSITY EXAMINATIONS

SECOND YEAR SEMETER TWO EXAMINATION FOR THE AWARD OF BACHELOR OF SCIENCE DEGREE IN APPLIED COMPUTER SCIENCE

ACSC 111: PRINCIPLES OF COMPUTER SYSTEM MANAGEMENT

STREAM: B.SCAPPLIED COMPUTER SCIENCE Y1S2
DATE: APRIL 2021 **TIME: 2 HOURS**

Instructions: Answer Question 1 and Any Other Two.

- Answer QUESTION ONE and any other TWO questions.
- This is a CLOSED BOOK exam. No reference materials are allowed in the exam room.
- No mobile phone allowed in the exam room *(make sure to switch it off and leave it with the invigilator if you carried one).*
- Write your answers legibly and use your time wisely

SECTION A (COMPULSORY)

Question One (Compulsory) [30 marks]

a) What is a computer port? **[2 Marks]**
b) Outline the advantages of SATA over PATA. **[4 Marks]**
c) Briefly explain any four features of the USB interface **[4 Marks]**
d) Differentiate between BIOS and CMOS. **[4 Marks]**
e) Discuss the major causes of PC downgrade. **[6 Marks]**
f) Describe the main functions that the motherboard BIOS provides. **[6 Marks]**
g) Discuss the main types of form factors in the market today. **[4 Marks]**

SECTION B (Answer any TWO questions from this section)

Question Two [20 marks]

a) Discuss the strategies that can be employed to fix software problems. **[6 Marks]**
b) Explain any three types of backups. **[6 Marks]**
c) Using a well labeled diagram, discuss the chipset, its components and functions. **[6 Marks]**
d) Explain any **Two** types of ports **[2 Marks]**

Question Three [20 marks]

a) Discuss the types of hardware technologies used inside a hard drive. **[6 Marks]**
b) Discuss the preventive measures one should consider in maintaining Windows. **[6 Marks]**
c) Explain the different hardware used by local networks. **[6 Marks]**

d) What is a form factor? **[2 Marks]**

Question Four [20 marks]

a) Your friend just bought a brand new laptop with no software installed. He would like to have both LINUX and WINDOWS operating systems in the laptop. Illustrate how you would perform this task from beginning to end.

(i) Mention how you would prepare the hard drives. **[4 Marks]**

(ii) Outline the procedure of installing the Windows operating system. **[8 Marks]**

(iii) Outline the procedure of installing the LINUX operating system. **[8 Marks]**

Question Five [20 marks]

a) Describe any three third party tools commonly used to optimize PC performance. **[6 Marks]**

b) Your immediate boss would like to know the advanced specifications of some computers the company recently bought. Explain two commands you would run in a windows environment to perform his task and what they exactly display. **[6 Marks]**

c) Using examples, discuss the commonly used commands to troubleshoot a computer network. **[8 Marks]**