



SCHOOL OF ENGINEERING AND COMPUTER SCIENCES
BACHELOR OF SCIENCE IN INFORMATICS AND COMPUTER SCIENCE
END OF SEMESTER EXAMINATION
CNS 1101: COMPUTER FUNDAMENTALS

DATE: 16th December, 2021

Time: 2 Hours

Instructions

1. This examination consists of **Five** questions.
2. Answer **Question ONE (COMPULSORY)** and any other **TWO** questions.
3. Do not write on the question paper.

Question one (20 Marks)

a) Read the case below and respond to the questions that follow:

A computer is an electronic device that processes data by following a set of instructions. A computer system is a set of parts, including the computer itself, that work together to perform tasks. These tasks may be relatively simple, as in a calculator for computing numbers, or they may be very complex, as in air traffic control systems for directing airplanes. The computer system that you are using now, could include a monitor, keyboard, mouse and the computer itself or it may be just a smartphone. They help you to carry out a variety of tasks such as writing emails, playing games and surfing the internet.

- i. Explain how a computer processes data. (1 mark)
 - ii. List any five tasks a computer can carry out mentioned in the case. (5 marks)
- b) Setting up a computer requires several devices to be connected. Imagine you would like to set up a cybercafe with 50 stations. Write a summary of input and output devices as shown in the table below and their corresponding quantity that will be needed to have a fully functional cyber. Explain the use of each device you mention. (12 marks)

Device name	Output/Input	Quantity	Use

- c) You were recently asked to purchase printers for the university cafeteria. Please advise on the type of printer you would recommend and state one advantage. (2 marks)

Question two (20 Marks)

- a) Electrostatic discharge can cause harm to computer users. List any two ways in which ESD damage can be prevented. (2 marks)

- b) Design a digital logic circuit to achieve the following operation

$$\overline{(Q \text{ AND } P)} \text{ OR } S = X$$

(3 marks)

- c) You recently bought a computer but due to the frequency of use of the computer you realize there is too much heat produced by the computer. The technician has advised you to purchase a new fan. Mention any three factors considered when choosing a case fan. (3 marks)
- d) Troubleshooting is a logical approach to problems with computers and is a skill refined over time. Explain the 6 steps of the troubleshooting process in their order.(12 marks)

Question three (20 Marks)

A power company in the Midwest hired a group of white hat hackers known as the RedTeam Security to test its defenses. They arrived in two teams, one team parked in the employee parking to pretend to be employees and the second parked in the visitors parking. They first attempted to get into the building by manipulating the reception into letting them in as contractors to check the internet facility. They broke into various premises using tactical methods to identify potential loopholes such as credit cards, laptops and flash drives found on workstations and open cars. Most doors in the building were not locked. The target's facilities included power generation substations, supplier outposts, dispatch stations, and offices throughout about a 100-mile radius. RedTeam Security attack methods included various facets of social engineering, physical penetration testing, application penetration testing, and network penetration testing.

- a) Define social engineering and give an example (2 marks)
- b) Identify any social engineering tactics and loopholes are shown in this case.(2 marks)
- c) Explain any methods you would advise to protect this firm from an eminent attack.(6 marks)
- d) Being able to communicate as an IT professional is very important. Classify the questions listed below as either “open ended” or “closed ended”. (5 marks)
- Can you tell me what you were doing before your computer developed a blue screen?
 - Which windows is your computer functioning on?

- iii. Was power on before you shut down your computer?
- iv. How many times does your computer freeze in a day?
- v. How many users operate this computer?

Question	Classification
Can you tell me what you were doing before your computer developed a blue screen?	
Which windows is your computer functioning on?	
Was power on before you shut down your computer?	
How many times does your computer freeze in a day?	
How many users operate this computer?	

- e) Define each of the following terms: (5 marks)
- i. Adware
 - ii. Ransomware
 - iii. Rootkits
 - iv. Spyware
 - v. Worms

Question 4 (20 marks)

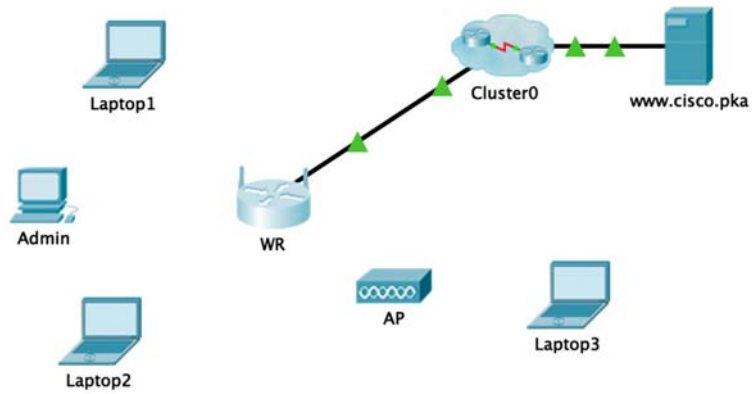
- a) You have been tasked to compute how much power is need to supply the computer from an imported power supply rated 12V, 3.6A. Compute how much power will be supplied by this computer. State the required formulas correctly. (3 marks)
- b) Most cloud computing services can be categorized into three main cloud computing services as defined by the National Institute of Standards and Technology (NIST) in their Special Publication (800-145), IaaS, PaaS and SaaS. Write these short forms in full and describe each of these services with one relevant example for each. (6 marks)
- c) Match the following devices to their respective requirement. (5 marks)

Requirement	Device
You are offline, but need to work with full copies of a spreadsheet and word processor program	E reader
A lady is hiking in the park and does not have a smartwatch but wants to upload data from her fitness tracker to the internet	laptop
A father wants to engage his children some educational apps while he talks on his smartphone	smartphone
You would like to read a softcopy book while you are travelling in a matatu but do not want to bring any expensive computing devices	smartwatch
A sports fan leaves his smartphone at home but still wants to be alerted to the scores of some football games while he is out jogging	tablet

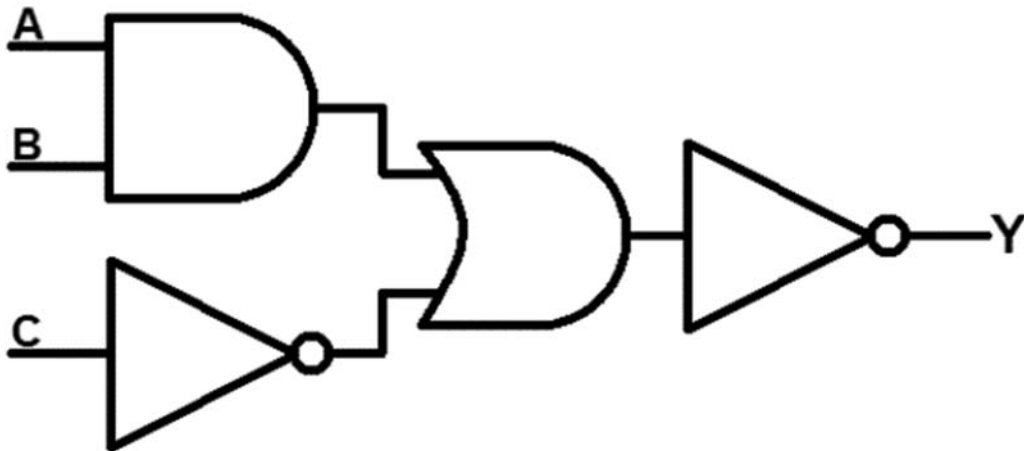
- d) Name any two characteristics of mobile devices. (2 marks)
- e) Before users can analyze and modify software, they must be able to see the source code. Differentiate between open source and closed source software and list two examples of operating systems used by mobile phones (4marks)

Question five (20 marks)

- a) Convert the following numbers to their respective bases. (4 marks)
- i) 157_8 to denary
 - ii) $4BD_{16}$ to binary
- b) Differentiate between a pixel and a byte. (2 marks)
- c) With reference to the image below, while using standard symbols, perform the following instructions to make a fully functional network. (5marks)
- i. Connect Admin to WR using a straight-through ethernet cable
 - ii. Connect AP to WR using a straight through cable to configure the access point
 - iii. Connect wireless clients Laptop1, Laptop2 and Laptop3



- d) State POST in full and define what it means as applied in computers. (2 marks)
- e) Differentiate these two number notations as used in networking. (2 marks)
- i. 192.168.200.8
 - ii. 00-50-56-BE-d7-87
- f) Complete the truth table of the following logic circuit (5 marks)



A	B	C	Y
0	0	0	
0	0	1	
0	1	0	
0	1	1	
1	0	0	