BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF SCIENCE AND ENGINEERING

AEH 108

Department of Engineering and Physics

Bachelor of Science Honours Degree in Agricultural Engineering

Computer Applications

NOV 2023

3 hours (100 Marks)

Instructions:

1. This paper contains 6 questions
2. Answer Four questions, **Two** from each section each of which carries 25 marks.
3. Section A should be done and submitted in the first 1hr 30 min.
4. Only after submitting Section A, or after 1hr 30 min can a student attempt section B.

Question 1

a) Provide three examples for each of the following
   i. Internet protocol [3 marks]
   ii. Operating system [3 marks]
   iii. Application Software [3 marks]

b) Explain why fibre optic cables are more suitable in internet connections than copper cables or wireless media in high voltage AC environments. [5 marks]

c) Explain the difference between TCP and UDP protocols. [6 marks]

d) For each of the following state whether you would use UDP or TCP:
   i. File transfer [2 marks]
   ii. Video streaming [2 marks]
   iii. An audio conference [1 mark]

Question 2

a) Outline the applications and limitations of each of the following types of transmission media.
   i. UTP [4 marks]
   ii. Optic fibre [4 marks]
   iii. Wireless [4 marks]

b) Explain the purpose of the 3-way handshake in TCP/IP connections and briefly describe the steps involved. [7 marks]

c) Briefly explain the following network topologies
   i. Ring [2 marks]
   ii. Bus, and [2 marks]
   iii. Star [2 marks]

Question 3

a) List three categories of peripheral devices in computers. [3 marks]

b) Discuss one example of each of the peripheral devices named in (3a) above. [12 marks]

c) Distinguish between a circuit switched network and a packet switched network. [10 marks]

Question 4

The department of Agricultural engineering is moving to a new site and is considering the networking that should be installed. The site consists of three buildings. The Library Building contains a dedicated computer room with a number of high performance dedicated servers. The servers provide services to students and staff who may access them either over the Internet or over the Department's own internal network. The Administration Building contains the staff offices, for both lecturers and administrative staff. They have desktop computers on fixed desks, from which they need access to the Internet and to other College servers. The Library Building and the Administration Building are linked by an underground duct. The Astra Building contains a reception desk, lecture rooms and a café. There is no duct linking it to the other buildings. The lecture rooms have a desktop computer at the front for use by the lecturers, but some lecturers prefer to use their own laptop or tablet computer. All the students use laptop or tablet computers to take notes and keep in touch with their friends.

a) Explain the type of network and equipment that should be deployed in the Library Building. [5 marks]

b) Explain the type of network and equipment that should be deployed in the Administration Building. [5 marks]

c) Explain the type of network and equipment that should be deployed in the Astra Building. [5 marks]

d) Suggest the type of network connections that should be used to link the building together and where the internet connection should be located. [10 marks]

Section B

Question 5

Create the following table in HTML [25 Marks]

BSc Agricultural Engineering		
Course Code	Course Title	Lecturer
AEH108	Computer Applications	Eng Zingwari
AEH 201	Applied Mechanics	Eng. Ndiyamba
AEH 211	Electrical Machines	Eng. Gwatidzo

Question 6

The effective rainfal is the total rainfal minus evaporation and minus deep percolation losses; only the water retained in the root zone can be used by the plants, and represents what is called the effective part of rain water. The term effective rainfall is used to define the fraction of the total amount of rainwater useful for meeting the water needs of the crops.Effective rainfall can be calculated using the dependable rain formula as follows:

Pe = 0.8P-25 If P => 75 mm

Pe = 0.6P-10 If P< 75 mm

Where Pe= effective rainfal

P= actual rainfall

Develop a C program that will calculate the effective rainfall when you enter the actual rainfall. [25 marks]