

WORLD MISSION HIGH SCHOOL

L4NIT

WIRELESS NETWORK OUTDOOR

HOMEWORK: OUTDOOR WIRELESS NETWORK MATERIALS, EQUIPMENT AND BOQ

A school called **Bright Future School** wants to install an outdoor wireless network to provide reliable Wi-Fi coverage around the administration block, library, classrooms, and sports field.

You have been assigned as the network technician. Before starting the installation, you are required to identify the necessary **materials and equipment**, determine their quantities, and prepare a **Bill of Quantities (BoQ)** for the project.

The network should be reliable, well organized, protected from weather and lightning, and able to continue operating during short power interruptions.

Questions

1. **Materials and Equipment:**

Identify and explain **five materials and five pieces of equipment** that may be required for the school's outdoor wireless network.

2. **Outdoor Access Point:**

Explain the purpose of an outdoor Access Point and give **two reasons** why an outdoor AP is suitable for this project.

3. **Network Protection and Power:**

Explain the purpose of each of the following in the project:

- a) PoE
- b) Lightning Arrestor
- c) UPS
- d) Firewall

4. **Network Devices:**

Explain the functions of a **network switch, router, wireless extender, and repeater** in an outdoor wireless network.

5. **Antennas and Cables:**

Explain the difference between **omnidirectional and directional**

antennas. Also explain why Ethernet cables and connectors are important when installing outdoor wireless equipment.

6. **BoQ:**

Define a **Bill of Quantities (BoQ)** and explain **four reasons** why it is important before starting a network deployment project.

7. **BoQ Preparation:**

Describe the main steps you would follow to produce a BoQ, starting from identifying the required items up to presenting the final document for review.

8. **BoQ Table:**

Using the requirements below, prepare a BoQ table with the columns **No., Description, Quantity, Unit Price, and Total Cost.**

Item	Quantity
Outdoor Access Point	4
Network Switch	1
Router	1
PoE Injector	4
Lightning Arrestor	4
UPS	1
Ethernet Cable	300 m
RJ45 Connectors	30
Cable Ties	50
Cable Clips	40

9. Use reasonable estimated prices for the items and calculate the **total cost of each item.**

10. **Contingency and Labor:**

If the total cost of materials and equipment is **RWF 2,000,000** and the labor cost is **RWF 300,000**:

- Calculate the cost before contingency.
 - Calculate **5% contingency**.
 - Calculate the **final project cost including labor and contingency**.
- Show all your calculations.

