



**UGANDA INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**  
**END OF SEMESTER ONE EXAMINATIONS**  
**ACADEMIC YEAR 2024/2025**

**DEPARTMENT:** ICT

**SEMESTER:** ONE

**PROGRAMME(S):** DIPLOMA IN ELECTRONICS COMMUNICATION ENGINEERING (DECE)

**YEAR OF STUDY:** TWO

**COURSE:** PRINCIPLES OF TELEPHONY

**COURSE CODE :** ECE212

**DATE:** WEDNESDAY 18TH, DECEMBER 2024

**TIME:** 2:00 PM – 5:00 PM

**DURATION:** 3 HOURS

**INSTRUCTIONS:**

- (i) This paper contains two Sections: A (40 marks) & B (60 marks).**
- (ii) Attempt ALL questions in Section A, and ONLY THREE questions in Section B.**
- (iii) All questions in Section B carry equal marks.**
- (iv) Credit will be given for use of relevant examples and illustrations.**
- (v) Begin each number in Section B on a new page of the answer sheet.**
- (vi) DO NOT write on this question paper.**

**SECTION A (40 MARKS)**

Attempt **ALL** the Questions in this Section.

Write the correct alternative in the answer booklet provided. **(1 mark @)**

1. Explain why the following are important in telecommunication (Telephony) **(1 mark @)**

- a) Modulation
- b) Multiplexing
- c) Repeaters

2. Briefly Explain the following transmission impairments and state one reason of mitigating them **(2 marks @)**

- a) Noise
- b) Distortion
- c) Echo
- d) Interference

3. What is the necessity for Digitization of a signal before transmission **(3 marks)**

4. State and explain the three major components of a telephone network **(6 marks)**

5. What is tone Dialing **(2 marks)**

6. State the **three** main functions of a telephone set **(3 marks)**

7. State **three** basic loop design requirements **(3 marks)**

8. State the **two** factors that limit user loop length **(2 marks)**

9. Explain the following **(2 marks)**

- a) Cable loading
- b) Loading coil

10. State the **two** types of fibre **(2 marks)**

11. Why we use negative voltages when transmitting telephone signals on an underground cable **(1 mark)**

12. Define the following according to traffic engineering **(1 mark @)**

- a) Busy hour
- b) Calling rate
- c) Holding time



**SECTION B [60 MARKS]**

Attempt **ONLY THREE** Questions in this Section.

**Question 1**

- a) Discuss the **four** parameters considered in choosing a transmission media **(8 marks)**
- b) In a tabular format compare the different guided transmission media, highlighting the advantages, disadvantages and applications **(12 marks)**

**Question 2**

- a) Why is signaling important in telephony **(1 mark)**
- b) State the **three** forms of signaling that are used by a switching system **(3 marks)**
- c) Give and explain **four** advantages of digital signals over analogue signals **(8 marks)**
- d) Discuss the **four** different types of call progress tones **(8 marks)**

**Question 3**

- a) Define the following with examples
- i) Half Duplex (with two example) **3 marks**
  - ii) Full duplex (with three examples) **4 marks**
  - iii) Simplex (with two examples) **3 marks**
- b) Explain the sequence of events of a telephone call **(6 marks)**
- c) An exchange use a -100v battery to drive users' lines. A Resistance of 450 Ohms is placed in series with battery to protect it from short circuit. The uses are required to use a telephone set which offers a dc resistance of 210 ohms. The microphone requires 80mA for proper functioning. Determine the furthest distance from the exchange at which a user can be located if 26AWG conductor is used if 84.22 Ohms/Km is its dc resistance per Km **(4 marks)**

**Question 4:**

- a) A subscriber of Uganda Telecom Limited located in Kampala has the follow subscriber number (041) 272226. He wants to call Masaka land office whose subscriber number is (044) 555001.  
How many switches are involved in this call connection and their subscriber capacity **(3 marks)**
- b) Explain the following **(2 marks @)**
- i) Circuit Switching
  - ii) Packet Switching
  - iii) Messages switching
- c) Which of the **two** methods in question b) and may have been used to establish the call to Masaka land office in the question (a) if the network is analogue with two pair copper wires for transmission **(3 marks)**

Suppose you are a network and optimization engineer in MTN Uganda explain four ways of managing traffic **(8 marks)**

**Question 5**

- a) With reference to UICIT explain the operation of a PABX highlighting how it can ease administration work. **(10 marks)**
- b) Briefly explain the following in PCM **(2 marks @)**
  - i) Sampling
  - ii) Quantization
  - iii) Encoding
- c) Give **two** examples of modulation techniques used to convert; **(2 marks @)**
  - i) Analogue to Digital Signals
  - ii) Digital to Digital Signals