



**UGANDA INSTITUTE OF INFORMATION AND COMMUNICATIONS
TECHNOLOGY**

END OF SEMESTER ONE EXAMINATIONS

ACADEMIC YEAR 2025/2026

DEPARTMENT: ICT
YEAR OF STUDY: TWO
PROGRAMME: DIPLOMA IN INFORMATION TECHNOLOGY
FOR BUSINESS (DITB)
COURSE: DATA COMMUNICATION & NETWORKING
COURSE CODE: ECE214
DATE: THURSDAY 11TH DECEMBER, 2025
TIME: 02:00 PM – 05:00 PM
DURATION: 3 HOURS

INSTRUCTIONS:

- (a)** This paper consists of two sections A and B
- (b)** Section A carry 40 marks and is compulsory
- (c)** Attempt any THREE questions from section B
- (d)** Any number in section B carry equal marks
- (e)** Credit will be given for use of relevant examples and illustrations
- (f)** Begin each number on a new page of the answer sheet

SECTION A [40 MARKS]

Attempt ALL the Questions in this section.

Part I:

This Part consists of 20 Multiple Choice Questions.

List numbers vertically from 1 to 20 in the answer booklet.

Write a letter corresponding to the best answer to each of the questions.

1. Data communication refers to
 - A. Storing data on a computer
 - B. Exchange of data between devices over a transmission medium
 - C. The physical structure of a computer
 - D. Internet browsing
2. A LAN is best described as
 - A. Network covering a country
 - B. Network covering a continent
 - C. Network within a small geographical area
 - D. Wireless communication only
3. A node in a network refers to
 - A. Only computers
 - B. Only routers
 - C. Any device connected to the network
 - D. A type of cable
4. Which of these devices operates at the Data Link Layer?
 - A. Gateway
 - B. Switch
 - C. Router
 - D. Repeater
5. A crossover cable is primarily used for
 - A. PC to switch connection
 - B. Router to switch connection
 - C. PC to PC connection
 - D. Internet connection
6. The OSI model has
 - A. 5 layers
 - B. 4 layers
 - C. 7 layers
 - D. 8 layers
7. TCP provides
 - A. Unreliable communication
 - B. Reliable, connection-oriented communication
 - C. Wireless communication
 - D. None of these
8. A communication mode where data flows in one direction at a time is
 - A. Full-duplex
 - B. Simplex
 - C. Half-duplex
 - D. Unicast
9. A broadcast transmission is sent to
 - A. A single device
 - B. Multiple selected devices
 - C. All devices on the network
 - D. Remote networks only
10. Which of these media uses light for transmission?
 - A. Twisted pair
 - B. Coaxial
 - C. Fiber optic
 - D. Microwave

11. CSMA/CD protocols commonly used in
 - A. Wireless networks
 - B. Token ring networks
 - C. Ethernet networks
 - D. Satellite communication
12. Which WAN switching technique establishes a dedicated path?
 - A. Circuit switching
 - B. Packet switching
 - C. Message switching
 - D. Virtual switching
13. The device that connects different network types is
 - A. Switch
 - B. Gateway
 - C. Repeater
 - D. Hub
14. IPv4 addresses are
 - A. 4-bit
 - B. 16-bit
 - C. 32-bit
 - D. 64-bit
15. The protocol used to resolve IP addresses to MAC addresses is
 - A. ICMP
 - B. IP
 - C. DHCP
 - D. ARP
16. POP3 is used for
 - A. Retrieving email
 - B. Sending email
 - C. DNS lookups
 - D. File transfers
17. In OSI, segmentation occurs at the
 - A. Network layer
 - B. Transport layer
 - C. Session layer
 - D. Data link layer
18. Which of the following is a 3-level line encoding technique?
 - A. NRZ-L
 - B. Manchester
 - C. Unipolar
 - D. Polar
19. At which layer of the OSI model does a router operate?
 - A. Data link
 - B. Network
 - C. Session
 - D. Application
20. The protocol used for web browsing is
 - A. FTP
 - B. SMTP
 - C. HTTP
 - D. DNS

Each question carries 1 mark.

(20 marks)

Part II:

This Part consists of Scenario type of Questions.

UICIT is expanding its Computer Laboratory. You are deployed as a Junior Technician to set up a **30-computer LAN**. The equipment available includes:

- 30 desktop computers
- 2 × 24-port switches
- 1 wireless router
- 1 DNS/DHCP server
- UTP cables for endpoints
- Fiber optic cable for backbone link
- 1 gateway router for internet access

- Cisco Packet Tracer for design simulation

You must design, interconnect, configure, and test the network before commissioning it.

Required:

- Draw a simple block diagram showing how the 30 computers, 2 switches, server, gateway router, and wireless router would be interconnected.
- You are to interconnect the two switches.
State the type of Ethernet cable you would use and justify your choice.
- The backbone between the lab and the main building uses fiber optic cable.
Explain what device(s) you need to connect UTP endpoints to the fiber link.
- You must give the server a static IPv4 address.
Propose a suitable IP address, subnet mask, and default gateway for the server.
- The DHCP server must assign IPs automatically.
Design an IP addressing range (scope) for the 30 computers (include network address, usable range, and broadcast address).
- The wireless router must be configured to provide internet to mobile devices in the lab.
State two configuration parameters you must set on the wireless router.
- After physical installation, some computers cannot reach the server.
List two practical troubleshooting steps you would take.
- When testing connectivity, you must verify the link between PC1 and the gateway router.
State the command you would use and explain the expected result.
- You are asked to test DNS resolution.
State the command you would run on a computer and what successful output should indicate.
- Before deployment, you must simulate the network in Packet Tracer.
List two practical tasks you can perform in Packet Tracer to verify that your design will work when physically installed.

Each question carries 2 marks.

(20 marks)

SECTION B [60 MARKS]

Attempt Only Three Questions in this section.

Question 1

A student in the lab reports that their computer cannot access the internet.

- List **any four simple checks** you would do first before changing configurations. **(8 marks)**
- State **two reasons** why a loose or damaged cable can cause loss of connection. **(4 marks)**
- Describe how the **ping command** helps in troubleshooting. **(4 marks)**
- Give **two reasons** why restarting a router or computer sometimes fixes network problems. **(4 marks)**

(4 marks)

Question 2

- (a) State in increasing order the layers of OSI Reference Model. (7 marks)
- (b) Choose **any three OSI layers** and describe one function for each in simple terms. (6 marks)
- (c) Provide a real-life example (analogy) that shows why communication needs layers. (7 marks)

Question 3

UICT wants to set up a small network of 20 computers in a classroom.

Required:

- (a) Draw a simple diagram showing how the computers, switch, router, and server would be connected. (8 marks)
- (b) Explain why a switch is needed in this setup. (4 marks)
- (c) List **four items** of network equipment or materials you would need to complete the installation. (4 marks)
- (d) State **two reasons** why the network needs a router. (4 marks)

Question 4

A technician is choosing cables and wireless links for a new office.

Required:

- (a) Explain the difference between UTP copper cable and fiber optic cable. (6 marks)
- (b) Give **three advantages** of using UTP cable inside a building. (6 marks)
- (c) List and briefly explain **any four wireless** communication methods used in data communication. (8 marks)

Question 5

- (a) State the purpose of each of these protocols in a network:
(i) DHCP (ii) DNS (iii) HTTP (iv) SMTP (8 marks)
- (b) You are required to create a small office network simulation in Packet Tracer.
Outline the steps for creating a wired LAN consisting of **five devices** connected by a router and switch, including addressing and interface configuration. (8 marks)
- (c) Describe any test you would perform in Packet Tracer to confirm correct end-to-end connectivity. (4 marks)

END