

The
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DIPLOMA UNIVERSITY EXAMINATIONS
SCHOOL OF SCIENCE AND TECHNOLOGY (SST)
DIPLOMA IN INFORMATION COMMUNICATION
TECHNOLOGY/ DIPLOMA IN BUSINESS INFORMATION
TECHNOLOGY

**DIT 201: CONCEPTS OF DATA COMMUNICATION AND
NETWORKING**

DATE: 4TH AUGUST 2026

DURATION: 2 HOURS

**MAXIMUM
MARKS: 70**

INSTRUCTIONS:

1. Write your registration number on the answer booklet.
2. **DO NOT** write on this question paper.
3. This paper contains **SIX (6)** questions.
4. Question **ONE** is compulsory.
5. Answer any other **FOUR** questions.
6. Question **ONE** carries **30 MARKS** and the rest carry **10 MARKS** each.

7. Write all your answers in the Examination answer booklet provided.

QUESTION ONE

Read the Case Study below carefully and answer the questions that follow:

TechInstitute is expanding its ICT infrastructure to support teaching, research, administration, and online learning. The institution has several buildings within the main campus that must be interconnected using a **standards-based network design** to ensure interoperability among devices from different vendors.

The network must support:

- Wired connectivity for offices, laboratories, and servers
- Wireless connectivity for students and staff
- Proper IP addressing for efficient communication
- Internal network services such as email, file sharing, and e-learning

Using concepts from OSI model, IP addressing, network design, transmission media, and network services, answer the questions that follow.

Required:

- a) Using examples, distinguish between the three network types based on distance in this scenario. **[6 Marks]**
- b) Propose a suitable IP addressing scheme for the campus network and justify your choice. **[4 Marks]**
- c) Identify TWO key network design considerations when interconnecting campus buildings. **[6 Marks]**
- d) Recommend suitable transmission media for the following and justify your choices. **[8 Marks]**
 - a) Inter-building connectivity

b) Office and laboratory user access

e) Identify THREE network services required to support academic and administrative activities. **[6 Marks]**

QUESTION TWO

- a) A medium-sized organization operates a head office, several branch offices, and has staffs who work remotely. Apply the concept of computer network types to determine the most suitable network for each operational area. **[4 Marks]**
- b) Analyze how the choice of LAN technology can affect data transmission efficiency within the head office **[4 Marks]**
- c) Evaluate the suitability of star and bus topologies for the internal network. **[2 Marks]**

QUESTION THREE

- a) A university plans to upgrade its network infrastructure to support online learning, video streaming, and cloud-based services. Apply digital and analog transmission concepts to determine the most appropriate transmission type **[6 Marks]**
- b) Analyze the role of transmission media in long-distance communication between campus buildings **[4 Marks]**

QUESTION FOUR

- a) A busy local area network experiences frequent frame loss and collisions. Apply data link layer functions to explain how framing and physical addressing improve communication reliability **[4 Marks]**
- b) Analyze how error detection and correction mechanisms enhance data integrity. **[4 Marks]**
- c) Evaluate the importance of access control protocols in shared networks. **[2 Marks]**

QUESTION FIVE

- a) An organization interconnects multiple independent networks to allow seamless communication. Apply network addressing concepts to explain how devices are uniquely identified across networks **[4 Marks]**
- b) Analyze how routing enables packet delivery across interconnected networks

[4 Marks]

- c) Evaluate the importance of internetworking in large enterprise environments

[2

Marks]

QUESTION SIX

- a) An e-learning system supports video lectures, file transfers, email, and web services. Apply transport layer concepts to justify the use of TCP or UDP for different services **[4 Marks]**
- b) Analyze how the client-server model supports web-based learning platforms

[4 Marks]

- c) Evaluate the role of application layer protocols in delivering network services.

[2 Marks]