



AMREF INTERNATIONAL TRAINING CENTRE

HEALTH RECORDS AND INFORMATION TECHNOLOGY LEVEL 6

AITC/HRIT/14/6/A

Computer Networking

July/August 2026

WRITTEN ASSESSMENT

11TH AUGUST 2026

Time: 2 HOURS

START :2PM FINISH:4PM

INSTRUCTIONS TO CANDIDATE

1. Marks for each question are indicated in the brackets.
2. The paper consists of **TWO** sections: **A** and **B**.
3. Candidates are provided with a separate answer booklet
4. **DO NOT** write on this question paper.

This paper consists of FOUR (4) printed pages

Candidates should check the question paper to ascertain that all pages are printed as indicated and that no questions are missing.

SECTION A: (40 MARKS)

Answer **all** questions in this section.

1. Define the following terms as used in networking.
 - i) Computer network. (2 Marks)
 - ii) Network Protocol. (2 Marks)
 - iii) Port Number. (2 Marks)
2. Convert the following IP Address 172.168.1.7 to its equivalent binary form and list the class to which the IP address belongs. (4 Marks)
3. VPN is one of the important technologies used by most of the networking organizations and individuals in their day to day networking activities. State THREE advantages of VPN. (3 Marks)
4. Networking devices such as smartphones and laptops require IP addresses to communicate with each other and access the internet. Outline TWO examples of Internet connections. (2 Marks)
5. Differentiate between Straight-through and crossover cables as used in network connection media. (2 Marks)
6. A media company intends to expand its communication services by transmitting television programs, radio broadcasts, and satellite signals to a wide audience across the country. As a networking expert, identify the three types of broadcast networks that can be used for such communication services (3 Marks)
7. A network administrator managing a TCP/IP based organization uses different protocols for name resolution and network monitoring, differentiate between DNS(Domain Name System) and SNMP(Simple Network Management Protocol) as used in TCP/IP networks (4 Marks)
8. Using a diagram, illustrate and explain peer-to-peer (P2P) networks and server-based networks. (4 Marks)
9. A router with IPv4 address 125.45.23.12 and Ethernet physical address 24:45:AB:4F:67:CD has to send a packet to a host destination with IP address 125.11.78.10. For the ARP request packet sent by the router, shown below, identify and correct the wrong entries.

ARP Request Packet

0x0001		0x0800
0x06	0x04	0x0002
23:45:AB:4F:67:CD		
125.45.23.12		
23:BA:54:E4:76:DC		
125.11.78.10		

(2 Marks)

10. Wambilianga runs a small business with 10 computer devices. He seeks to know what type of IP addresses he should use to assign to his devices. Explain public, private and special ipv4 addresses. (4 Marks)

11. Global messaging application sends users' messages across multiple routes in small units to ensure fast and reliable delivery even when network paths are congested, define packet switching and why is it relevant to the internet. (3 Marks)

12. A technician is setting up a local area network in a computer lab and must select appropriate transmission media to connect different devices, state any THREE cables used in networking. (3 Marks)

SECTION B: (60 MARKS)

Answer any THREE questions in this section

13.

- a) A networking class is reviewing different ways computers can be arranged in a network to support communication. Explain THREE categories of topologies. (6 Marks)
- b) In a modern communication system where data such as messages, videos, and files must move reliably across different interconnected devices and networks, using a diagram describe the FOUR layers of the TCP/IP model. (8 Marks)
- c) Regional Health Network X connects multiple hospitals and clinics but faces potential security threats to patient data. Explain any THREE network attacks that could threaten Regional Health Network X and compromise patient data security. (6 Marks)

14.

- a) Encryption and decryption are important operations in the field of network communication. Distinguish between Encryption and decryption. (4 Marks)
- b) Organization Y is training its IT staff on how different communication systems are structured in layers, describe the OSI model and state its governing body. (4 Marks)
- c) A training institution is teaching students how data is transmitted and processed through different stages in a networking system to ensure reliable communication between devices and applications, describe the OSI model layers. (12 Marks)

15.

- a) A network administrator at Organization X is upgrading the office network and is required to install different networking devices to improve data communication, Explain the functions of the following network devices:
 - i) Router. (2 Marks)
 - ii) Bridge (2 Marks)
 - iii) Switch (2 Marks)
 - iv) Repeater. (2 Marks)
 - v) Hub (2 Marks)
- b) In a hospital environment, sensitive patient records and medical systems must be protected from unauthorized access, alteration, and disruption to ensure safe and

reliable healthcare services, discuss FIVE information security services.

(5 Marks)

- c) Amref International University is upgrading its computer systems to a networked environment to improve resource sharing. List FIVE advantages of a Network Operating System (NOS) in this setup. (5 Marks)

16.

- a) During an Ebola outbreak response coordinated by MTRH and the Ministry of Health, a secure network is being designed to support data sharing between treatment units, laboratories, and surveillance teams. The network administrator is assigned the IP block 205.150.65.0/26 for subnetting within the system. Using the information provided, Compute:

- i) Subnet mask. (3 Marks)
- ii) Network ID. (3 Marks)
- iii) Broadcast ID. (2 Marks)
- iv) Number of subnets. (2 Marks)
- v) Number of hosts. (2 Marks)

- b) Decide whether the following will work with a switch or a Router:

IP Address	Subnet Mask	Device
192.172.3.4 192.172.6.0	255.255.255.0	
239.255.192.10 239.255.173.0	255.255.0.0	
192.178.20.1 192.158.30.3	255.0.0.0	
188.89.45.50 224.45.67.0	255.255.255.0	

(4 Marks)

- c) In Institution Y, the organization relies on interconnected computer systems to support communication, explain FOUR basic characteristics of a computer network.

(4 Marks)