

031306T4PSY

Computer Networking Level 6

PSY/OS/CO/CR/10/6

July/August 2025



**AMREF INTERNATIONAL TRAINING CENTER
CANDIDATE WRITTEN ASSESSMENT**

Time: 3 HOURS

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 TWO (2) 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 the questions in this section.

1. Hospital X is planning to connect all departments using a bus topology network but the IT manager has concerns about potential limitations. Identify FOUR (4) disadvantages of using bus topology that could affect the hospital's network performance. (4 Marks)
2. A health informatics student is learning about how medical data is transmitted between hospital systems. Outline FOUR (4) data representation methods used in data communication between healthcare devices. (4 Marks)
3. Medical Center Y is upgrading their network infrastructure and the network administrator needs to understand topology concepts. Explain TWO (2) differences between physical topology and logical topology in the context of the medical center's computer networking. (4 Marks)
4. A healthcare organization is implementing client-server architecture for their health information systems. Highlight FOUR (4) common application areas in healthcare where the client-server model can be effectively utilized. (4 Marks)
5. Clinic Z is setting up a new network infrastructure to connect all their medical equipment and computers. List FOUR (4) examples of computer networking devices that the clinic will commonly use in their network infrastructure. (4 Marks)
6. A hospital's radiology department uses various communication channels to transmit medical images between devices. Explain what a half-duplex channel is in computer networking and how it functions in facilitating communication between medical devices. (4 Marks)
7. A telemedicine system requires precise timing when transmitting patient vital signs data between remote locations and the hospital. Describe TWO (2) fundamental techniques used in computer networking to ensure accurate synchronization during medical data transmission. (4 Marks)
8. A health informatics specialist is analyzing the transmission of patient monitoring signals from medical devices to central systems. Identify FOUR (4) properties that distinguish Digital signals from Analog signals in medical equipment communication. (4 Marks)
9. A regional health network is expanding to connect multiple healthcare facilities across different locations. List FOUR (4) basic types of networks that would be suitable for connecting the healthcare facilities. (4 Marks)
10. Hospital Y is implementing a new patient monitoring system that requires effective data communication between medical devices and central servers. List FOUR (4) essential components of data communication that the hospital's system must include. (4 Marks)

SECTION B:(60 MARKS)

Answer Any Three Questions

11. Regional Health Network X connects multiple hospitals and clinics but faces potential security threats to patient data.
 - a. Analyze ANY FIVE (5) network attacks that could threaten Regional Health Network X and compromise patient data security. (10 Marks)
 - b. Evaluate ANY FIVE (5) network security practices that Regional Health Network X can implement to protect patient data from attacks. (10 Marks)
12. A telemedicine company needs reliable communication between patient monitoring devices and hospital systems. Using well-labelled diagrams, explain the THREE (3) data flow techniques used in data communication that the telemedicine company should consider for their health systems. (20 Marks)
13. Dr. Sarah's clinic has expanded from 2 to 15 staff members and needs to implement an electronic health records system with networked workstations. Discuss TEN (10) key factors that Dr. Sarah should consider before setting up a computer network for her clinic's health information system. (20 Marks)
14. City Hospital is implementing a health information system where multiple departments need to access patient data from central servers.
 - a. Describe how the client-server model will function in City Hospital's networking environment, providing healthcare examples. (10 Marks)
 - b. Examine FIVE (5) key properties of computer networks crucial for City Hospital's network design and healthcare service delivery. (10 Marks)