BINDURA UNIVERSITY OF SCIENCE EDUCATION
DEPARTMENT OF COMPUTER SCIENCE
NETWORKING PROTOCOLS – NWE202/IT202
2 HOURS 30 MINUTES

INSTRUCTION TO CANDIDATES

Answer **all** questions
Each question carries **20 marks**. Total marks are **100**.

≈ NOV 2024

Question 1

a. Define a protocol and explain any **three** key elements?
   [8]
b. Mention standard organizations categories in field of networking and give an example of each.   **[4]**
c. Compare the operation of the protocol layers above and below the Network Layer.
                                                                                      [4]
d. Explain what is meant by the term Service Access Point.   **[4]**

Question 2

a. In modern protocol design, protocols are layered to form a protocol stack.
   i.   Define the term Layering.   **[2]**
   ii. Describe any **five** advantages of layering.   **[10]**

b. An end to end connection may be checked in an IP internet using the ping program which uses the Internet Control Management Protocol, ICMP. Describe the operation of the ICMP echo request and ICMP echo reply to perform this check, and how this may measure the round trip delay across the network.   **[8]**

Question 3

a. Compare and contrast the OSI reference model to the TCP/IP suite.   **[10]**
b. The OSI reference model describes some protocols as End-to-End and other layers as Link-by-Link (also known as Hop-by-Hop). Explain these two terms, and provide examples of each type of protocol.   **[4]**
c. Explain various flow control and congestion control mechanisms adopted in TCP.   **[6]**

Question 4

a. In protocol development, define data communication standards? [2]
b. Explain the **two** categories of data communication standards. [6]
c. Explain the following data link standards and protocols:
  i. Ethernet [4]
  ii. Token Ring [4]
  iii. FDDI [4]

Question 5

a. A distance-vector routing protocol in data networks determines the best route for data packets based on distance.
  i. Identify any **two** examples of distance-vector routing protocol. [2]
  ii. State any **four** characteristics that can be used to compare distance-vector routing protocol. [4]
b. OSPF (Open Shortest Path First) is a link state routing Protocol, a type of the Internal Gateway Protocol (IGP), which was designed to scale and support more extensive networks. Describe the seven stages of OSPF process. [14]

***********END OF PAPER**********