THE COPPERBELT UNIVERSITY

SCHOOL OF INFORMATION AND COMMUNICATIONS TECHNOLOGY

COMPUTER SCIENCE DEPARTMENT

Internet Technologies I Test one
Time allowed 2 hrs min
Answer all questions
All questions have equal marks
Date: 8th July 2020
Prepared by Dr DB Ntalasha

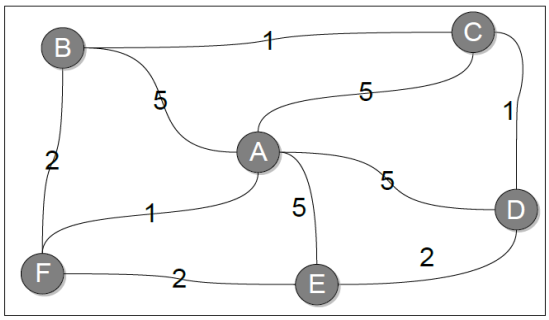
Question one

a) State and describe six services provided by Layer 2 of the TCP/IP protocol stack. **[6 marks]**

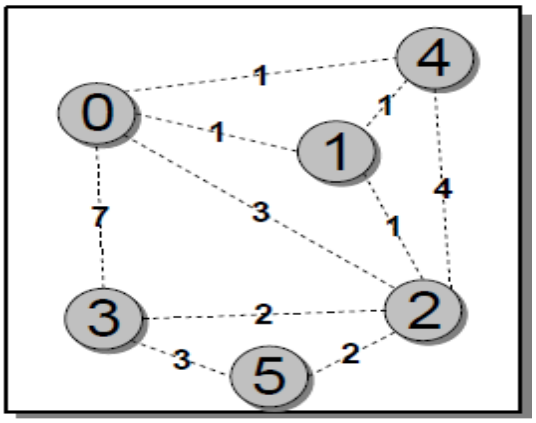
b) Explain using a diagram why datagram fragmentation is an issue in IPv4 and how it is dealt with in the Internet? **[4 marks]**

Question two

a) Using the network diagram, draw a table that shows the computation the shortest path from node A to all network nodes using Dijkstra's algorithm. **[5 marks]**



b) Consider the network shown below and assume that each node initially knows the costs to each of its neighbors. Use the distance vector algorithm and complete the entire distance table below as it would look like at node ***2*** after the algorithm has converged. **[5 marks]**



Question three

a) Discuss the issues and solutions related to the interworking of IPv6 and IPv4**. [5 marks]**
b) Briefly describe the factors influencing the need to adopt IPv6 and replace IPv4. **[3 marks]**
c) Briefly describe any TWO possible methods for enabling a smooth transition from IPv4 to IPv6. Briefly comment on their suitability. **[2 marks**]

Question four

a) Draw the IPv4 header **[5 marks]**
b) When is an ARP request packet generated? **[5 marks]**

Question five

a) IP specified that datagram can arrive in a different order than they were sent. If a fragment from one datagram arrives at a destination before all the segments from a previous datagram arrive, how does the destination know to which datagram the fragments belong**. [3 marks]**
b) Explain the Delay-Throughput product and also explain the importance of this product to the design of a sliding window protocol. **[3 marks]**
c) A network has a packet size of 1000 octets, a throughput capacity of 2 Mbps, and a delay of 50 milliseconds. The network hardware can transport 2 Mbps from one computer to another on this network. Calculate the maximum rate (expressed as a bit rate) at which data can be sent using stop-and-go in this network. **[5 marks]**

!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!ALL THE BEST!!