

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

THIRD YEAR EXAMINATION FOR THE AWARD OF BACHELOR OF SCIENCE
IN COMPUTER SCIENCE

COSC 363: COMPUTER NETWORKS 11

STREAMS: BSC (COMP. SCI) Y3S1

TIME: 2 HOURS

DAY/DATE: WEDNESDAY 10/4/2019

11.30 A.M. – 1.30 P.M.

INSTRUCTIONS

- Attempt **Question 1** and any other **TWO** from **SECTION B**
- Marks are awarded for clear and concise answers
- ONLY the first **THREE** Questions attempted will be marked (**Question one inclusive**)

SECTION A-COMPULSORY

Question One [30 Marks]

(a) Give a description of the role of the following protocols in computer networks

[10

Marks]

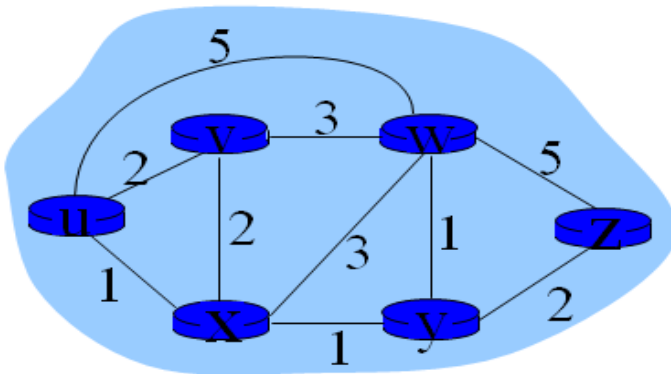
- (i) A.R.P
 - (ii) R.A.R.P
 - (iii) Telnet
 - (iv) S.N.M.P
 - (v) S.M.T.P
- (b) Give **THREE** Examples of Distance Vector routing protocols [3 Marks]
- (c) Differentiate between the following in relation to routing:
- (i) Linkstate and Distance vector routing algorithms [3 Marks]
 - (ii) Flow control and congestion control [3 Marks]
- (d) What is the role of sequence number field in a TCP segment [3 Marks]
- (e) Give **FOUR** approaches of decreasing traffic to reduce congestion in computer Networks [4 Marks]

- (f) Describe the memory and processing requirements for using a link state routing protocol [4 Marks]

SECTION B-Attempt TWO questions in this section

Question TWO [20 Marks]

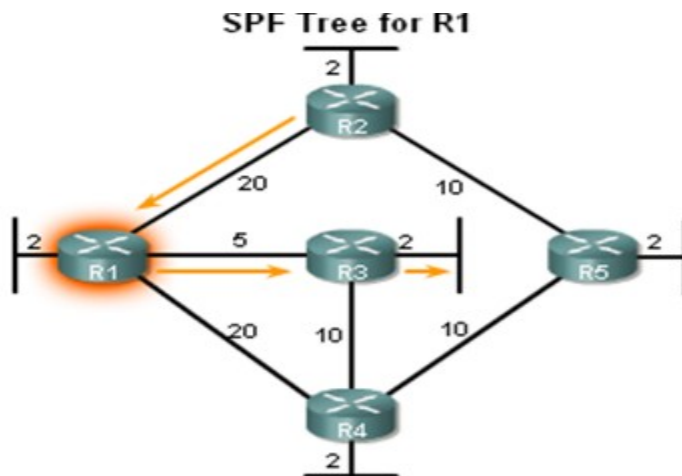
- (a) The figure below shows an arrangement of routers in a certain area. Using distance vector protocol's Bellman-Ford equation, compute $D_u(w)$ and $D_u(y)$ [6 Marks]



- (b) Show the routing table that would result from convergence of the routing information from the segment containing routers **u**, **v** and **x** only [9 Marks]
- (c) Using a diagram, illustrate the four step **D.H.C.P** Process [5 Marks]

Question THREE [20 Marks]

- (a) The diagram below shows a shortest path first (SPF) tree for router R1. Using the diagram. Using digijkstra algorithm:
- (i) Compute the shortest path and cost from R1 to a host in R5 LAN [6 Marks]
- (ii) Compute the shortest path and cost from R1 to a host in R4 LAN [6 Marks]



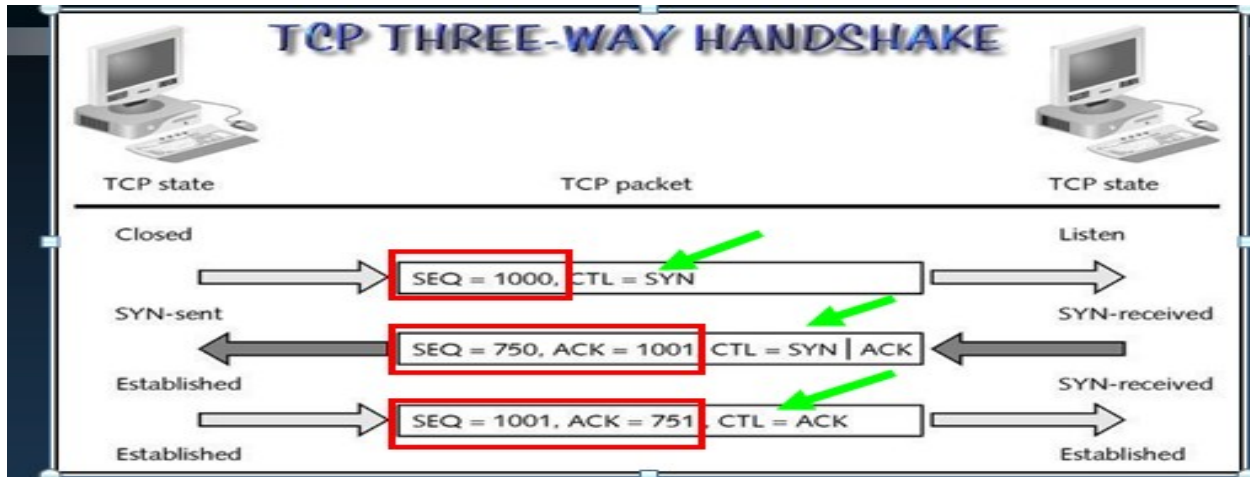
- (b) The DNS protocol defines an automated service that matches resource names with the required numeric network address. Describe **FOUR** steps of interaction between DNS and the Browser during DNS resolution [8 Marks]

Question FOUR [20 Marks]

- (a) An autonomous system in a medium-sized organization consisted of fifty personnel all with personal computers or workstations. The computers were connected to a network which consisted of five physical segments each connected by a hub which in turn connected to an Ethernet switch. Each hub connected ten computers. Most of the activities of the personnel were internal to the segment except the mail server and backup server which was common to the entire organization. Thus most of the traffic was internal to each hub/LAN segment except email and backup operations which went across the hub.
- (i) Capture the network topology described above diagrammatically showing all information described and explaining the purpose and operation of each network element [10 Marks]
- (ii) As the volume of activities increased, the LAN segments would go down frequently. The problem was especially severe during heavy bursts such as code compilation. Based on your knowledge of networking and the setup described, explain what the problem could be and propose a solution to the network setup [6 Marks]
- (b) Give **FOUR** key tools for administration of an IP network [4 Marks]

Question FIVE [20 Marks]

The diagram below illustrates a **THREE** way handshake mechanism employed by applications that use TCP at transport layer.



- (a) Explain what is happening in each of the areas pointed by arrows [6 Marks]
- (b) Explain TWO characteristics/situations that would demand an application to use TCP for end-to end delivery of messages [4 Marks]
- (c) Why is UDP suitable for video and audio applications [4 Marks]
- (d) Describe a **FOUR** step process for TCP session termination [6 Marks]
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