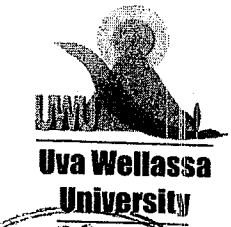
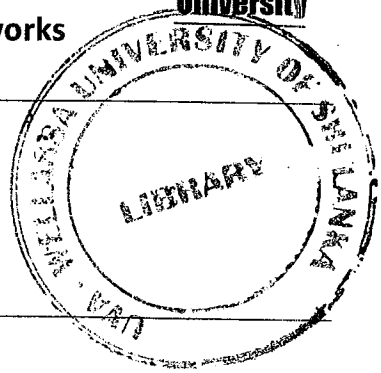
Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Computer Science and Technology
100 level 2nd Semester Examination – Dec./Jan. 2017
CST105-2 Fundamentals of Computer Networks





Instructions to candidates
Duration: Two (02) hours
Number of questions: Four (04)
Mark allocation: 100
Answer all questions.

1.

a. Briefly describe analog and digital signal. (4 mark)
b. Pulse Code Modulation (PCM) method used to convert an analog signal to a digital signal. Briefly explain sampling, quantizing and encoding in PCM. (9 mark)
c. Describe the usage of computer networks in following application areas.
   i. Business application (4 mark)
   ii. Home application (4 mark)
d. Explain "synchronous transmission" and "asynchronous transmission" techniques using diagrams. (4 mark)

2.

a. Name the ISO – OSI seven (07) layers in proper order and briefly explain the functionality of any three (03) layers. (8 mark)
b. State two (02) reasons for using layered architecture in network protocol design. (2 mark)
c. Briefly explain unguided media and give two (02) examples. (3 mark)
d. Name three (03) guided media types and give two (02) characteristics for each type. (9 mark)
e. For the usage in the Internet there is a shortage of IP version 4 addresses, state two (02) reasons why there is a shortage. (2 mark)
f. List one (01) method of overcoming the shortage of IP version 4 addresses. (1 mark)

3.

a. Explain how your home internet is connected with the Internet through Asymmetric Digital Subscriber Line (ADSL) using a diagram. (4 mark)
b. Discuss the differences between segments, frames and packets. (6 mark)
c. Briefly describe circuit switching and packet switching. (6 mark)
d. What is meant by line configuration of a network? (1 mark)
e. Name three (03) benefits of Virtual Local Area Networks (VLANs) and describe any two (02) (5 mark)
f. Write any three (03) properties of the connection less protocol. (3 mark)

(44)

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4.

a. Briefly explain the following mode of transmissions by providing examples. (4 mark)

   i. Simplex transmission
   ii. Full duplex transmission

b. Explain the functionality of the following networking devices. (4 mark)

   i. Switch
   ii. Router

c. Consider the following scenario in TCP/IP model and Ethernet frame in a Local Area Network (LAN) model. The data of size 2950 bytes from application layer are going through the transport layer, network layer and data link layer. Maximum transfer unit (MTU) of ethernet frame is 1500 bytes.

   i. Draw the TCP segment, IP packet/packets and Ethernet frame/frames with number of bytes in each header and data sections.
   (Note: Assume LLC frame is not used with TCP/IP combine with data link layer – Ethernet frame.) (6 mark)

d. Briefly explain the Network topology and give three (03) examples. (5 mark)

e. XYZ is a well reputed bank in Uva province. It has following components.

   - Three (03) floors in the building. (Floors are named as ground, first and second)
   - The server room is located in the first floor.
   - The Internet connection is terminated directly to the server room.
   - The Human Resources (HR) division with three (03) users and the accounts division with five (05) users is located in the ground floor.
   - Pawning center is located in the first floor with fifteen (15) users.
   - There are ten (10) computers in the administration division and the branch manager's office is located in the second floor.

   The supplied resources are given below,

   Cable boxes (CAT 5 cables), Crimping tools, RJ-45 jacks for the cables, three (03) units of 48 port switches, four (04) units of 12 port switches, two (02) units of 8 port switches, two (02) routers.

   Draw the network diagram for XYZ bank using the information given above. (6 mark)