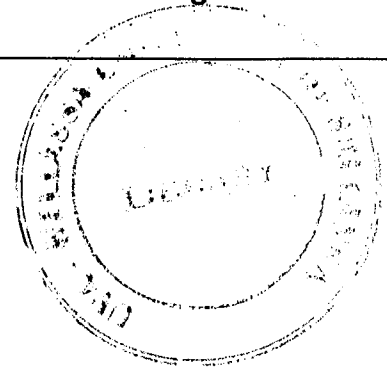


Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Computer Science and Technology
200 level 1st Semester Examination – Jan. / Feb. 2016
CST 241-3 / SCT 377-3 Data Communication and Networking



Instructions to candidates

Duration: Three (03) hours

Number of questions: Six (06)

Answer all Questions

Mark allocation: 100

1.
 - a. Discuss the responsibilities of each layer of the ISO-OSI Seven Layer Model.
 - b. Differentiate Segment and Frame with the aid of diagrams.
 - c. Describe private and public address classes, IP address ranges associated and the appropriate subnet masks.
 - d. Briefly explain the four (04) physical layer characteristics with examples

(15 mark)

2.
 - a. Compare and contrast Forward and Backward Error Correction using diagrams.
 - b. Illustrate Automatic Repeat request (ARQ) error correction method with suitable examples.
 - c. What is meant by clock recovery in data transmission?
 - d. Draw the line codes RZ, NRZ for the following bit pattern
0110001110101

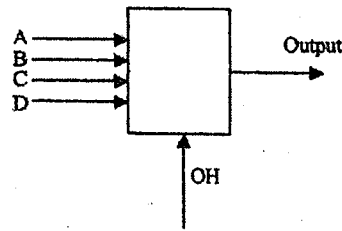
(15 mark)

3. Use the network address given below to answer the following questions.
Address – 192.168.20.0/24
 - a. What is the network address and the class indicated above ?
 - b. Illustrate the network and host portion of the address indicated above.
 - c. Indicate that first usable IP address range.
 - d. What is the broadcast IP address of the first usable IP address range.
 - e. Make four (04) subnets from above IP address.

(15 mark)

4.
 - a. Explain in detail with diagrams how the analog signals are being converted into digital signals.
 - b. Illustrate with diagrams how amplitude modulation (AM) differs from frequency modulation (FM).
 - c. Explain in detail about multiplexing and how it works.

- d. If four (4) input channels (each channel's data rate is 250bps) are multiplexed and there is one overhead channel (45 bps) as follows, calculate the output bit rate.



(20 mark)

5.

- Why wireless networking is important in LANs?
- Name two (02) frequency ranges available for Wireless Local Area Networks (WLANs)
- Write brief notes on the following transmission media including the noise, attenuation and interference features.
 - Copper cables
 - Fiber optics
 - Radio transmission
- Draw a diagram and explain the light propagation principle in fiber optics.

(15 mark)

6.

- What is multiplexing?
- Consider the following bit pattern for the digital modulation.
1 0 0 0 1 0 0 1 1 1 1 1
 - FSK
 - ASK
 - BPSK
 - QPSK
- Explain what is meant by signal to noise ratio (S/N)?
- Describe how SNR affects to the signal quality.
- Automatic Repeat reQuest (ARQ) is an example for Backward Error Correction. Draw the timing diagrams for the followings,
 - Send 5 frames and 2nd frame has errors. - use Idle ARQ
 - Send 6 frames and 3rd frame has errors - use Selective ARQ
 - Send 6 frames and 4th frame has errors – use Go-Back-N ARQ

(20 mark)