



UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

Academic Year 2012/2013 – 2nd Year Examination – Semester 4

IT4504: Data Communication and Networks
PART 2 - Structured Question Paper

21st July, 2013
(ONE HOUR)

To be completed by the candidate

BIT Examination Index No:

Important Instructions:

- The duration of the paper is **1 (One) hour**.
- The medium of instruction and questions is English.
- This paper has **4 questions** and **8 pages**.
- **Answer all questions.** All questions carry equal marks.
- **Write your answers** in English using the space provided **in this question paper**.
- Do not tear off any part of this answer book.
- Under no circumstances may this book, used or unused, be removed from the Examination Hall by a candidate.
- Note that questions appear on both sides of the paper.
If a page is not printed, please inform the supervisor immediately.

Questions Answered

Indicate by a cross (X), (e.g.

X

) the numbers of the questions answered.

To be completed by the candidate by marking a cross (X).	Question numbers			
	1	2	3	4
To be completed by the examiners:				

(1)

(i)

Your Internet Service Provider has given you the following information regarding your office data link.

- Link type local loop with 128Kbps fixed bandwidth in both directions.
- LAN interface - IP 192.248.19.20
- Subnet - 255.255.255.240

(a) What is the network address /subnet ID?

(2 marks)

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(b) What is the broadcast address for the specified subnet?

(2 marks)

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(c) How many usable IP numbers are available for your equipment?

(2 marks)

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(d) What ID is the above router Interface IP in Classless Inter-Domain Routing (CIDR) notation?

(2 marks)

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(ii)

State the technologies that are available to provide internet facilities to the office staff if 50 computers are using the above link.

(5 marks)

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- (iii) If the office is using VoIP technology as a replacement for its internal PABX (intercom) facilities, state a technology by using which, you can provide a guaranteed bandwidth for internal voice applications. Explain briefly how you can implement your technical solution.

(12 marks)

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- 2)

- (i) If you have to convert a sound signal having a frequency range between 1KHz to 8KHz, to a digital signal, calculate the required minimum sampling rate that will enable you to recover the original signal later.

(5 marks)

- (ii) Calculate the maximum permissible propagation delay for a shared Ethernet that sends packets of 32Kbits at 64Mbps.

(10 marks)

- (iii) Calculate the maximum data rate over a noisy channel that has a linear S/N of 31 and a bandwidth of 200Khz.

(10 marks)

- (3) Suppose you have got an ADSL link with one static IP for your office to serve 20 computers.
- (i) What basic equipment (active components) will you require for the network to be setup? Explain the connectivity in the form of a basic diagram.

(15 marks)

[illegible]

- (ii) If the office has a wireless environment, explain how you can secure the WiFi access point to restrict the connectivity to two Laptops used by top management.

(5 marks)

- (iii) State an alternative way to secure your WiFi to enable only a selected user to be connected to it without making restriction on the device.

(5 marks)

- 4
(i) Explain briefly the difference between IPv4 loopback address, network address and the broadcast address giving examples.

(9 marks)

- (ii) Explain the difference between adaptive and non-adaptive routing algorithms.

(6 marks)

- (iii) A three-way handshake is used to establish a TCP connection. Explain the main stages of the three-way handshake.

(6 marks)

- (iv) Explain a firewall and highlight the 4 main generations of firewalls.

(4 marks)
