UNIVERSITY OF MORATUWA

FACULTY OF ENGINEERING

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

BSc Engineering Honours Degree
2013 Semester 3 Examination

CS2032: Principles of Computer Communication

Time allowed: 2 Hours Held in September 2015

ADDITIONAL MATERIAL: *None*

INSTRUCTIONS TO CANDIDATES:

1. This paper consists of 6 questions in **3** pages.
2. Answer **any five** questions. All questions have equal marks.
3. The maximum attainable mark for each section is given in brackets.
4. This examination accounts for 60% of the module assessment.
5. This is a closed book examination.

   NB: It is an offence to be in possession of unauthorised material during the examination.
6. Only calculators approved and labelled by the Faculty of Engineering are permitted.
7. Assume reasonable values for any data not given in or with the examination paper. Clearly state such assumptions made on the script.
8. In case of any doubt as to the interpretation of the wording of a question, make suitable assumptions and clearly state them on the script.

Q1 Introduction and Communication Principles

a) Communication may be categorised as *one-way, two-party interactive, multi-party interactive,* etc.

Describe the different types of communication, using suitable examples, and explain why some communication is called *real-time.* [8]

b) Name the *layers* of the OSI Model of networking, and explain how it allows communication to be independent of the underlying network architecture. [6]

c) What is *bandwidth?* What is the effect of the limited bandwidth of a channel on communications? How does increasing the *signal-to-noise* (S/N) *ratio* affect a limited bandwidth channel? [6]

Q2 Encoding/Modulation, Transmission Media

a) What is the difference between *encoding* and *modulation?* [4]

b) Name *three* methods of transmitting a digital signal via a carrier, and show each method, using suitable diagrams. [6]

c) What features of copper wire have made it popular as a communication medium? [4]

d) What is the most popular type of copper-based Ethernet cable today? Show, using a suitable diagram, how it is constructed. [6]

Q3 Wireless Networks

a) Why are mobile devices becoming more-and-more popular? [4]

b) What are the two modes in which an IEEE 803.11 wireless network can work? When would each of these modes be used? [6]

c) What are the basic concepts of cellular mobile telecommunications? [4]

d) What is *handoff?* Why is it needed in a cellular mobile network? Briefly explain how it operates. [6]

Q4 Switching and upper layers

a) Explain, using a suitable diagram, how a *crossbar* switch works. [4]

b) What is a *virtual circuit identifier* (VCI) in a packet switched network? How does a switch use VCIs to switch packets? [4]

c) Draw a diagram of the Internet Networking Model, and briefly state the role of *hosts, networks* and *routers.* [7]

d) What are the two principal transport layer protocols used on the Internet? What are their main differences? [5]

Q5 Web and HTTP

a) Show how the World-Wide Web (WWW) is formed by web pages, hyperlinks and URLs. [6]

b) "200 OK" is a common HTTP response code.
What does this response indicate? Name one other response code, and state what it indicates. [4]

c) "HTTP is a stateless protocol"
i. What is meant by this statement? [2]

ii. How could state be introduced into a web session? [4]

d) Explain how a web site may be shown in Sinhala to some users, and Tamil to others, using features of HTTP. [4]

Q6 File Storage, P2P

a) What is a *network file system* (also called network attached storage)? Why are they widely used? [6]

b) Name two ways by which you could access and manipulate files stored on the Internet, and compare how they work. [6]

c) Name one *advantage* and one *disadvantage* of peer-to-peer compared with client-server systems. [2]

d) Briefly explain, using a suitable diagram, how a file is shared on a BitTorrent system. [6]