UNIVERSITY OF MORATUWA

FACULTY OF ENGINEERING

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

BSc Engineering Honours Degree
2015 Semester 3 Examination

CS2032: Principles of Computer Communication

Time allowed: 2 Hours   Held in May 2017

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**

a) What are the main differences between a Wide-Area Network (WAN) and a Local-Area Network (LAN)? [4]

b) What are the main functions of

i. terminals, and

ii. media.

In a communications network? [4]

c) Name *two* types of terminals and *two* types of media [4]

d) Which of the 7 OSI Model layers has the purpose "Providing error free transmission across a single link"? [2]

e) Briefly describe *two* functions of the *physical layer.* [6]

Q2 **Data Transmission / Errors**

a) Explain, using a suitable diagram, how *asynchronous* transmission works. [6]

b) What are the functions of the *start* and *stop bits* in asynchronous transmission? [4]

c) How can a sender help a receiver to detect an error in the data? [4]

d) If a receiver detects that an error has occurred, describe the *two* principal ways it can deal with the error. [6]

Q3 **Transmission Media / LAN**

a) *Twisted pair* cables contain pairs of copper wires twisted together.

i. Why are they twisted? [4]

ii. Why is *copper* used? [4]

b) What frequency band (in GHz) may Wireless LANS (WiFi) use? [2]

c) What may a *Personal-Area Network* (PAN) be used for? [4]

d) Using a suitable diagram, describe the *Master-Slave* MAC protocol and explain how it may be used by a set of "dumb" IoT devices to send data to a server. [6]

Q4 **Switching**

a) What are the main features of *circuit switching*? Explain why it was popular for voice conversations. [6]

b) Using a suitable diagram, explain the operation of a *crossbar* switch. [6]

c) What are the main contents of the *header* in a data packet in Datagram packet switching? [2]

Incoming		Outgoing	
Port	VCI	Port	VCI
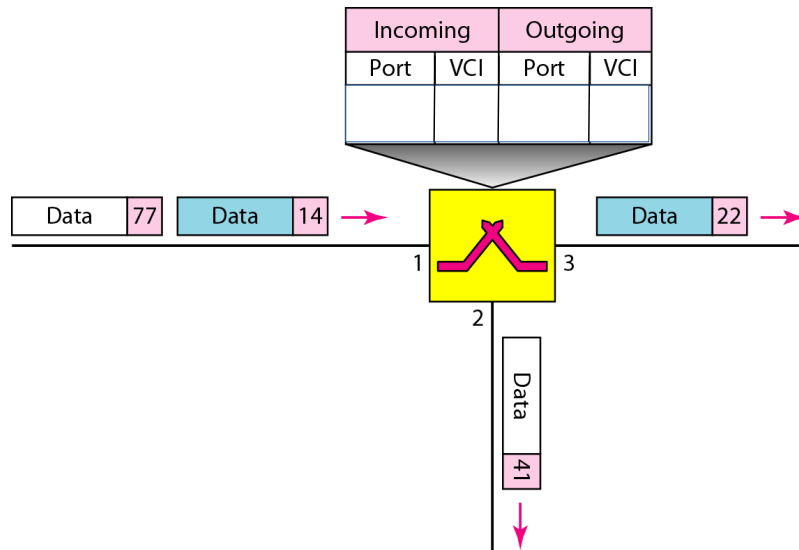
d) The above figure shows a *virtual-circuit* packet switch. Copy the routing table to your answer script and fill in the values of *Port* and *VCI* in the table. [6]

Q5   Web

a) What is a *web page?* Give two examples of web resources which are *not* web pages. [6]

b) Give an example of and brief explanation of

  i. an HTTP method

  ii. an HTTP header and

  iii. an HTTP response status code [6]

c) How does *caching* improve the performance of the web? [4]

d) Name a popular web application, and briefly describe its main features. [4]

Q6   Network Storage, Telephony

a) *Why* do many organisations utilise *file servers?* [4]

b) Name, and briefly describe, *two* methods by which users may access files stored on an Internet storage system such as Dropbox. [6]

c) A mobile telephone system consists of a set of *cells.*

  Why do we need cells? In what places would cells be very small, and where would they be large? [6]

d) Give examples of the two main formats of a *Session Initiation Protocol* (SIP) address? When would each format be more useful? [4]