UNIVERSITY OF RUHUNA

Faculty of Engineering

Mid-Semester 7 Examination in Engineering: June 2014

Module Number: EE7234 **Module Name: Advanced Data Communication**

[Two Hours]

[Answer all questions, each question carries 7.5 marks]

Q1 a) i) Explain the term 'Modulation' in data communication.
ii) Mention the advantages of 'Modulation'.

[1.5 Marks]

b) Digital modulation is more popular than analog modulation. Explain.

[1.0 Mark]

c) Switching is the generic method for establishing a path for point-to-point communication in a network. Explain the two basic switching methods briefly.

[2.5 Marks]

d) Networks can be classified according to their size. A Local Area Network (LAN) is a privately-owned network, which covers a small geographic area. Describe two popular technologies used in LANs.

[1.5 Marks]

e) A WAN (Wide Area Network) is a data communication network that covers a relatively broader geographic area. DSL (Digital Subscriber Line) is one of the popular WAN technologies and it has several variants, which differ in data rate and distance limitations. Explain the significance of ADSL (Asymmetric Digital Subscriber Line) compared to DSL.

[1.0 Mark]

Q2 a) State the basic functions of each layer in TCP/IP (Transport Control Protocol / Internet Protocol) model.

[1.5 Marks]

b) Explain the following terms.
i) Encapsulation in TCP/IP model
ii) Bit synchronization
iii) MAC (Media Access Control) address
iv) 3-way handshake in TCP

[2.0 Marks]

c) What is the purpose of ARP (Address Resolution Protocol)? Describe how it works.

[2.0 Marks]

d) TCP (Transport Control Protocol) and UDP (User Datagram Protocol) are two primary protocols implemented in the transport layer. State the differences between them.

[1.0 Mark]

e) Explain the structure of a UDP packet stating the importance of each field.

[1.0 Mark]

Q3 a) What is flow control in networking?

[0.5 Marks]

b) Stop and Wait is the simplest scheme used in flow control. Explain stop and wait with necessary illustrations.

[2.0 Marks]

c) What is Pipelining in flow control? Explain it using 'Sliding Window with Selective Repeat' scheme.

[2.0 Marks]

d) What is 'congestion' in a network?

[1.0 Mark]

e) Describe the following congestion control algorithms.
   i) Token bucket
   ii) Slow start with Congestion Avoidance (CA)

[2.0 Marks]

Q4 a) What are the advantages of using MPLS (Multi-Protocol Label Switching) over IP (Internet Protocol) and ATM (Asynchronous Transfer Mode)?

[2.0 Marks]

b) Describe the MPLS label format.

[1.5 Marks]

c) Describe the MPLS architecture in a router.

[1.0 Mark]

d) i) What is FEC (Forward Equivalence Class) in MPLS?
   ii) What is the relationship between FEC and MPLS labels?

[1.5 Marks]

e) MPLS is used in different network applications. Briefly explain three of them.

[1.5 Marks]