



DUBLIN INSTITUTE OF TECHNOLOGY

BSc. (Honours) Degree in Computing

Year 1

WINTER EXAMINATIONS 2014/2015

NETWORKING 1 - FUNDAMENTALS [CMPU1021]

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FRIDAY 9TH JANUARY 4.00 P.M. – 6.00 P.M.

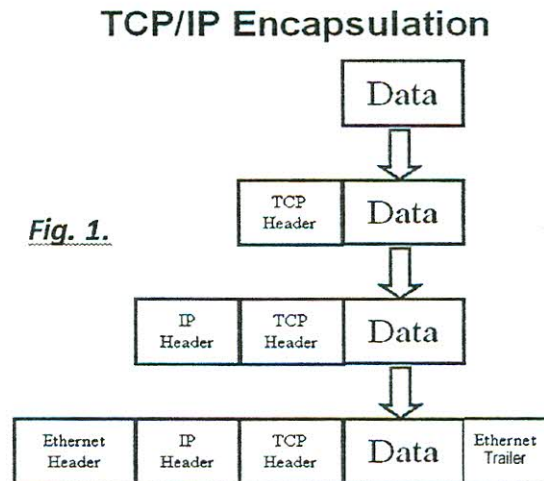
TWO HOURS

INSTRUCTIONS TO CANDIDATES

ANSWER **THREE** QUESTIONS OUT OF **FOUR**.

ALL QUESTIONS CARRY EQUAL MARKS.

1. (a) The following acronyms have been extracted from the networking glossary. *DNS*, *DHCP*, *HTTP* and *FTP*.
- State the full version of each acronym.
 - Briefly describe the function of each.
- [16 marks]
- (b) Draw the OSI 7 layer Reference Model diagram and briefly explain the function and responsibilities of each layer.
- [17 marks]
2. (a) Fig. 1. shows a diagram of TCP/IP encapsulation. Briefly describe the *main information* that makes up the contents of the header/trailer at each layer. Name the Protocol Data Unit (PDU) at each layer.



[20 marks]

- (b) TCP/IP provides two transport layer protocols; TCP and UDP. Compare and contrast the operation of the TCP and UDP protocols. Give an example of the type of communications where they are both used.

[13 marks]

3. (a) Explain briefly the purpose of Media Access Control Methods.

Describe the following access methods used in Local Area Networks (LANs).

- (i) Controlled
- (ii) Contention.

[10 marks]

- (b) Describe the operation of a Layer 2 Network Switch explaining how it fills its address table and makes forwarding decisions.

[14 marks]

- (c) Briefly describe the following methods used by switches in switching data between network ports:

- (i) Store-and-forward switching
- (ii) Cut-through switching

[9 marks]

4. (a) Given the following host IP addresses 172.16.20.36/28

- (i) What is the subnet mask (in decimal) for this network?
- (ii) How many bits have been borrowed to create this subnet?
- (iii) What is its network address of this subnet?
- (iv) What is the broadcast address of this subnet?
- (v) What is the usable host address range for this network?
- (vi) How many usable host addresses are on this networks?

[12 marks]

- (b) There are currently two version of Internet Protocol (IP): IPv4 and a new version called IPv6. Briefly describe the major characteristics of IPv6 as compared to IPv4.

[14 marks]

- (c) Given the following IPv6 address, 2001:0DB8:00A0:0011:0000:0000:0000:0200.

Rewrite this address in valid compressed form.

[7 marks]