

Instructions: Answer FIVE Questions only. Each carries 20 marks.

Question 1 (20 marks)

Answer FOUR parts only. Each carries 5 marks:

- i) Briefly describe the Internet Control Message Protocol (ICMP) and describe how ICMP is used to trace a route to a destination & to discover the path MTU size.
- ii) Outline the main features of the IPv6 addressing scheme
- iii) Distinguish between Anonymous vs non-Anonymous FTP
- iv) How is encryption used to authenticate the sender of a message?
- v) What are Subnets, how are they addressed and list three advantages of using subnets

Question 2 (20 marks)

Answer all parts

- i) Describe the main features of the DNS system. (4 marks)
- ii) Outline the structure of computer names used by DNS. (4 marks)
- iii) What are zones of authority in DNS? (4 marks)
- iv) Outline the process of name resolution. (8 marks)

Question 3 (20 marks)

Answer all parts

- i) Describe the main features of the IP protocol. (3 marks)
- ii) Describe the five reserved IP addresses (5 marks)
- iii) TCP and UDP are the transport layer protocols of the TCP/IP protocol stack. Outline the main features of both. (6 marks)
- iv) How does TCP implement addressing? (3 marks)
- v) Briefly describe the processes of connection establishment under TCP. (3 marks)

Question 4 (20 marks)

Describe the main features and operation of each of the following networking technologies:

- a) ATM
- b) DSL

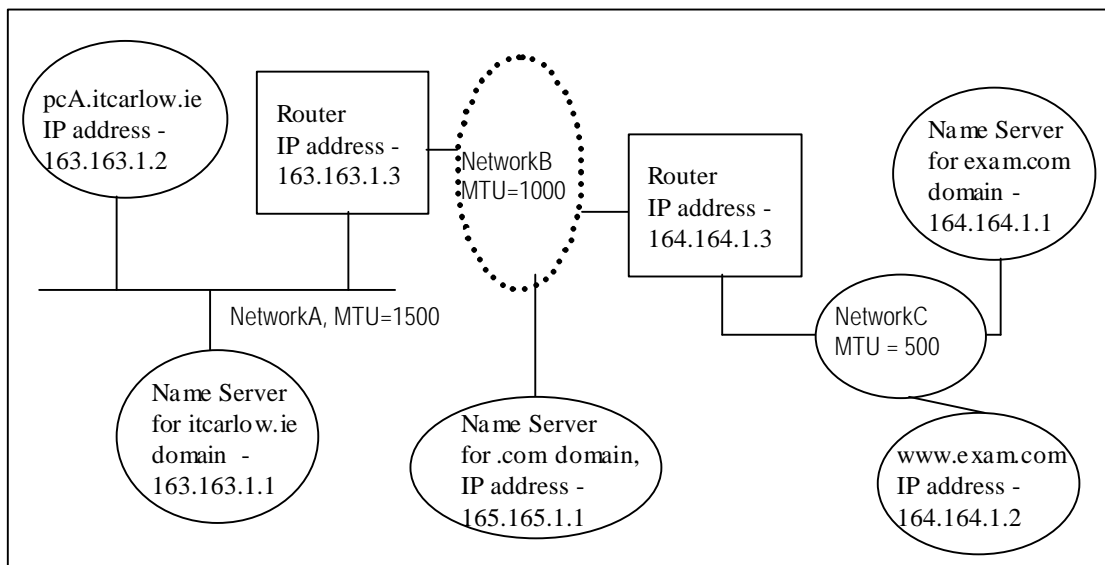
- c) FDDI
- d) ISDN

Question 5

(20 marks)

Using the diagram below as a reference, fully describe the events that would take place if a user on pcA.itcarlow.ie downloaded a web page from www.exam.com Your answer should outline what happens with respect to address resolution, encapsulation, fragmentation and routing through the network. Name the protocol that is being used for each stage in the operation. Assume that all caches on all machines are empty and if any further assumptions are made, these must be mentioned in your answer.

Note: The network to which pcA.itcarlow.ie is attached has an MTU size of 1500. To connect to www.exam.com, it passes through a network, NetworkB, with an MTU size of 1000 and the network to which www.exam.com is attached has an MTU size of 500.



Question 6

(20 marks)

Answer FOUR parts only. Each carries 5 marks:

- i) Briefly describe the operation of an Internet Service Provider (ISP)
- ii) Briefly describe the four major methods of attack on networked systems
- iii) What is the Dynamic Host Configuration Protocol (DHCP) and how does it operate?
- iv) A company with a network address of 166.167.0.0 wants to segment the network into 14 different subnets? What subnet mask is needed and how many hosts per subnet could be supported?
What subnet mask is needed for a class C network divided into 7 different subnets and how many hosts per subnet could be supported?

- v) **Briefly describe the operation of the Address Resolution Protocol**

Question 7 (20 marks)

Answer all parts

- i) **Describe the architecture of Internet mail.** (5 marks)
- ii) **Outline the main features of the Simple Mail Transfer Protocol (SMTP)** (5 marks)
- iii) **Detail the process of mail retrieval by clients using the POP protocol** (6 marks)
- iv) **Write a brief note on Multipurpose Internet Mail Extensions (MIME)** (4 marks)