Question 1

a) Define a network (2 Marks)

b) Signals that are transmitted on a network are either analog or digital. Distinguish the two types of signals mentioned above. (4 Marks)

c) Describe the following types of networks:

i) LAN (2 Marks)
ii) CAN (2 Marks)
iii) MAN (2 Marks)
iv) PAN (2 Marks)
v) WAN (2 Marks)

d) Coaxial cables were one of the earliest networking cables on the market. Outline any two (2) disadvantages why they are not used any more. (4 Marks)

[Total: 20 Marks]

Question 2

a) Contrast the OSI model with the TCP/IP reference model. Using a diagram show the correspondence between relevant protocol layers in the two models. (14 Marks)

b) Summarise the relative merits of each of these models in the context of modern computer networking (6 Marks)

[Total: 20 Marks]

Question 3

a) Outline the role of a firewall and illustrate using a diagram where it should be positioned with in a local network. (5 marks)

b) Describe the techniques that a firewall uses at different levels to prevent external attacks on the network and controlling traffic flow through the firewall. (5 marks)

c) Briefly describe the following in relation to network security.

i) TLS/SSL (3 marks)

ii) HTTPS (3 marks)

d) Define the term encryption and briefly explain how it works. (4 Marks)

[Total: 20 Marks]

Question 4

a) Distinguish between:
   i) Synchronous and Asynchronous transmission (4 Marks)
   ii) Full duplex and Half duplex transmission (4 Marks)
   iii) PSTN and PBX (4 Marks)

b) Describe how a circuit switched network works mentioning how it differs from a packet switched network. (8 Marks)

[Total: 20 Marks)

Question 5

a) TCP and UDP are some of the protocols found in the TCP/IP protocol suite. Identify the layer of the TCP/IP model are these protocols found and briefly explain each protocol. (5 Marks)

b) A switch that has been newly connected will not know where to find the devices which are addressed in the MAC address. Explain the process by which the switch builds its switching table. (5 Marks)

c) Consider the IP address below together with its subnet mask.

192.168.12.17
255.255.255.224

i) Calculate the network address for this IP address (3 Marks)
ii) Calculate the number of networks can be created using this subnet mask? (3 marks)
iii) Calculate the number of valid IP addresses are there per network (3 marks)
iv) Identify the broadcast address for this network (1 Mark)

[Total: 20 Marks]

Question 6

a) Define the term **Encapsulation** and state the name of the PDU as it moves from one layer of the OSI model to another. (6 Marks)

b) Using an illustration describe any two types of multiplexing. (14 Marks)

[Total: 20 Marks]

Question 7

a) Describe the use DHCP and DNS in a networking environment (8 Marks)

b) Distinguish between physical addressing and logical addressing. (6 Marks)

c) Distinguish between a routed protocol and a routing protocol giving an example of each. (6 Marks)

[Total: 20 Marks]