Instructions: Answer <u>FIVE</u> Questions only. Each carries 20 marks.

Question 1 (20 marks)
Answer <u>FOUR</u> parts only. Each carries 5 marks:

i) Describe the main features of the UDP protocol. How does it differ from the TCP protocol?

ii) Outline the main features of the Simple Mail Transfer Protocol (SMTP)

iii) Distinguish between repeaters, bridges and routers.

iv) Write a short note on Sockets and explain how sockets identify communication end points.

v) A company with a network address of 156.157.0.0 wants to segment the network into 31 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 3 different subnets and how many hosts per subnet could be supported?

Question 2 (20 marks)
Answer all parts

i) Describe the main features of the IP protocol. (3 marks)

ii) What is fragmentation and why is it sometimes needed? (2 marks)

iv) Describe the process of fragmentation & reassembly. How are the IP header fields - Identification and Fragment Offset used in this process (8 marks)

iv) How does IP handle fragment loss? (4 marks)

v) How does Ipv6 handle fragmentation differently than Ipv4? (3 marks)

Question 3 (20 marks)
Answer all parts

i) What are the main functions of the DNS system. (2 marks)

ii) Outline the structure of computer names used by DNS. (4 marks)

iii) Describe the process of name resolution under DNS. (8 marks)

iv) Outline two optimizations that are used to improve performance in the DNS system. (4 marks)

v) How is the CNAME type used in DNS database entries? (2 marks)

Question 4 (20 marks)
Answer all parts

i) Describe the following cable types and their characteristics: (6 marks)
    a) Coaxial
    b) UTP
    c) Fiber Optic

ii) What is a network's topology? (1 mark)

iii) Distinguish between the following network topologies: (6 marks)
    d) Star
    e) Bus
    f) Ring

iv) What is CSMA/CD and explain how it controls medium access and handles collisions. (7 marks)

Question 5 (20 marks)
Answer all parts

i) What is modulation and why is it used? (3 marks)

ii) Describe three different types of modulation. (6 marks)

iii) What is a dial-up modem and explain how a dial-up modem works. (3 marks)

iv) What is multiplexing and why is it needed? (3 marks)

v) Differentiate between time division multiplexing and frequency division multiplexing outlining when one might be used in preference to the other. (5 marks)

Question 6 (20 marks)
Answer FOUR parts only. Each carries 5 marks:

i) What is a firewall and how does it function?

ii) What is a proxy server and how does it function?

iii) Describe the five classes of IP address

iv) Briefly describe the operation of the Address Resolution Protocol

v) Outline the main features of Asymmetric Digital Subscriber Line (ADSL)

Question 7 (20 marks)
Answer all parts

i) Outline the different types of Web documents and their relative (8 marks)

advantages/disadvantages.

ii)   **Describe the Common Gateway Interface and the two methods of sending**   **(6 marks)**
        user data to the server.

iii)   **Outline the main features of Active Server Pages.**   **(3 marks)**

iv)   **What is an applet?**   **(3 marks)**