National University of Computer and Emerging Sciences,
Lahore Campus

	Course Name:	Computer Networks	Course Code:	CS 3001
	Program:	BS (Computer Science)	Semester:	Fall 2025
	Duration:	15 minutes	Total Marks:	15
	Paper Date:	21-October-2025	Section	5A , 5C
	Exam Type:	Quiz 4 - Chapter 4	Page(s):	2

Student Name **Roll No.** **Section:**

Q1. Encircle the correct option: **[5 marks] [CLO 3]**

1. What is the purpose of a Subnet mask in IP addressing??
   a) To identify the Subnet portion of an IP address
   b) To encrypt IP traffic
   c) To define the Default gateway
   d) To allocate Dynamic IP Addresses
2. Which TCP/IP model layer does DHCP work at?
   a) Internet
   b) Session
   c) Application
   d) Transport
3. An IP layer datagram has arrived with the first 8 bits as 0110 0110. Which of the following is correct?
   a) IPv4, Header Length: 80 bytes
   b) IPv4, Header Length: 32 bytes
   c) IPv6, Some Priority / Traffic Class
   d) IPv6, Header Length: 24 bytes

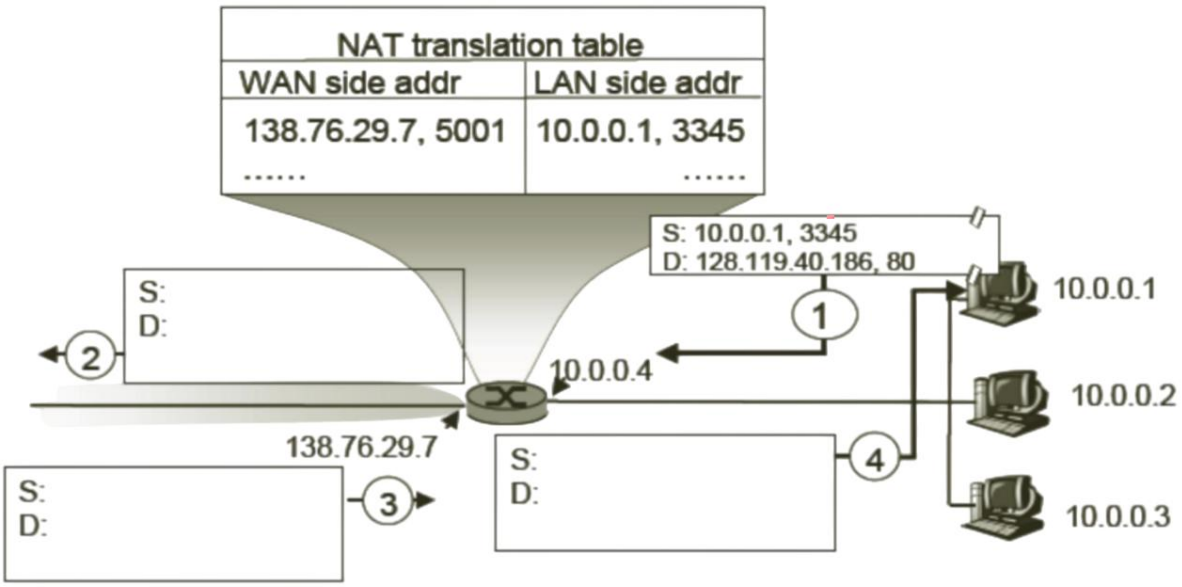
True/False:

1. DHCP can provide not only IP addresses but also subnet masks, gateways, and DNS server information. [T / F]
2. Class A IP addresses have the first octet (8-bits) reserved for the network portion, and the remaining 3 octets for hosts. [T / F]

Q2: **[6 Marks] [CLO 3]**

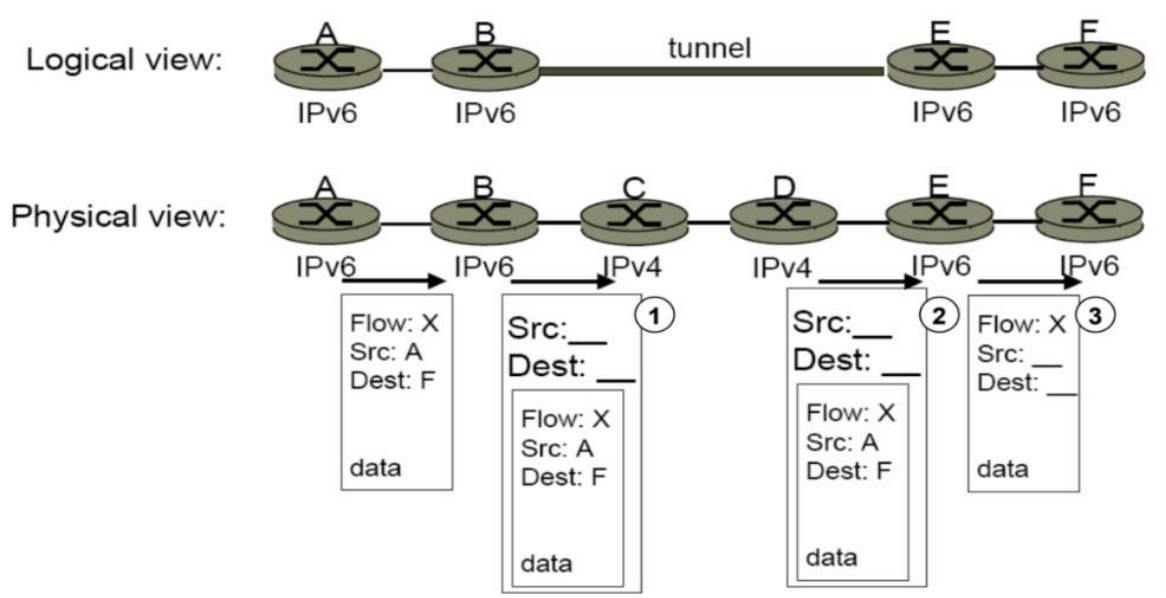
The diagram below shows a packet traveling through a NAT router. Packet 1 is sent from the internal host (S) to the NAT router, packet 2 is sent from the NAT router to the external web server (D), packet 3 is received from the web server by the NAT router, and packet 4 is sent by the NAT router to the original host. Fill in the missing source and destination IP

addresses and port numbers in packets 2-4 (ie fill in the S and D values in the given Boxes 2, 3 and 4):



Q3: **[3 Marks] [CLO 3]**

The diagram below shows an IPv6 packet tunneled over IPv4 across routers with IP addresses A, B, C, D, E & F. Fill in the missing source and destination addresses at places/packets marked 1, 2, and 3 (fill in the diagram).



Q4: **[1 Mark] [CLO 3]**

We know that an IPv4 Address is 32 bits long. We also know that a bit can either be a 1 or 0. How many total IPv4 Addresses can possibly exist?

	Course Name:	Computer Networks	Course Code:	CS 3001
	Program:	BS (Computer Science)	Semester:	Fall 2025
	Duration:	15 minutes	Total Marks:	15
	Paper Date:	21-October-2025	Section	5A , 5C
	Exam Type:	Quiz 4 - Chapter 4	Page(s):	2

Student Name **Roll No.** **Section:**

Q1. Encircle the correct option: **[5 marks] [CLO 3]**

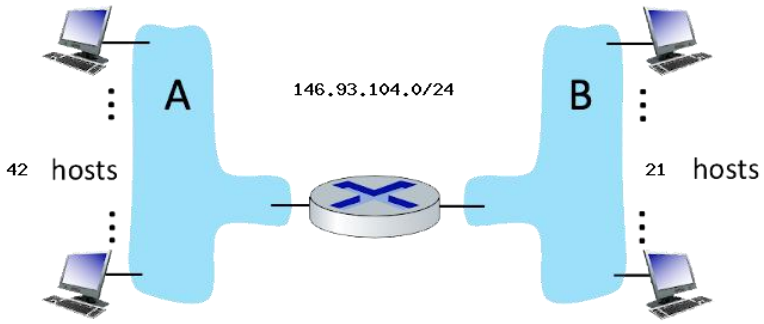
1. An IP packet has arrived with the first 8 bits as 0100 0110. Which of the following is correct?
   a) IPv4, Header Length: 24 bytes
   b) IPv4, Header Length: 32 bytes
   c) IPv6, Header Length: 24 bytes
   d) IPv6, Header Length: 32 bytes
2. In Classless Inter-Domain Routing (CIDR), the network ID in an IPv4 address is:
   a) Always 8 bits long
   b) Always 16 bits long
   c) Always 24 bits long
   d) None of the above
3. Which IP address(es) should never be assignable to host or router interfaces?
   a) Network Address
   b) Broadcast Address
   c) Both a and b
   d) None of the above

True/False:

1. A DHCP client that has been assigned an Address for a period can release the Address before the Expiration time. [T / F]
2. VLSM is possible with both Classful and Classless IPv4 Addressing Schemes. [T / F]

Q2: **[2+1+1+1+1+1+1+1+1 = 10 Marks] [CLO 3]**

Consider the router and the two attached subnets below (A and B). The number of hosts is also shown below. The subnets share the 24 high-order bits of the address space: 146.93.104.0/24. Assign subnet addresses to each of the subnets (A and B) so that the amount of address space assigned is minimal, and at the same time leaving the largest possible contiguous address space available for assignment if a new subnet were to be added in the future. Then answer the questions below:



(1) How many **Hosts** can there be in this Address Space?

(2) What is the **Subnet Address** of Subnet A? **(CIDR notation)**

(3) What is the **Broadcast Address** of Subnet A?

(4) What is the **First Usable Address** of Subnet A?

(5) What is the **Last Usable Address** of Subnet A?

(6) What is the **Subnet Address** of Subnet B? **(CIDR notation)**

(7) What is the **Broadcast Address** of Subnet B?

(8) What is the **First Usable Address** of Subnet B?

(9) What is the **Last Usable Address** of Subnet B?