- 9 JUL 2025 (M)

NCU/FRM/2.6/ACAD/027

THE NORTHCAP UNIVERSITY	**Question paper for Major Test 2025** **School of Engineering & Technology**	**Review Date:** **Session: Jan-Jun 2025**
	Programme Name: BCA (Re-Major) **Course Name: Computer Networks** **Course Code: BCL202** **Semester: Even, 4th Semester**	**Maximum Marks: 100** **Duration: 3 hrs** **Sheet 1 of 2**

Note:
1. All the questions are compulsory.
2. Marks and COs are indicated against the questions.
3. Calculator permitted.

CO1: Describing computer network in terms of a layered model.
CO2: To determine different types of errors and data flow within networks.
CO3: Planning logical sub-address blocks with a given address block.
CO4: Develop basic understanding of Connection oriented and connection services as well as protocols used in transport layer.
CO5: Describing the standard protocols involved with TCP/IP based communications.

SECTION A (25 marks)

Q. No.	Question	Marks	CO's
Q1.	Compare and contrast the OSI model with the TCP/IP model. How do the layers correspond to each other?	2+3	CO1
Q2.	A slotted ALOHA network transmits 200-bit frames on a shared channel of 200 kbps. What is the throughput if the system (all stations together) produces a) 2000 frames per second b) 1000 frames per second	 2.5 2.5	CO2
Q3.	Consider the data word 110101 and the generator polynomial 1011. Using binary division, determine the CRC code that should be appended to the data. Show the steps of the division.	5	CO3
Q4.	What happens when a TCP segment with the FIN flag is received by a host? Describe the steps in the connection termination process.	2+3	CO4
Q5.	How does the Domain Name System (DNS) resolve a domain name like www.example.com to its corresponding IP address? Explain the process with an example.	2+3	CO5
	SECTION B (60 marks)		
Q6.	a) Describe how a NAT (Network Address Translation) device works and its importance in IPv4 networks. b) How does the Token Ring protocol control access to the network, and how does it prevent data collisions?	8 7	CO1 CO2

Q7.	An ISP is granted a block of addresses starting with 190.100.0.0/16 (65,536 addresses). The ISP needs to distribute these addresses to three groups of customers as follows: a) The first group has 64 customers: each need 256 addresses. b) The second group has 128 customers: each need 128 addresses. c) The third group has 128 customers: each need 64 addresses.	 5 5 5	CO3
Q8.	The details of UDP are given in hexadecimal format C350 1F90 001C 5A3F a) What is the destination port number? b) What is the source port number? c) What is the total length of the user datagram? d) What is the length of the data? e) Is the packet directed from a client to a server or vice versa?	 3 3 3 3 3	CO4
Q9.	a) How does an email client send a message from a user's device to the recipient's mail server using different layers of the TCP/IP model? Describe the role of each layer involved in the process. b) What are the functions of the DHCPDISCOVER and DHCPACK messages in the DHCP process?	8 7	CO5 CO5
	SECTION C (15 marks)		
Q10.	The following is a dump of a TCP header in hexadecimal format: **C001 0050 0000001A 0000002B 60121000 00000000** **Answer the following:** a) What is the **source port number**? b) What is the **destination port number**? c) What is the **sequence number**? d) What is the **acknowledgment number**? e) What is the **header length** in bytes? f) Which **TCP control flag(s)** are set in this segment? g) What is the **window size value**? h) Based on the port numbers, is this segment likely from a **client or a server**?	 2 2 2 2 2 1 2 2	CO4