

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur (GIET University)



B. Tech (Sixth Semester - Regular) Examinations, April 2026 23BECPE36011 – Data Communications and Networking (ECE)

Time: 3 hrs

Maximum: 60 Marks

Answer ALL questions
(The figures in the right-hand margin indicate marks)

PART – A**(2 x 5 = 10 Marks)**Q.1. Answer **ALL** questions

- | | CO # | Blooms
Level |
|---|------|-----------------|
| a. Mention the five major components of a communication system with a suitable diagram. | CO1 | K2 |
| b. Differentiate between single-bit error and burst error with example. | CO2 | K2 |
| c. Find the class of each address: | | |
| i. 00000001 00001011 00001011 11101111 | | |
| ii. 11000001 10000011 00011011 11111111 | CO3 | K3 |
| iii. 14.23.120.8 | | |
| iv. 252.5.15.111 | | |
| d. Differentiate between UDP and TCP. | CO4 | K2 |
| e. What is the role of HTTP in the World Wide Web? | CO5 | K2 |

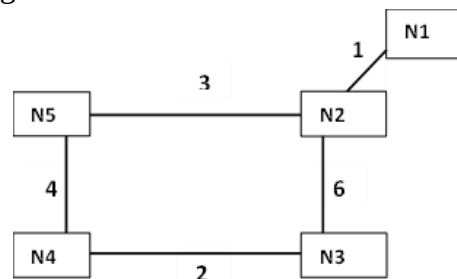
PART – B**(10 x 5 = 50 Marks)**Answer **ALL** the questions

- | | Marks | CO # | Blooms
Level |
|--|-------|------|-----------------|
| 2. a. Explain different types of network topologies with suitable diagrams. | 5 | CO1 | K2 |
| b. Describe the process of error detection in block coding with a structural diagram. | 5 | CO2 | K2 |
| (OR) | | | |
| c. Describe the different unguided transmission media in detail with their applications. | 5 | CO1 | K2 |
| d. Station A needs to send a message consisting of 10 packets to Station B using a sliding window protocol with window size = 4 and Go-Back-N error control strategy. All packets are ready for transmission. If every 4th packet transmitted by A is lost (no ACK is lost), determine the total number of packets transmitted by A to successfully deliver the complete message to B. | 5 | CO2 | K3 |
| 3.a. With a neat diagram, show the implementation of leaky and token bucket. | 5 | CO4 | K2 |
| b. Write a short note on HTTP and WWW. | 5 | CO5 | K2 |
| (OR) | | | |
| c. Discuss the working principle of User Datagram Protocol (UDP) and mention its applications. | 5 | CO4 | K2 |
| d. Determine which of the following are FQDNs and which are PQDNs: | | | |
| i. com. | | | |
| ii. mail | 5 | CO5 | K3 |
| iii. www.example.org | | | |
| iv. ftp.college.edu. | | | |

v. server.department.university.ac.in

- 4.a. Assume that a voice channel occupies a bandwidth of 4 kHz. We need to combine three voice channels into a link with a bandwidth of 12 kHz, from 20 to 32 kHz. Show the configuration, using the frequency domain. Assume there are no guard bands.
- b. What is routing? Using distance vector routing algorithm, calculate the shortest path in the following given network.

5 CO1 K3



5 CO3 K4

(OR)

- c. How does communication take place in a circuit-switched network? Discuss its three phases in detail.
- d. Expand the IPv6 address into its full notation:
- 2001:db8:1234:5678::abcd
 - ::ffff:10.0.0.1
 - 2001:db8::
 - fe80::2aa:ff:fe9a:1234
 - ff02::16

5 CO1 K2

5 CO3 K3

- 5.a. A bit stream 10011101 is transmitted using the standard CRC method. The generator polynomial is x^3+1 .

- What is the actual bit string transmitted?
- Suppose the third bit from the left is inverted during transmission. How will receiver detect this error?

5 CO2 K3

- b. Explain the concept of logical addressing in computer networks. Discuss the structure and features of IPv4 addressing.

5 CO3 K2

(OR)

- c. How congestion control technique can be implemented in open loop?
- d. Illustrate frame collision in a Pure ALOHA system with a neat diagram.
- 6.a. Find the minimum hamming distance of the coding scheme:

5 CO4 K2

5 CO2 K3

<u>Data words</u>	<u>Codewords</u>
00	000
01	011
10	101
11	110

5 CO2 K3

- b. What do you mean by DNS in the internet? Give examples.

5 CO5 K2

(OR)

- c. Explain the behaviour of three persistence methods in CSMA with a suitable diagram.
- d. Explain the services of a User Agent in an electronic mail system.

5 CO2 K2

5 CO5 K2

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