Course Code	**:**	**BCS-041**
Course Title	**:**	**Fundamentals of Computer Networks**
Assignment Number	**:**	**BCA (IV)/041/Assignment/2024-25**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Date of Submission	**:**	**31st October, 2024 (For July Session)** **30th April, 2025 (For January Session)**

This assignment has eight questions for a total of 80 marks. Answer all the questions. Each question carries 10 marks. Rest 20 marks are for viva voce. You may use illustrations and diagrams to enhance explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

Q1.

(a) Differentiate between parallel and serial communication. Give an example of each.

(b) Compare POP and IMAP.

Q2.

(a) What is Ad hoc Wireless Communication System? Explain.

(b) What is better for computer communication — analog or digital? Justify your answer.

Q3. What is Windowing? How is flow control and reliability achieved through windowing at transport layer?

Q4.

(a) Compare between CSMA/CD and Ethernet protocol. How does CSMA/CD resolve the problem of line connection? Explain.

(b) Differentiate between circuit switching and virtual circuit. Also explain the effect of router failure in virtual circuits.

Q5. Given data frame is 1101011011 and generator polynomial $G(x) = x^4 + x + 1$. Derive the transmitted frame using CRC method. Write all the steps involved in the process

Q6. Differentiate between public key cryptography and private-key cryptography. Assume two prime numbers p and q are 13 and 17 respectively. Calculate private key and public key using RSA algorithm.

Q7.

(a) Differentiate between pure ALOHA and slotted ALOHA. Give formulas for their throughput.

(b) Explain the importance of Sliding Window Protocol. Also, list the types of sliding window techniques.

Q8.

(a) Write the step-by-step working of Link State Routing. Also, compare it with Distance Vector Routing.

(b) Explain leaky bucket algorithm for congestion control. Also list its advantages and disadvantages.