**Roll No……..…..** **Total No. of Printed Pages: [2]**
**Total No. of Questions: [09]**

**B. Tech EE (Semester – 6th/8th)**
**COMPUTER NETWORKS-I**
**Subject Code: BCSE0F96**
**Paper ID: OE2111525**

**Time: 03 Hours** **Maximum Marks: 60**

**Instruction for candidates:**

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consists of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consists of 3 questions of 10 marks each. The student has to attempt any 2 questions.

**Section – A** **(2 marks each)**

Q1. Attempt the following:

a. Differentiate between broadcast and point-to-point networks, providing examples of each.
b. How does the Nyquist formula determine the maximum data rate for a channel?
c. Provide an overview of twisted pair and fiber optics as transmission media.
d. Define checksum and explain its role in error detection.
e. Outline the IEEE 802.3 frame format used in Ethernet networks.
f. Describe the role of token passing in network access control and its advantages.
g. Briefly introduce IPv6 and highlight its advantages over IPv4.
h. How does subnetting aid in the efficient utilization of IP addresses in large networks?
i. Outline the concept of flow control in transport protocols.
j. Differentiate between SMTP and POP in terms of their functions.

**Section – B** **(5 marks each)**

Q2. Compare and contrast the ISO-OSI reference model and the TCP/IP reference model in terms of their architectures and layering schemes with existing networks. Discuss the advantages and disadvantages of each model in the context of modern networking technologies.

Q3. Discuss the operation of sliding window protocols, focusing specifically on the Stop & Wait Automatic Repeat reQuest (ARQ) protocol.

Q4. Discuss the concepts of leaky bucket and token bucket algorithms in congestion control, detailing their operation, advantages, and applications in regulating traffic flow. Provide examples and illustrations where necessary to support your explanations.

Q5. Compare and contrast TCP and UDP in terms of their features, reliability, and suitability for different types of applications.

Q6. Discuss the differences between FTP, HTTP, and SNMP. Explain how FTP facilitates the transfer of files between client and server systems.

**Section – C** **(10 marks each)**

Q7. Explain the fundamental concepts of data communication systems, including their components, data flow, and goals. Discuss the differences between wireless and wired networks and broadcast and point-to-point network architectures, highlighting their advantages and limitations.

Q8. Explain the static and dynamic channel allocation concepts in computer networks, highlighting their advantages and limitations. Compare and contrast random access protocols such as ALOHA and CSMA with controlled access methods like polling and token passing, discussing their mechanisms, efficiency, and suitability for different network environments.

Q9. Explain different transmission media used in communication networks, including twisted pair, coaxial cable, and wireless transmission technologies. Discuss each transmission medium's characteristics, advantages, and limitations, considering factors such as bandwidth, distance, and susceptibility to interference.