(b) What is an IP address ? Explain the classful IP addressing. (C04)

(c) Explain the following : (CO4)

(i) Hub

(ii) Switch

(iii) Bridge

(iv) Gateway

(v) Router

5. (a) Compare and contrast TCP and UDP (User Datagram Protocol). Discuss the key differences between these two transport layer protocols. In what scenarios is UDP preferred over TCP ? Provide examples. (CO5)

(b) Explain the Domain Name System (DNS) and its role in translating domain names to IP addresses. Discuss the hierarchy of DNS servers and the process involved in resolving a domain name. (CO5)

(c) Explain Electronic mail architecture in detail. Explain the use of protocols in sending and receiving an email. (CO5)

H Roll No. 22921104

TBC–301/TBI–301/TBS–301

B. C. A./B. SC. (IT)/B.SC. (H) (CS)
(THIRD SEMESTER)
END SEMESTER
EXAMINATION, Dec., 2023

DATA COMMUNICATION AND COMPUTER NETWORKS

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each sub-question carries 10 marks.

1. (a) What is Data Communication ? Explain various modes of communication and types of network in detail. (CO1, CO3)

P.T.O.

(b) Explain the architecture of Internet Model. Give the detailed comparison between ISO-OSI and Internet Model. (CO1, CO3)

(c) What are errors ? Explain various error detection and correction techniques. (CO1, CO3)

2. (a) Explain the role and significance of the Physical Layer in the OSI model. Discuss the functions and services provided by the Physical Layer in the context of data communication. (CO2, CO3)

(b) Apply checksum for the following data at sender and receiver side. (CO2, CO3)

10011001, 11100010, 00100100, 10000100

(c) Differentiate the following : (CO2, CO3)

(i) Menchester and Differential Menchester Encoding

(ii) Circuit switching and Packet Switching

(iii) Twisted pair cable and fibre optic cable

3. (a) A sender is transmitting a dataword 10011010101 using CRC with a polynomial divisor 1011. Calculate the CRC bits to be appended to the dataword. Also, calculate the transmitted codeword. (CO3)

(b) Explain the Stop-and-Wait protocol for flow control in the Data Link Layer. Discuss its operation, advantages, and limitations. Provide a step-by-step explanation of how it prevents data overflow. (CO3)

(c) Describe in detail the functions performed by the Data Link Layer. Discuss the method of bit-stuffing framing with example. Discuss the services it provides to the Network Layer. (CO3)

4. (a) Describe the structure of an IPv4 frame format. Explain the various fields present in an IPv4 packet and their roles in the data transmission process. (CO4)