Ref No.: Ex/PG/ETCE/T/113A/2018

M.E. ELECTRONICS AND TELECOMMUNICATION ENGINEERING

FIRST YEAR FIRST SEMESTER 2018

COMPUTER COMMUNICATION NETWORK (COMM/COMP)

Time:3hrs Full Marks:100

Answer **Question No.1** and **ANY** four from the rest

All questions carry equal marks

5×4=20

1. Distinguish between
   - i) Synchronous TDM and statistical TDM
   - ii) Protocols and standards
   - iii) Syntax and semantics of protocols
   - iv) Logical address and port address of nodes in networking
   - v) FDM and WDM

5+10+5=20

2. What is OSI-ISO model for a data communication network architecture ?
   Give a list of constituent layers and describe briefly the functions as implemented in each layer of OSI model.
   Compare OSI model with TCP/IP model of network architecture.

8+4+8=20

3. Using schematic diagrams outline data transfer mechanism in LAN and WAN.
   What is Metropolitan Area Network ?
   Mention the services provided under the following IP protocol
   a) ARP b) RARP c) ICMP d) IGMP

6+8+6=20

4. What are the different performance parameters necessary for evaluating the quality of service of data communication network ? Briefly outline them.
   List five line coding schemes used in the transmission of digital data. Briefly explain their characteristics. Compare their bandwidths.
   Four channels are multiplexed using TDM. If each channel sends 100 bytes/s and multiplexing occurs with 1 byte per channel. Find size of a frame, frame rate and bit rate of the multiplexed data.

10+10=20

5. What is called a datagram ? Describe the features of datagram networks including resource allocation, efficiency and delay. Illustrate data transfer in a datagram network using four routers.

   What is a virtual circuit identifier ? Describe with example how utilization of virtual circuit identifier is made in set up, data transfer and tear down phase of virtual circuit operation.

   Mention the application area of virtual circuit.

6+12+2=20

6. What are the principal functions of data link layer ? What are the activities carried out in the sub layer data link control under datalink layer protocol ? Distinguish between Byte oriented framing and Bit oriented framing. Why are they needed ?

   Draw schematic diagram for flow control and error control actions in a Go-Back N ARQ protocol. Describe the operations and performance in this protocol.

   What is the major difference between Stop and Wait ARQ and Go-Back N ARQ protocol ?

8+8+4=20

7. Describe the performance and application of Unshielded Twisted Pair (UTP) cable in data communication. What are the different categories of UTP ? Compare their characteristics including data rate of operation and application.

   What is the advantage of serial transmission over parallel transmission in data communication ? What are the different types of serial transmission ?

   Outline the principal features in each of them.

   What is the total delay (latency) for a frame of size 10 million bits that is sent in a link with 15 routers each having queuing time of 2 μs and a processing time of 1μs. The length of the link 3000 Km. The speed of light inside the link is 2×10^8 m/s. The link has a bandwidth of 6Mbps. What component of the total delay is dominant ?

4×5=20

8. Write notes on:

   a) Slotted ALOHA
   b) CSMA/CD
   c) MAC layer in IEEE 802.11
   d) Bridge connecting two LANs