ROLL NO. _____

Code: AE71/AC67/AT67/AE119/AC119/AT119
Subject: DATA COMMUNICATION & COMPUTER NETWORKS

AMIETE – ET/CS/IT (Current & New Scheme)

Time: 3 Hours **June 2019** **Max. Marks: 100**

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE: There are 9 Questions in all.

- **Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.**
- **The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.**
- **Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.**
- **Any required data not explicitly given, may be suitably assumed and stated**

Q.1 Choose the correct or the best alternative in the following: (2×10)

a. Due to delay distortion, some of the signal components of one bit position will spill over into other bit positions, causing,
(A) Inter Symbol Interference **(B)** Attenuation
(C) Cross talk **(D)** Equalization

b. The generator polynomial of a CRC is $g(x)=X^3+X+1$, the transmitted code for data 101101 is
(A) 101101001 **(B)** 101101100
(C) 101101000 **(D)** 101101011

c. At a given SNR, binary coherent PSK is superior to binary coherent FSK by
(A) 6dB **(B)** -3dB
(C) 2dB **(D)** 3dB

d. To divide time into equal-sized quanta, and send data over the physical link in a round-robin fashion is
(A) Frequency Division Multiplexing (FDM)
(B) Synchronous Time Division Multiplexing (STDM)
(C) Statistical Multiplexing
(D) Round-Robin Multiplexing

e. On a 1-Mbps network, it takes_____ time to transmit each bit.
(A) 0.1μs **(B)** 10μs
(C) 0.01μs **(D)** 1μs

f. The Shannon channel capacity for a telephone channel with bandwidth of 3400 Hz and SNR of 30 db is
(A) 45.2 kbps **(B)** 33.889 kbps
(C) 39.2 kbps **(D)** 18.2 kbps

g. If carrier modulated by digital bit stream had one of the possible phases of 0, 90,180 and 270 degree, then the modulation is called
(A) BPSK **(B)** QAM
(C) QPSK **(D)** MSK

h. If the source node wants to send a message to some subset of the other nodes, but not all of them, the situation is called
(A) Unicast **(B)** Broadcast
(C) Multicast **(D)** Subcast

i. The address bits of IPv4 is _____bits
(A) 64 **(B)** 32
(C) 124 **(D)** 256

j. Class C default subnet mask is
(A) 255.255.255.0 **(B)** 255.0.0.0
(C) 255.255.0.0 **(D)** 255.255.255.255

Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

Q.2 a. Compare LAN and WAN network. **(4)**

b. Explain the functions performed by the following layers of OSI model **(6)**
(i) Network layer
(ii) Data link layer

c. What is the need of protocol Architecture? With neat block diagram explain the TCP/IP concept. **(2+4)**

Q.3 a. With neat diagram explain Acoustic spectrum of speech and music. **(6)**

b. Briefly explain different guided media commonly used for data transmission. (**6)**

c. Assume a receiver with an effective noise temperature of 294 K and 10-MHz bandwidth. Find the thermal noise level at the receiver's output. **(4)**

Q.4 a. With neat block diagram explain pulse code modulation technique. **(5)**

b. Represent the binary data 100110001in **(5)**
(i) NRZ-I
(ii) Pseudo ternary
(iii) Bipolar-AMI
(iv) Manchester
(v) Differential Manchester Encoding format

c. With an example explain the CRC error detection method. **(6)**

Q.5 a. With neat diagrams explain TDM & FDM multiplexing techniques. **(6)**

b. Explain with relevant diagram the working of Sliding window protocol. **(5)**

c. Briefly explain cable modem scheme. **(5)**

Q.6 a. Give the comparison between circuit switching and packet switching. **(5)**

b. With suitable example explain Bellman-ford algorithm. **(6)**

c. Briefly explain the mechanism for congestion control. **(5)**

Q.7 a. Explain with neat diagram the 10 Gigabit Ethernet configurations. **(6)**

b. With suitable diagram explain different LAN topologies. **(5)**

c. Briefly discuss the IEEE 820.11 Frame architecture with suitable diagram. **(5)**

Q.8 a. Explain the Internet Protocol operation with suitable diagram. **(5)**

b. With neat diagram explain IPv4 header formet. **(7)**

c. Mention the type of address for the following IP address **(4)**
(i) 132.33.144.56
(ii) 122.53.23.66
(iii) 195.133.142.26
(iv) 232.152.125.45

Q.9 a. What is multicasting and explain the requirements of multicasting? **(5)**

b. With neat diagram explain UDP header**.** **(5)**

c. Briefly explain SMTP protocol. **(6)**