Subject: DATA COMMUNICATION & COMPUTER NETWORKS

Time: 3 Hours **JUNE 2011** **Max. Marks: 100**

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. The _____ is the physical path over which a message travels.

(A) protocol **(B)** medium
(C) signal **(D)** transmission

b. The _____ layer changes bits into electromagnetic signals.

(A) physical **(B)** data link
(C) transport **(D)** application

c. If the data word is 1101101, the divisor 10011 and the remainder 1001, what is the CRC code word?

(A) 11011010000 **(B)** 11011011001
(C) 110110110011 **(D)** 100111001

d. A channel is extremely noisy for which the value of signal-to-noise ratio is almost zero; Then the channel capacity will be _____.

(A) zero **(B)** 1
(C) 10 **(D)** 100

e. In Go-back N ARQ, if frames 4,5 and 6 are received successfully, the receiver may send an ACK _____ to the sender.

(A) 5 **(B)** 6
(C) 7 **(D)** 3

f. In statistical multiplexer, for 'n' signal sources, each frame contains 'm' slots where 'm' is usually _____ n.

(A) less than **(B)** greater than
(C) equal to **(D)** one less than

g. Which type of switching uses the entire capacity of a dedicated link?

(A) circuit switching **(B)** datagram packet switching
(C) message switching **(D)** virtual circuit packet switching

h. Routing strategies are implemented in _____ layer.
(A) datalink **(B)** transport
(C) network **(D)** physical

i. Another term for CSMA/CD and the IEEE 802.3 standard is _____
(A) Ethernet **(B)** Token Ring
(C) FDDI **(D)** Token bus

j. IP address in IPv6 consist of _____ bits.
(A) 128 **(B)** 64
(C) 32 **(D)** 16

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

Q.2 a. With the help of a block schematic, discuss the salient features of a data communication model. **(8)**

b. Describe the ISO OSI reference model of a computer network. Discuss the function of each layer. **(8)**

Q.3 a. Assuming that a PSTN has a bandwidth of 3000 Hz and typical signal to noise ratio of 20dB, determine the maximum theoretical data rate that can be achieved. **(4)**

b. Explain degradation of signal quality due to attenuation and delay distortion. **(6)**

c. Explain various channel impairments. **(6)**

Q.4 a. Explain the three basic modulation techniques for transforming digital data into analog signals with waveforms. **(6)**

b. Find the CRC code for a frame (message) 1010001101 and generator polynomial $G(X) = \left(X^5 + X^4 + X^2 + 1\right)$. **(6)**

c. Compare synchronous and asynchronous data transmission techniques. **(4)**

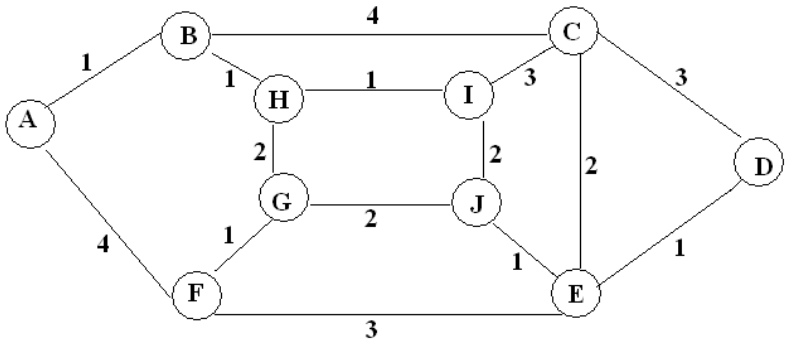
Q.5 a. With suitable illustrations, explain selective reject ARQ. **(6)**

b. What do you mean by statistical time division multiplexers? Explain with relevant diagrams. **(6)**

c. How is WDM similar to FDM? Give their differences. **(4)**

Q.6 a. Discuss the switching technique used for a packet switched network by datagram and virtual circuit approach. **(8)**

b. Find the shortest path from A to D using shortest path algorithm (Dijkstra algorithm) for the network shown below:- (6



c. When congestion occurs in a network? **(2)**

Q.7 a. What is the function of a bridge in networking? Discuss the architecture and operation of a bridge connected network. **(7)**

b. Explain characteristics of high Speed LANs. Give the functionality of CSMA/CD. **(5)**

c. List key requirements for wireless LANs. **(4)**

Q.8 a. What are the different classes of IP addressing? **(4)**

b. Explain various ICMP message formats. **(4)**

c. Give the advantages of IPv6 over IPv4. **(4)**

d. Instead of using 16 bits for the network part of a class B address in IPv4, 20 bits are used. How many class B networks and hosts would there be? **(4)**

Q.9 a. Draw the TCP header format and brief the function of each field. **(8)**

b. Discuss DNS with respect to
(i) Domain names (ii) Name resolution **(4+4)**