CS/BCA/(Supple)/SEM-5/BCA-501/09

DATA COMMUNICATION AND COMPUTER NETWORKS (SEMESTER - 5)

1. ..... *Signature of Invigilator*

2. ..... *Signature of the Officer-in-Charge*

Reg. No. | | | | | | | | | | | | | | |

Roll No. of the Candidate | | | | | | | | | | | | | | |

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CS/BCA/(Supple)/SEM-5/BCA-501/09

ENGINEERING & MANAGEMENT EXAMINATIONS, AUGUST – 2009

DATA COMMUNICATION AND COMPUTER NETWORKS (SEMESTER - 5)

Time : 3 Hours] [Full Marks : 70

INSTRUCTIONS TO THE CANDIDATES :

1. This Booklet is a Question-cum-Answer Booklet. The Booklet consists of **32 pages**. The questions of this concerned subject commence from Page No. 3.
2. a) In **Group – A**, Questions are of Multiple Choice type. You have to write the correct choice in the box provided **against each question**.
   b) For **Groups – B** & **C** you have to answer the questions in the space provided marked 'Answer Sheet'. Questions of **Group – B** are Short answer type. Questions of **Group – C** are Long answer type. Write on both sides of the paper.
3. **Fill in your Roll No. in the box** provided as in your Admit Card before answering the questions.
4. Read the instructions given inside carefully before answering.
5. You should not forget to write the corresponding question numbers while answering.
6. Do not write your name or put any special mark in the booklet that may disclose your identity, which will render you liable to disqualification. Any candidate found copying will be subject to Disciplinary Action under the relevant rules.
7. **Use of Mobile Phone and Programmable Calculator is totally prohibited in the examination hall.**
8. You should return the booklet to the invigilator at the end of the examination and should not take any page of this booklet with you outside the examination hall, **which will lead to disqualification**.
9. Rough work, if necessary is to be done in this booklet only and cross it through.

No additional sheets are to be used and no loose paper will be provided

FOR OFFICE USE / EVALUATION ONLY

Marks Obtained

	Group – A										Group – B			Group – C				
Question Number																	***Total Marks***	***Examiner's Signature***
Marks Obtained																		

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Head-Examiner/Co-Ordinator/Scrutineer

S–54006 (17/08)

DO NOT WRITE ON THIS PAGE

CS/BCA/(Supple)/SEM-5/BCA-501/09
DATA COMMUNICATION AND COMPUTER NETWORKS
SEMESTER - 5

Time : 3 Hours] [Full Marks : 70

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : $10 \infty 1 = 10$

i) Which of the following is not a standard RS-232C signal ?

a) RTS b) CTS

c) DSR d) VDR. ☐

ii) The network topology that supports bi-directional links between each possible node is

a) ring b) star

c) tree d) mesh. ☐

iii) Which of the following ISO level is more closely related to the physical communications facilities ?

a) Application b) Session

c) Network d) Data link. ☐

iv) In Ethernet CSMA/CD, the special bit sequence transmitted by media access management for collision handling is called as

a) preamble b) postamble

c) jam d) none of these. ☐

v) Baud means

a) the number of bits transmitted per unit time

b) the number of bytes transmitted per unit time

c) the rate at which the signal changes

d) none of these. ☐

vi) A modem constellation diagram has data points at (0, 1) and (0, 2). What type of modulation does the modem use ?

a) Phase modulation b) Amplitude modulation

c) Both (a) and (b) d) None of these. ☐

vii) Manchester code is

a) Bi-polar code b) Non return to zero code

c) Polar code d) None of these. ☐

viii) Bit stuffing refers to

a) inserting a '0' in user data stream to differentiate it with a flag

b) inserting a '0' in flag stream to avoid ambiguity

c) appending a nibble to the flag sequence

d) appending a nibble to the user data stream. ☐

ix) Which of the following is not a field in the Ethernet message packet ?

a) Type b) Data

c) Pin-code d) Address. ☐

x) Baud rate of the signal if the bit rate is 20000 bits per second & 4 bits per signal, is

a) 20000 b) 5000

c) 80000 d) None of these. ☐

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 ∞ 5 = 15

2. What does the CRC generator append to the data unit ?

3. In what situations does the sender retransmit a packet ?

4. What is the advantage of QPSK over ASK or PSK ?

5. Briefly explain asynchronous transmission method.

6. What is the difference between routing and bridging ?

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 ∞ 15 = 45

7. a) What are the differences between unicast, multicast and broadcast addresses ? 5

   b) Explain the goals of layered protocol. 5

   c) List the names of guided and unguided media. 5

8. a) Suppose there is heavy traffic on both a CSMA/CD LAN and a token ring LAN. A station on which system is more likely to wait longer to send a frame ? Give reasons. 6

   b) How does a token bus LAN operate ? Explain. 6

   c) What is the smallest size of a token ring data frame ? What is the largest size of a Token ring data frame ? 3

9. a) What is the difference between in-band signaling and out-of-band signaling ? 4

   b) When a device uses a B channel, how many bits can it send per frame ? 2

   c) Briefly explain the advantage of ISDN over other types of network. 5

   d) Define NT1, NT2, TA, TE2 in connection with ISDN. 1 + 1 + 1 + 1

10. a) Given a 10 bit sequence 1010011110 and a divisor 1011, find whether there is any error in the data unit using CRC method. 7

b) What are the three important multiplexing techniques ? Explain in brief. 8

11. Write short notes on any *three* of the following : 3 ∞ 5

a) Packet switching

b) Leaky bucket algorithm

c) Network security

d) Digital to analog conversion

e) Topology.

END

Name : .....

Roll No. : .....

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CS/BCA/SUPPLE/SEM-5/BCA-501/2010

2010

DATA COMMUNICATION & COMPUTER NETWORKS

Time Allotted : 3 Hours | Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : 10 × 1 = 10

   i) In Ethernet CSMA/CD, the special bit sequence transmitted by media access management for collision handling is called a

   a) preamble b) portamble

   c) jam d) none of these.

   ii) The maximum length of data in a token ring frame is

   a) 1500 b) 4500

   c) 3200 d) 6400.

   iii) Which is not a basic multiplexing method ?

   a) FDM b) TDM

   c) WDM d) MDM.

iv) A cipher refers to

a) an encryption algorithm

b) a decryption algorithm

c) a private key

d) both (a) and (c).

v) As the bit rate of FSK signal increases, the bandwidth

a) decreases b) increases

c) remains same d) doubles.

vi) The topology with highest reliability is

a) Bus topology b) Star topology

c) Ring topology d) Mesh topology.

vii) "Baud" means

a) the number of bits transmitted per unit time

b) the number of bytes transmitted per unit time

c) the rate at which signal changes

d) none of these.

viii) UDP belongs to

a) Network layer b) Transport layer

c) Mac layer d) Data link layer.

ix) Start and stop bits are used in serial communication for

a) Error detection

b) Error correction

c) Synchronization

d) Slowing down the communication.

x) Which layer handles encryption in ISO/OSI model ?

a) Physical b) Presentation

c) Session d) Application.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. What is IP addressing ? What are the different classes of IP addressing ? What is the difference between static and dynamic IPs. 1 + 2 + 2

3. State the advantages of IPv6 over IPv4.

4. Differentiate between bit rate and baud rate with examples.

5. Write a note on pure and slotted ALOHA.

6. Briefly explain IPv4 Datagram.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. a) Explain the OSI reference model. 6

   b) Compare the OSI with TCP/IP reference model. 3

   c) Define Repeater, Router & Bridge. 6

8. a) What do you mean by congestion ? Why does congestion occur in the network layer ? 5

   b) Describe the concept of Leaky Bucket for controlling congestion. 6

   c) Explain the terms 'Bridging' and 'Routing'. 4

9. Explain the operations of CSMA/CD bus and Token passing bus. Compare the advantages and disadvantages of each. Why is the latter favoured for real time application such as process control ?

10. What do you understand by the terms

    i) LAN

    ii) MAN

    iii) WAN ?

    Give example for each.

11. Write short notes on any *three* of the following : 3 × 5

    a) Virtual packet switching

    b) Public key and private key

    c) X.25

    d) TCP segment format.

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CS/BCA/SEM-5/BCA-501/2011-12

2011

DATA COMMUNICATION & COMPUTER NETWORK

Time Allotted : 3 Hours *Full Marks :* 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : $10 \times 1 = 10$

   i) FTP stands for

   a) File Transfer Protocol b) File Tree Protocol

   c) Field Transfer Protocol d) none of these,

   ii) The end to end delivery of the entire message is the responsibility of

   a) Network Layer b) Transport Layer

   c) Session Layer d) Presentation Layer.

   iii) Power gain can be represented as

   a) 20 log 2 (P2/P1) b) 10 log 2 (P2/P1)

   c) log 2 (P2/P1) d) none of these.

   iv) Shannon capacity determines

   a) noise present in he channel

   b) highest data rate in a noisy channel

   c) channel is noiseless

   d) all of these.

v) The number of network in class A addressing system is

a) 2^8 b) 2^{16}

c) 2^{32} d) 2^{24}

vi) What is the network address for 198.76.9.23 ?

a) 198.0.0.0 b) 198.76.0.0

c) 198.76.9.0 d) none of these.

vii) In digital transmission

a) bit rate is higher than baud rate

b) bit rate is lesser than baud rate

c) bit rate is equal to baud rate

d) none of these.

viii) Framing is done in ..... layer.

a) physical b) data link

c) transport d) network.

ix) Digital signature is

a) Symmetric key cryptography

b) Asymmetric key cryptography

c) both (a) and (b)

d) none of these.

x) Which of the following works in 7 layers ?

a) Router b) Switch

c) Hub d) Gateway.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. What are the advantages of digital transmission over analog transmission ?

3. Write short notes on the following:

   a) Full Duplex

   b) Half Duplex

4. Define bit rate and baud rate. An analog signal carries four bits in each signal element. If 1000 signal elements are sent per second, find the baud rate and bit rate. 3 + 2

5. What are the functions of DTE and DCE ? Give an example of each. What does the modem stand for ? What is null modem ? 2 + 1 + 1+ 1

6. a) Draw the various fields in IP packet header.

   b) What is the purpose of DSCP field ? 3 + 2

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. a) Draw a digital encoding format for NRZI, Manchester code, Differential Manchester coding for the digital signal 01001100011 and also write down the procedure in brief. 9

   b) Compare TCP/IP with OSI layer architecture. What are the major differences between these two protocols ? 3 + 3

8. a) What are the X.25 layer ? How does each relate to the OSI model ? 4

   b) How does the frame layer address field differ from the HDLC address field ? 3

   c) Explain the token ring network (IEEE 802.5) & FDDI. 5

   d) What do you mean by data security ? 3

9. Analyze the performance of pure ALOHA. How does slotted ALOHA improve the performance over pure ALOHA ? In both the cases find the expression for average delay and throughput. Compare the performance of pure ALOHA with slotted ALOHA. 4 + 5 + 6

10. a) Explain the reasons why the TCP/IP model came out as winner in the battle of the internet over ISO-OSI. 6

    b) What are adoptive and non-adoptive routings ? Give examples. 6

    c) Explain with diagram, how the lost frame, delayed and lost acknowledgements are handled in Go-Back-N ARQ. 3

11. Write short note on (any *three*) : 3 × 5

    i) PCM

    ii) Piggy backing

    iii) ALOHA

    iv) Symmetric key cryptography

    v) DNS.

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CS/BCA/SEM-5/BCA-501/2012-13

2012

DATA COMMUNICATION AND COMPUTER NETWORK

Time Allotted : 3 Hours *Full Marks :* 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : $10 \times 1 = 10$

   i) The slowest transmission speeds are those of

   a) Twisted pair wire b) Coasxial cable

   c) Twisted pair cable d) Microwaves.

   ii) HDLC protocol works in

   a) Application Layer b) Presentation Layer

   c) Session Layer d) Data Link Layer.

   iii) The number of outgoing lines in a hub is

   a) 1 b) n

   c) $n - 1$ d) $n + 1$.

iv) Base band is

a) digital signal b) analog signal

c) none of these d) all of these.

v) Encryption is performed in

a) Network Layer

b) Transport Layer

c) Session Layer

d) Data Link Layer.

vi) What is the network address for 198.76.9.23 ?

a) 198.0.0.0 b) 198.76.9.0

c) 198.76.9.0 d) None of these.

vii) Keyboard is an example of which of the following ?

a) Simplex b) Half Duplex

c) Full Duplex d) None of these.

viii) Subnet mask of default route in

a) 0.0.0.0 b) B255.255.255.255

c) Both (a) and (b) d) None of these.

ix) Fragmentation is applicable for

a) IP Header b) IP Data

c) TCP Header d) TCP Data.

x) In sliding window protocol is the window size is 64 what is t4he range of number

a) 0 to 63 b) 0 to 64

c) 1 to 63 d) None of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. Explain Delta modulation with proper example. Mention its limitations.

3. What is IP addressing ? What are the classes of IP addressing ? What is the difference between static and dynamic IPs ?

4. Explain Leaky Bucket Algorithm.

5. State the advantages of IPv6 over IPv6.

6. Briefly explain FDM process.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. a) Compare between Asynchronous TDM and Synchronous TDM with proper diagram.

b) Briefly explain Virtual Packet switching network.

c) Briefly define Repeater, Bridge and Router. 5 + 4 + 6

8. a) What is MAC address ?

   b) Briefly describe the TCP connection establishment and termination. What are the basic differences between TCP/IP and OSI reference mode ?

   c) Discuss the tasks of transport layer.

   d) Briefly discuss Token Bucket Algorithm of Congestion control. 1 + 4 + 3 + 2 + 5

9. a) What do you mean by Classes Addressing ?

   b) What is the first address in the block if one of the addresses is 167.199.170.82/27 ? If a network on the Internet has a subnet mask of 255.255.240.0 and then what is the maximum number of hosts that it can handle ?

   c) What is the need of subnet masking ?

   d) How can you compare Pure ALOHA and slotted ALOHA ? 2 + 3 + 3 + 2 + 5

10. Write short notes on any *three* of the following : 3 × 5

   a) Public key Cryptography

   b) BSC protocol

   c) Sliding Window Protocol

   d) Congestion Control

   e) OSI/ISO reference model.

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CS/BCA/SEM-5/BCA-501/2013-14

2013

DATA COMMUNICATION AND COMPUTER NETWORKS

Time Allotted : 3 Hours *Full Marks* : 70

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : $10 \times 1 = 10$

   i) Which topology requires a central controller or hub ?

   a) Mush b) Star

   c) Bus d) None of these.

   ii) FTP stands for

   a) File Transfer Protocol b) File Tree Protocol

   c) Field Transfer Protocol d) None of these.

   iii) The end to end delivery of the entire message is the responsibility of

   a) network layer b) transport layer

   c) session layer d) presentation layer.

iv) RZ stands for

a) Return to zero

b) Return to zero position

c) Return to zero multipolar

d) None of these.

v) Which of the following can be determined from a frequency domain graph of a signal ?

a) Bandwidth b) Phase

c) Power d) None of these.

vi) Power gain can be represented as

a) 20 log 2 (P2/P1) b) 10 log 2 (P2/P1)

c) log 2 (P2/P1) d) none of these.

vii) ASK, PSK, FSK are the examples of

a) Digital to digital b) Digital to analog

c) Analog to analog d) None of these.

viii) Synchronous transmission does not have

a) a start bit b) a stop bit

c) gaps between bits d) none of these.

ix) IEEE stands for

a) Institute of electrical and electronic engineers

b) Institute of electronics and electrical engineers

c) International electrical and electronic engineers association.

d) None of these.

x) Most popular cable used in communication nowadays is

a) Coaxial cable b) Twisted pair cable

c) Fibre optic cable d) None of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. a) How does graded index multimode optical fibre transmission minimize data loss ? 3

   b) What is Burst Error ? 2

3. Given a 10 bit sequence 1011001001 and a divisor of 1011, find the CRC.

4. a) What is the significance of twisting in a twisted pair cable ? 3

   b) What is Trellis coding ? 2

5. What are the advantages of IPv6 over IPv4 ?

6. What are the functions of Gateway and Repeater ? 2 + 3

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) Draw the digital signal encoding format for NRZI, NRZL, RZ Manchester Code and Differential codings for the digital signal 01001100011 and also write down the procedure in brief. 10

   b) In QPSK modulation data rate is 9600 bps. Calculate baud rate. 2

   c) An analog signal carries 4 bits in each signal element. If 1000 signal elements are sent per second, find baud rate and bit rate. 3

8. a) Why do we need use of layered protocol ? 5

   b) Give three differences between OSI reference model and TCP/IP model. 4

c) The bit pattern 01011001 is to be transmitted using the following techniques :

i) ASK

ii) FSK

iii) PSK 6

9. a) Write down the names of different multiple access protocols. Compare FDMA, TDMA and CDMA. 3 + 5

b) State Nyquist theorem. 2

c) Write a short note on CSMA/CD. 5

10. a) Draw the block diagram of stop-and-wait ARQ protocol and explain it. 3 + 3

b) Explain the Sliding window. What is Piggy backing ? 6 + 3

11. a) What do you mean by congestion ? Why does congestion occur in the network layer ? 5

b) Describe the concept of Leaky Bucket for controlling congestion. 6

c) Explain the terms 'Bridging' and 'Routing'. 4

12. Write short notes on any *three* of the following : 3 × 5

a) Safe IP

b) Public key and private key

c) Circuit switched and packet switched networks

d) 802·3 LAN

e) X·25 protocol.

BCA-501

DATA COMMUNICATION AND COMPUTER NETWORK

Time Allotted: 3 Hours | Full Marks: 70

The questions are of equal value.
The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

GROUP A
(Multiple Choice Type Questions)

1. Answer all questions. $10 \times 1 = 10$

(i) The slowest transmission speeds are those of

(A) twisted pair wire (B) coasxial cable
(C) twisted pair cable (D) microwaves

(ii) HDLC protocol works in

(A) application layer (B) presentation layer
(C) session layer (D) data link layer

(iii) The number of outgoing lines in a hub is

(A) 1 (B) n
(C) n–1 (D) n+1

(iv) What is the network address for 198.76.9.23?

(A) 198.0.0.0 (B) 198.76.9.1
(C) 198.76.9.0 (D) none of these

(v) Keyboard is an example of which of the following?

(A) simplex (B) half duplex
(C) full duplex (D) none of these

(vi) Subnet mask of default route in

(A) 0.0.0.0 (B) 255.255.255.255
(C) both (A) and (B) (D) none of these

(vii) FTP stands for

(A) file transfer protocol (B) file tree protocol
(C) field transfer protocol (D) none of these

(viii) The end to end delivery of the entire message is the responsibility of

(A) network layer (B) transport layer
(C) session layer (D) presentation layer

(ix) Framing is done in .....layer

(A) physical (B) data link
(C) transport (D) network

(x) Digital signature is

(A) symmetric key cryptography
(B) asymmetric key cryptography
(C) both (A) and (B)
(D) none of these

GROUP B
(Short Answer Type Questions)

Answer any *three* questions. 3×5 = 15

2. What is IP addressing? What are the classes of IP addressing? What is the difference between static and dynamic IPs? 1+2+2

3. Explain Leaky Bucket Algorithm. 5

4. Briefly explain FDM process. 5

5. What are the advantages of digital transmission over analog transmission? 5

6. Define bit rate and baud rate. An analog signal carries four bits in each signal element. If 1000 signal elements are sent per second, find the baud rate and bit rate. 3+2

GROUP C
(Long Answer Type Questions)

Answer any *three* questions. 3×15 = 45

7. For the bit string 10101101 draw the line coding using Unipolar NRZ, Polar RZ, Manchester and differential Manchester. What is baud rate and bit rate? 10+5

8. (a) Differentiate between TCP and UDP. 4
   (b) What is unicast, multicast and broadcast? 4
   (c) Explain IPv4 frame format. 7

9. (a) Explain three-way handshake for connection establishment. 6
   (b) How can you compare pure ALOHA and slatted ALOHA? 5
   (c) Explain dynamic model of ARP. 4

10. (a) What is cryptography? 3
    (b) Write the RSA algorithm. 7
    (c) Differentiate between Symmetric and Asymmetric key cryptography. 5

11. Write short notes on any *three* of the following: 3×5
    (a) Multiplexing
    (b) HDLC
    (c) Transmission Impairment
    (d) ATM
    (e) DNS

MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

BCA-501

DATA COMMUNICATION AND COMPUTER NETWORKS

Time Allotted: 3 Hours | Full Marks: 70

The questions are of equal value.
The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.
All symbols are of usual significance.

GROUP A
(Multiple Choice Type Questions)

1. Answer any *ten* questions. $10 \times 1 = 10$

(i) A system uses 32 levels for data representation for transmission; the number of bits that this system can support is _____.

(A) 4 (B) 16
(C) 32 (D) 5

(ii) Baud is _____

(A) number of bits per second
(B) number of signal changes per second
(C) number of bytes per second
(D) number of character per second

(iii) ARP is used to find _____

(A) IP address (B) MAC address
(C) Subnet address (D) Host address

(iv) How many redundancy bits are required to correct a data containing 8 bits?

(A) 3 (B) 4
(C) 5 (D) 8

(v) Firewall _____

(A) allows people on the internet to see just one IP address
(B) does not allow any connections to server
(C) restricts unauthorized users from accessing sensitive data
(D) manages password function

(vi) In which ARQ, when a NAK is received, all frames sent since the last frame acknowledge are retransmitted?

(A) Stop-and-Wait (B) Go back n
(C) Selective Reject (D) Both (A) and (B)

(vii) The highest data rate is provided by the transmission medium _____

(A) Coaxial Cable (B) Twisted Pair
(C) Optical fiber (D) Microwave

(viii) What is present in all HDLC control fields?

(A) P/F bit (B) N(R)
(C) Code bits (D) N(S)

(ix) Signal become weak with increase in distance traveled because of

(A) modulation (B) attenuation
(C) distortion (D) switching

(x) IP address in the B class is given by

(A) 125.123.123.3 (B) 191.023.21.52
(C) 192.128.32.56 (D) 10.17.16.38

(xi) Usually information security is achieved by

(A) layering (B) addressing
(C) grade of service (D) cryptography

(xii) Router operates in _____

(A) data link layer (B) network layer
(C) transport layer (D) all of these

GROUP B
(Short Answer Type Questions)

Answer any *three* questions. 3×5 = 15

2. What is transmission impairment? What are its causes? 5

3. Distinguish between Circuit switching and Packet switching. 5

4. Define bit rate and baud rate. Consider a noiseless channel with a bandwidth of 3000 Hz transmitting a signal with two signal levels. Calculate the maximum bit rate. 3+2

5. (a) What is Ethernet? 1
   (b) What are the differences between IEEE 802.4 and IEEE 802.5? 4

6. (a) What do you mean by multiplexing? 2
   (b) Discuss the basic difference between TDM and FDM. 3

GROUP C
(Long Answer Type Questions)

Answer any *three* questions. 3×15 = 45

7. (a) Communications services may be classified as Connection Oriented or Connectionless. Briefly summarize the principal difference between these two service classes. 6
   (b) Write down the advantages and disadvantages of Synchronous and Asynchronous modes of data transmission. 6
   (c) Given a bandwidth of 6000 Hz for an 8-PSK signal, what are the baud rate and bit rate? 3

8. (a) Explain the operation of CRC error detection method. By means of an example show how: 8
   (i) The error detection bits are generated
   (ii) The received frame is checked for transmission errors
   Use the generator polynomial $x^3 + x + 1$.
   (b) In stop-and-wait flow control, define and discuss the handling of 7
   (i) A damaged frame
   (ii) A lost frame

9. (a) Differentiate between Link State and Distance Vector routing algorithms. 5
   (b) What do you mean by encryption and decryption? What is Cipher text? Explain different encryption techniques under conventional method of encryption and decryption. 6
   (c) What is inverse multiplexing? Why do we need inverse multiplexing? 4

10. (a) Explain the IEEE 802.3 MAC frame format. 6
   (b) Explain X.25 frame format. How packets are associated with the virtual circuit on which they travel? What is the purpose of an LCN? 7
   (c) A file contains 3 million bytes. How long does it take to download this file using a 100-Kbps channel and 10-Mbps channel? 2

11. Write short notes on any *three* of the following: 3×5
   (a) Firewall
   (b) Describe the following terms.
   (i) Hop-by-hop
   (ii) End-to-end
   (c) UDP
   (d) TELNET
   (e) IP6

MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

Paper Code : BCA-501

DATA COMMUNICATION AND COMPUTER NETWORKS

Time Allotted : 3 Hours *Full Marks* : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : $10 \times 1 = 10$

i) OSI stands for

a) open system interface

b) open system interconnection

c) organizational system interfaces

d) none of these.

ii) Which topology requires a multipoint connection ?

a) Mesh b) Star

c) Bus d) Ring.

iii) The main function of Transport layer is

a) node to node delivery

b) process to process delivery

c) synchronization

d) updating & maintenance of routing tables.

iv) If the baud rate is 400 for a 4-PSK signal, the bit rate is

a) 100 bps b) 400 bps

c) 800 bps d) 1600 bps.

v) Baud means

a) the no. of bits transmitted per unit time

b) the no. of bytes transmitted per unit time

c) the rate at which signal changes

d) none of these.

vi) UDP belongs to

a) Network layer

b) Transport layer

c) Mac layer

d) Data link layer.

vii) Start and stop bits are used in serial communication for

a) error detection

b) error correction

c) synchronization

d) slowing down the communication.

viii) TCP is a/an

a) reliable connection oriented

b) unreliable connection oriented

c) reliable connectionless

d) unreliable connectionless.

ix) Repeater operates in

a) physical layer

b) data link layer

c) network layer

d) transport layer.

x) In a Go-Back-N ARQ, if the window size is 63, what is the range of sequence number ?

a) 0 – 63 b) 0 – 64

c) 1 – 63 d) 1 – 64.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. Briefly explain IPV4 Datagram with diagram.

3. What do you mean by CRC ? Explain with a block diagram. 2 + 3

4. Explain the HDLC frame format.

5. Distinguish between open loop and closed loop congestion control.

6. Compare AM, FM and PM with example.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. Define ISDN. Explain the signaling system 7 (SS7). Five channels each with a 100 KHz bandwidth to be multiplexed together. What is the minimum bandwidth of the link ? 2 + 5 + 5 + 3

8. a) What is the differences between baud rate and bit rate ? 3

   b) Why is star topology not suitable for a large network ? 3

   c) Why is FSK not suitable for high speed modems ? 4

   d) What are the advantages of IPV6 over IPV4 ? 5

9. a) Using differential Manchester and NRZ-L line encoding techniques encode the following binary strings : 11000010, 01011011 5

b) What do you mean by asynchronous serial transmission ? 3

c) We have a channel with a 1 MHz bandwidth. The signal to noise ratio for this channel is 63. What is the appropriate bit rate and signal level ? 4

d) What is bit stuffing in HDLC ? 3

10. a) A signal is quantized using 10-bit PCM. Find the SNR in dB. 3

b) Find the maximum bit rate for an FSK signal if the bandwidth of the medium is 12000 Hz and the different between the two carriers must be at 2000 Hz. 4

c) A system is designed to sample analog signals, convert them to digital form with a 4-bit converter and transmit them. What bit rate is required if the analog signal consists of frequencies between 400 Hz and 3400 Hz. 4

d) Given the bit pattern 01100, encode this data using ASK and FSK. 4

11. a) What do you mean by congestion ? Why does congestion occur in the network layer ? 5

b) Describe the concept of Leaky bucket for controlling congestion. 6

c) Explain the terms 'Bridging & Routing'. 4

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Paper Code : BCA-501

PUID : 05144 (To be mentioned in the main answer script)

DATA COMMUNICATION & COMPUTER NETWORKS

Time Allotted : 3 Hours | *Full Marks* : 70

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GROUP – A
(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : $10 \times 1 = 10$

   i) TCP is a/an

      a) reliable connection oriented protocol

      b) unreliable connection oriented protocol

      c) reliable connectionless protocol

      d) unreliable connectionless protocol.

   ii) Microwaves are used for

      a) unicast communication

      b) multicast communication

      c) both (a) and (b)

      d) none of these.

iii) UDP belongs to

a) network layer b) transport layer

c) Mac layer d) data link layer.

iv) Range of class *C* address is

a) 128-191 b) 190-220

c) 192-223 d) 190-223.

v) ARP protocol is used to map

a) hardware address to hardware address

b) physical address to logical address

c) IP network address to hardware address

d) none of these.

vi) Framing is done in

a) network layer b) transport layer

c) data link layer d) none of these.

vii) The standard for Token Ring is

a) IEEE 802•3 b) IEEE 802•5

c) IEEE 802•6 d) none of these.

viii) GSM stands for

a) Good Service Management

b) Global Service Management

c) Good Sender Memory

d) Global System for Mobile Communication.

ix) Which topology features a point-to-point line configuration ?

a) Mesh b) Ring

c) Star d) All of these.

x) After a message is decrypted, it is called

a) plain text b) cipher text

c) crypto text d) none of these.

xi) Keyboard is an example of which of the following ?

a) Simplex b) Half Duplex

c) Full Duplex d) None of these.

xii) MODEM stands for

a) MODulo Encoding Mechanism

b) MOdulator DEModulator

c) Maximally Optimized DEModulator

d) None of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. a) Compare between OSI Model and TCP/IP reference Model. 4

b) What is MAC address ? 1

3. What is IP addressing ? What are the classes of IP addressing ? What do you mean by classless addressing ? 2 + 2 + 1

4. Explain the transmission characteristics of fiber optics.

5. Encode the bit stream 01001110 using NRZ-L, NRZ-I encoding.

6. What is RSA ? How does it work ? 1 + 4

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) Discuss the frame format of 802.4 LAN. 4

b) Given a bandwidth of 5000 Hz for an 8-PSK signal, what are the band rate and bit rate ? 2 + 2

c) Compare between BSC protocol and HDLC protocol. 4

d) What is piggy backing ? 3

8. a) Explain the Stop and Wait protocol. 4

b) What is circuit switching ? How does it differ with message switching ? 3 + 2

c) Briefly define Repeater, Bridge and Router. 2 + 2 + 2

9. a) Encode the bit sequence 0101 using ASK, FSK, PSK. 2 + 2 + 2

b) Briefly describe the priority access methods of Token Ring. 5

c) Compare FDM and TDM. 4

10. a) Briefly describe the function of Data Link Layer and Network Layer of OSI Model. 3 + 3

b) What are DTE and DCE ? Explain the DTE and DCE interface. 2 + 4

c) What is baud rate ? 1

d) What are Private Key and Public key ? 2

11. Write short notes any *three* of the following : 3 × 5

a) Leaky Bucket Algorithm

b) GEO

c) ALOHA

d) Topology

e) PCM.