*§Jh. Sem B.Tech & B.Tech Dual (M.Teclr/MBAJ*



fH.eg-2010 & Back-2009. 2008 Admitted Batch)

CN IT-603 (CSE, IT)

SPRING END SEMESTER EXAMINATION-2013

6th St: mester B.Tech & B.Tech Dual (M.Tech/MBA)

# COMPUTER NETWORKS IT-603

[ ReguJar-2010 & Back-2009, 2008 Admitted Batch ]

Full Marks: 60 Time: 3 Hours

*Answer any SIX questions including Question No.I which is compulsory.*

*Thefigures in the margin indicate full marks.*

*Candidates are required togive their answers in their own words asfar as practicable and all parts of a question should be answered at one place onlv.*

1. a) What is the topology used in your hostel or lab to connect [2 x I O systems to internet? Explain the benefits of above topology.
   1. Flow control and error control services are offered by both Transport layer and Data link layer.Why?
   2. What isthepurpose of flags inframing? Which ofthe two flag sequences, 10101010 and 11001100, is better for sending binary data 101010101010101010101010. Explain why.
   3. Why does physical address field of apacket change at every node?
   4. Explain how traceroute program identifies intermediate nodes. Which of the ICMP messages are used for identifying intermediary nodes.

t) Explain the significance of routing table inDatagram switched networks.

g) What is the relation between Minimum hamming distance and error correction? Justify the relation using geometric concept.

h) Explain the purpose of Address Resolution Protocol. Which address does it resolve?

(1)

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i) Insynchronous TDM, the data rate oflink is *n* times faster, and unit duration is *n* times shorter.Justifythe statement. *n* is the number ofinput links.

j) Contrastbetween I-persistent, p-persistent andnon-persistent CSMA/CD.

(4

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| --- | --- | --- |
| 2. | a) | Explain different layersof OSI model. Compare it with layers |
|  |  | in TCP/IP model. |
|  | b) | What are different types of optical fibre cables based on their propagation modes? |

[4

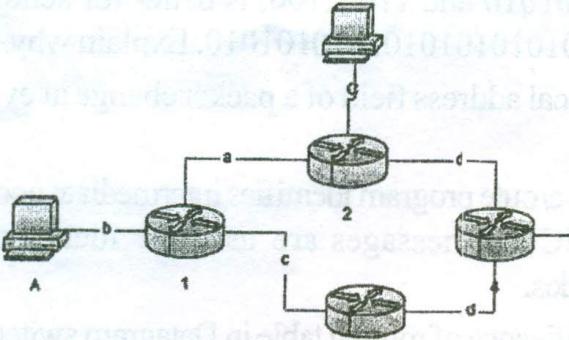
1. Consider anetwork given inthe figure below.A, B, and C are the end nodes and 1, 2, 3, and 4 re:present virtual circuit switches.a, b, c ,d, and e are names of the links. The range of virtual circuit identifier are {0 to 7}, {8 to 15}, {16to 23},

{24, 31} at switches 1,2,3,4 respectively.

* 1. How many fields arerequired to identify avirtual circuit? How [2 many virtual circuits can be established from Ato B.justify

your answer.Assume Aand B have unlimited range ofvirtual circuit identifiers otherthan mentioned above.

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B

3

* 1. Explain indetail, the setup phase inwhich Awill establish a [4 virtual circuit to B. Assume setup packet travels the path

A-1-3-4-B. Mention tables at each switch that are responsibl for constructing a virtual circuit.

(2)

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* 1. What will be contents of table at switchl if virtual paths [2

A-1-2-C and A-1-3-4-B is already established?

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| 4. |  | Consider a four bit generator G (divisor) =1001and suppose that dataword D = 1010. TI1e codeword is oflength 7. |  |
|  | a) | Calculate the remainder R and codeword C. | [4 |
|  | b) | Explain whythe divisorwill successfully detect a single bit error but fail to detect a two bit error separated by 2 bits, with an | [4 |
|  |  | example. |  |

5. a) Explain the design of Go-back-to-N flowcontrol protocol with [4 the help of a diagram. How does Go-back-to-N protocol improves efficiency over Stop and Wait protocol?

1. If m number of bits are used for representing a sequence [4

number in selective repeat ARQ, then the maximum size of sliding window is 2m-1 Justify this statement using aboundary case example. What will happen ifthe sizeof sliding window exceeds 2m-1?

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| 6. a) | A local ISPprovides internet services to clients spanning over | [2 |
|  | a range ofl KM.Engineers ofISP used a single copper wire |  |
|  | to connect to all the clients, because ofwhich allthe clientc; are |  |
|  | ina single collision domain. The bit rate is 10Mbps. What is |  |
|  | the minimum frame sizerequired for successfully detecting a |  |
|  | collision inthis setup?Assume propagation speedof electrical signal in copper wire is 1xl ()8 *mis.* |  |
| b) | Now the ISP isplanning to expand their operations over arange | [2 |
|  | ofl0KM.CantheISP stillmaintainrest oftheparameters likebit |  |
|  | rate,minimumfumesizesmne. Whatwill betheiroblemifminimum frame sizeisnot changed?Howdoesbitrate affected ifframesiz.e |  |
|  | is kept constant and collisions are detected? Which of the |  |
|  | parameters will you change for optimalperformance foruser? |  |

(3)

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1. Explain in detail, the working of CSMA/CA with the help of a [4

flowdiagram.

1. a) Consider sending a 2400-byte datagram into a link that has an [4

MTU of 700 bytes. Only the second fragment ofthe datagram hasto further gothrough another linkwith MID of 400 bytes. Supposethe original datagram isstamped with the identification number 422. How many fragments are generated? What are the values inthe various fields in the IP datagram(s) generated related to fragmentation?

1. One of your alumni has created a new software services [4

company.You were asked to provide network planning. The setup requires that there will be 4 departments. Department 1 requires 8networks with 64 hosts each. Department2 requires 32 networks with 32 hosts each. Department3 requires 16 networks with 128 hosts each. Department4 requires 8 networks with each having 256 hosts. The address range to be used starts with 10.0.0.0/16.

* 1. Write the subnets in the form a.b.c.d/x. Mention first and last network addresses of each department.

(ii)For purpose ofRouting, Each department hasto beidentified with a single supemet. Glve the supemet address of each department in ab.c.d/x format

1. Write short note on any 4. [2 x 4
   1. TCPconnection Tuneout
   2. UDP
   3. ETHERNET
   4. Statistical Tune division Multiplexing
   5. Circuit switching

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