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B.E. (E&TC)

COMPUTER NETWORK

(Sem. - I) (2008 Course) (404183)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer three questions from Section I and three questions from Section II.***
2) ***Answer to the two sections should be written in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of electronic pocket calculator is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Multiple Choice questions. Select one Correct answer for each of the following i) to vi) and write it. **[6]**

i) The _____ is the physical path over which a message travels.
   A) Protocol, B) Medium,
   C) Signal, D) All the three.

ii) The OSI model consists of _____ layers.
   A) Three, B) Five,
   C) Seven, D) Eight.

iii) _____ are used for short-range communications such as those between a PC and a peripheral device.
   A) Radio waves, B) Microwaves,
   C) Infrared waves, D) none of these

iv) In a fiber-optic cable, the signal is propagated along the inner core by
   A) reflection, B) refraction,
   C) modulation, D) none of these.

v) In _____ there are no setup or teardown phases.
   A) datagram switching, B) circuit switching,
   C) frame switching, D) none of these.

P.T.O.

vi) _____ technology is a set of technologies developed by the telephone companies to provide high data rate transmission.

A) ASL, B) DSL,
C) LDS, D) none of these

b) i) What is dial-up modem technology? List some of the common modem standards discussed in this chapter and give their data rates. **[5]**

ii) What type of topology is used when customers in an area use DSL modems for data transfer purposes? Explain. **[5]**

OR

Q2) a) Multiple Choice questions. Select one Correct answer for each of the following i) to vi) and write it. **[6]**

i) Data from a computer are _____; the local loop handles _____ signals

A) analog; analog B) analog; digital,
C) digital; digital D) digital; analog

ii) A local telephone network is an example of a _____ network.

A) packet-switched, B) circuit-switched,
C) message-switched, D) none of these

iii) Traditionally, _____ methods of switching have been important.

A) four, B) three,
C) five, D) six

iv) Circuit switching takes place at the _____ layer.

A) data line, B) physical,
C) network, D) transport

v) Which of the following is not a guided medium?

A) twisted-pair cable, B) coaxial cable,
C) fiber-optic cable, D) atmosphere.

vi) The physical layer is concerned with the movement of ____ over the physical medium.

A) Programs, B) dialogs,
C) protocols, D) bits.

b) Five equal-size datagrams belonging to the same message leave for the destination one after another. However, they travel through different paths as shown in Table 2b.1.

Table 2b.1

Datagram	*Path Length*	*Visited Switches*
1	3200 Km	1,3,5
2	11,700 Km	1, 2, 5
3	12,200 Km	1, 2, 3, 5
4	10,200 Km	1,4,5
5	10,700 Km	1,4,3,5

Assume that the delay for each switch (including waiting and processing) is 3, 10, 20, 7, and 20 ms respectively. Assuming that the propagation speed is 2×10^8 m, find the order the datagrams arrive at the destination and the delay for each. Ignore any other delays in transmission. **[10]**

Q3) a) Fill in the gaps by selecting one correct answer from the given set. **[8]**

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

ii) In _____ framing, there is no need for defining the boundaries of frames.

iii) In pure ALOHA, the vulnerable time is _____ the frame transmission time.

iv) The _____ layer of Ethernet consists of the LLC sublayer and the MAC sublayer.

Given set of answers.: A] 6, B] variable size, C] three times, D] 7, E] the same as, F] fixed size, G] two times, H] 8, I] data link, J] standard, K] physical, L] network

b) The timer of a system using the Stop-and-Wait ARQ Protocol has a time-out of 6 ms. Draw the flow diagram for four frames if the round trip delay is 4 ms. Assume no data frame or control frame is lost or damaged. **[5]**

c) Suppose the length of a 10Base5 cable is 2500 m. If the speed of propagation in a thick coaxial cable is 200,000,000 m/s, how long does it take for a bit to travel from the beginning to the end of the network? Assume there are 10 microsec delay in the equipment. **[5]**

OR

Q4) a) Fill in the gaps by selecting one correct answer from the given set. **[8]**

i) For Stop-and-Wait ARQ, for *10* data packets sent, _____ acknowledgments are needed.

ii) In a _____ protocol, the data section of a frame is a sequence of characters.

iii) In ____ each station sends a frame whenever it has a frame to send.

iv) The _____ sublayer is responsible for the operation of the CSMA/CD access method and framing.

Given set of answers.
A] character oriented, B] exactly 10, C] bit oriented, D] pure ALOHA, E] LLC, F] less than10, G] slotted ALOHA, H] both pure and slotted ALOHA, I] MAC, J] greater than 10, K] word oriented, L] MII.

b) A system uses the Stop-and-Wait ARQ Protocol. If each packet carries 1000 bits of data, how long does it take to send 1 million bits of data if the distance between the sender and receiver is 5000 km and the propagation speed is 2×10^8 m? Ignore transmission, waiting, and processing delays. We assume no data or control frame is lost or damaged.(ignore the overhead due to the header and trailer). **[10]**

Q5) a) Fill in the gaps by selecting one correct answer from the given set. **[6]**

i) IEEE has defined the specifications for a wireless LAN, called _____, which covers the physical and data link layers.

ii) A repeater is a connecting device that operates in the _____ layer of the Internet model.

iii) In ATM, the ____ layer accepts transmissions from upper-layer services and maps them into ATM cells.

Given set of answers .
A] physical, B] ATM, C] IEEE802.3, D] network, E] AAL, F] IEEE802.11, G] physical, H] IEEE802.5, I]]data link

b) Create a system of three LANs with four bridges. The bridges (B 1 to B4) connect the LAN s as follows :

i) B1 connects LAN 1 and LAN 2.
ii) B2 connects LAN 1 and LAN 3.
iii) B3 connects LAN 2 and LAN 3.
iv) B4 connects LAN 1, LAN 2, and LAN 3.

Choose Bl as the root bridge. Show the forwarding and blocking ports, after applying the spanning tree procedure, by drawing sketches for network, graph, spanning tree and blocking ports. **[10]**

OR

Q6) a) Fill in the gaps by selecting one correct answer from the given set. **[6]**

i) In IEEE 802.11, communication between two stations in two different BSSs usually occurs via two _____.

ii) A _____ regenerates a signal, connects segments of a LAN, and has no filtering capability.

iii) Frame Relay networks offer an option called _____ that sends voice through the network.

Given set of answers.
A] router, B] APs, C] ESSs, D] repeater, E] VOFR, F] BSSs, G] bridge, H] MUX, I] FRAD

b) If an application uses AAL3/4 and there are 47,787 bytes of data coming into the CS, [In AAL3/4, the CS layer needs to pass 44-byte data units to SAR layer.Packet uses 4byte each for header and trailer.]
How many padding bytes are necessary?
How many data units get passed from the SAR to the ATM layer?
How many cells are produced? **[10]**

SECTION - II

Q7) a) Multiple Choice questions. Select one Correct answer for each of the following i) to vi) and write it. **[6]**

i) In IPv4, class _____ has the greatest number of addresses in each block

A) 4, B) 8,

C) 32, D) 64

ii) The number of addresses in a class C block is _____ .

A) 65,534, B) 256,

C) 16,777,216, D) none of these

iii) In IPv4, what is the value of the total length field in bytes if the header is 28 bytes and the data field is 400 bytes?

A) 428, B) 407,

C) 107, D) 427

iv) In IPv4, when a datagram is encapsulated in a frame, the total size of the datagram must be less than the _____ .

A) MUT, B) MAT,

C) MTU, D) none of these

v) In _____, a table associating a logical address with a physical address is updated manually.

A) static mapping, B) dynamic mapping,

C) physical mapping, D) none of these

vi) ____ deals with the issues of creating and maintaining routing tables.

A) Forwarding , B) Routing ,

C) Directing , D) none of these

b) An IPv4 datagram has arrived with the following information in the header (in HEX) **Ox45 00 00 54 00 03 58 50 20 06 00 00 7C 4E 03 02 B4 OE OF 02**

i) Is the packet corrupted?

ii) Are there any options?

iii) Is the packet fragmented?

iv) What is the size of the data?

v) How many more routers can the packet travel to? **[10]**

OR

Q8) a) Multiple Choice questions. Select one Correct answer for each of the following i) to vi) and write it. **[6]**

i) Identify the class of the following IPv4 address: 191.1.2.3.

A) C, B) A,

C) B, D) none of these

ii) An organization is granted a block; one address is 2.2.2.64/20. The organization needs 10 subnets. What is the subnet prefix length?

A) /20, B) /24,

C) /25, D) none of these

iii) The _____ protocol is the transmission mechanism used by the TCP/IP suite.

A) ARP, B) IP,

C) RARP, D) none of these

iv) The IPv4 header size _____ .

A) is 20 to 60 bytes long, B) is 20 bytes long,

C) is 60 bytes long, D) none of these

v) The logical addresses in the Internet are called _____ addresses.

A) port, B) IP,

C) Email, D) none of these

vi) The use of hierarchy in routing tables can _____ the size of the routing tables.

A) reduce, B) increase,

C) both A and B, D) none of these

b) A router has the following RIP routing table:

Net1	4	B
Net2	2	C
Net3	1	F
Net4	5	G

What would be the contents of the table if the router received the following RIP message from router C?

Net1	2
Net2	1
Net3	3
Net4	7

Assume router C is one hop away. **[10]**

Q9) a) Fill in the gaps by selecting one correct answer from the given set. **[6]**

i) One of the responsibilities of the transport layer protocol is to create a _____ communication.

ii) The ports ranging from 49,152 to 65,535 can be used as temporary or private port numbers. They are called the _____ ports.

iii) In _____ we try to avoid traffic congestion.

Given set of answers :

A) process-to-process, B) node-to-node,

C) none of these, D) congestion control,

E) dynamic, F) quality of service,

b) What is the definition of bursty data?
What is the difference between open-loop congestion control and closed-loop congestion control?
Name the policies that can prevent congestion. [6]

c) In a leaky bucket used to control liquid flow, how many gallons of liquid are left in the bucket if the output rate is 5 gal/min, there is an input burst of 100 gal/min for 12 s, and there is no input for 48 s? [4]

OR

*Q10)*a) Fill in the gaps by selecting one correct answer from the given set.

i) UDP is an acronym for _____ . [2]

ii) The ports ranging from 49,152 to 65,535 can be used as temporary or private port numbers. They are called the _____ ports. [2]

iii) Traffic _____ are qualitative values that represent a data flow. [2]

Given set of answers :

A) User Datagram Protocol, B) port addresses;

C) controls, D) User Delivery Protoco,

E) transport addresses, F) descriptors,

b) Q23.20. The following is a dump of a UDP header in hexadecimal format.

0632 000D 00IC E217

i) What is the source port number?

ii) What is the destination port number?

iii) What is the total length of the user datagram?

iv) What is the length of the data?

v) Is the packet directed from a client to a server or vice versa? [10]

*Q11)*a) Determine which of the following is an FQDN and which is a PQDN.

i) xxx
ii) xxx.yyy.
iii) xxx.yyy.net
iv) zzz.yyy.xxx.edu. [2]

b) If a DNS domain name is *voyager fhda.edu*, how many labels are involved here? How many levels of hierarchy? [2]

c) Describe the addressing system used by SMTP. **[2]**

d) What are some advantages and disadvantages of using long passwords? **[2]**

e) Plain text was encrypted using RSA key(Kp = 33,3).English alphabets (A,B.. up-to Z) are numbered as (1,2.. up-to 26) respectively. The encrypted Ciphertext (C) transmitted as (11, 01, 14, 24, 03, 05, 01). The received signals are decrypted using key (Ks = 33,7) . Find out the symbols i.e. alphabets after decryption.
[Given algorithm to avoid exponentation operation....
C : = 1; *begin for i* = 1 to *E do*
C : = MOD *(C. P, N);* end. Where E is exponent.] **[10]**

OR

Q12)a) Determine which of the following is an FQDN and which is a PQDN.

i) mil.

ii) edu.

iii) xxx.yyy.net

iv) zzz.yyy.xxx.edu **[2]**

b) A domain name is ***hello. customer. info.*** Is this a generic domain or a country domain? **[2]**

c) What is a certification authority? **[2]**

d) In electronic mail, what are the tasks of a user agent? **[2]**

e) The encrypted message is "***NBCM CM UH YRYLWCMY.***" using a shift cipher with a key of 20. [The characters are encoded with A to Z as 0 to 25. To wrap, subtract 26.] Ignore the space between words. Decrypt the message to get the original plaintext. **[10]**