UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

Academic Year 2008/2009 –2nd Year Examination – Semester 4

IT4503 : Data Communication and Networks

Part 1: Multiple Choice Question Paper

16th August, 2009
(ONE HOUR)

Important Instructions :

- The duration of the paper is **1 (one) hour.**
- The medium of instruction and questions is English.
- The paper has **25 questions** and **5 pages**.
- All questions are of the MCQ (Multiple Choice Questions) type.
- All questions should be answered.
- Each question will have 5 (five) choices with **one or more** correct answers.
- All questions will carry equal marks.
- There will be a penalty for incorrect responses to discourage guessing.
- The mark given for a question will vary from 0 to +1 (*All the correct choices are marked & no incorrect choices are marked*).
- Answers should be marked on the special answer sheet provided.
- Note that questions appear on both sides of the paper.
  If a page is not printed, please inform the supervisor immediately.
- Mark the correct choices on the question paper first and then transfer them to the given answer sheet which will be machine marked. **Please completely read and follow the instructions given on the other side of the answer sheet before you shade your correct choices.**

1) What is the maximum data rate sustainable by a noisy channel with a bandwidth of 10KHz and a signal to noise ratio of 2047?

(a) 110 Kbps	(b) 1 Kbps	(c) 20 Kbps
(d) 1023 Kbps	(e) 10 Kbps	

2) The maximum data rate of a noiseless channel with a bandwidth of 10Khz is 40 Kbps. How many discrete levels are used to transmit the data in this channel?

(a)	2	(b)	16	(c)	3	(d)	10	(e)	4

3) What is the baud rate of a Manchester encoded digital signal with a data rate of 100 bits per second?

(a) 100	(b) 200	(c) 50	(d) 1	(e) 10

4) Consider the following statements.

(i) ADSL provides the same maximum data rate for the channel from the ISP to the subscriber as well as for the channel from the subscriber to the ISP.
(ii) If a subscriber wants to run a public web server, ADSL is a good technology to connect such a web server to the Internet.
(iii) The actual data rate of an ADSL channel depends on the distance of the subscriber from the telephone exchange.
Which of the alone statements is/ are correct?

(a) (i) only	(b) (ii) only	(c) (i) and (ii) only
(d) all	(e) (iii) only	

5) Consider the following statements
(i) Category 3 UTP cables have a higher bandwidth than Coaxial cables.
(ii) Fiber optic cables are more resilient to electrical interferences than UTP cables.
(iii) Category 5 UTP cables have more twists per centimeter than the category 3 UTP cables
Which of them is/are correct?

(a) (i) only	(b) (ii) only	(c) (iii) only
(d) all	(e) (ii) and (iii) only	

6) UTP cables are twisted to

(a) reduce the cross talk.	(b) decrease the length.	(c) strengthen them.
(d) make them easier to use in networks.		(e) reduce the cost of manufacturing.

7) The maximum throughput of a link with a very high latency is measured to be S bps when the link is using the stop and wait flow control. The maximum throughput of the same link after the flow control protocol is changed to a sliding window protocol is W bps. What is the most reasonable relation between S and W?

(a) $S < W$	(b) $W < S$	(c) $S = W$
(d) $S = 2W$	(e) $W = \log_2(S)$	

8) In encoded codeword, what is the minimum Hamming distance required to detect 2 errors?

(a)	1	(b)	2	(c)	3	(d)	4	(e)	5

9) The Hamming distance of a code book is 9. How many errors can it correct?

(a) 1	(b) 4	(c) 10	(d) 9	(e) 18

10) Consider the following statements.

(i) Error correcting codes are more suitable than error detecting codes for wireless links.
(ii) Error detecting codes are more suitable than error correcting codes for fiber optic links.
(iii) Error detecting codes have high overhead compared to error correcting codes in terms of the number of bits required to encode a message.

Which of the above is/ are correct?

(a) (i) only	(b) (ii) only	(c) (iii) only
(d) (i) and (ii) only	(e) all	

11) A data communication system uses 8 bit words with one parity bit where **odd** parity is used. Following are some words received by the receiver.

(i) 11010101
(ii) 11111111
(iii) 11111110

Which of them indicate an error?

(a) (i) only	(b) (ii) only	(c) (iii) only
(d) (i) and (ii) only	(e) (ii) and (iii) only	

12) A data communication system uses 8 bit words with one parity bit.The parity bit is the Least Significant Bit (LSB). Consider the following statements about this system.

(i) The system can correct single bit errors if the error has not occurred on the LSB.
(ii) The system can detect single bit error any where in the 8 bit word.
(iii) The system can detect double bit errors if the system uses odd parity and not even parity.

Which of them is/ are correct?

(a) (i) only	(b) (ii) only	(c) (iii) only
(d) (i) and (iii) only	(e) all	

13) Select the correct statement(s).

(a) The physical topology of an Ethernet LAN connected through a switch is a star.
(b) The physical topology of an Ethernet LAN connected through a Hub is a Star topology.
(c) The physical and logical topologies of networks are always different.
(d) The Internet can be considered as a network with a Bus topology.
(e) The physical topology of all types of Ethernet LANs is a Bus topology.

14) Select the layers which are in the OSI model but not in the TCP/IP model.

(a) Application	(b) Presentation	(c) Session
(d) Transport	(e) Data Link	

15) What is the subnet mask of the network identified as 10.16.48.0/20 in dotted decimal notation?

(a) 255.255.255.0	(b) 255.255.240.0	(c) 10.16.48.255
(d) 10.255.255.255	(e) 255.255..254.0	

16) What is the purpose of the ARP protocol in TCP/IP networks?

(a) It is used to find the MAC address for an IP address.
(b) It is used to find the IP address for a MAC address.
(c) It converts a domain name to an IP address.
(d) ARP is used for reporting errors in TCP.
(e) It is the session protocol in TCP/IP networks.

17) A TCP connection experiences a packet loss when the congestion window is W bytes and the threshold is 64KB. What should be the new value of the threshold after this packet loss?

(a)	W/2	(b)	W- 64	(c)	W - 6400
(d)	2W	(e)	W+ 6400		

18) The expected throughput of a pure Aloha network at the offered load of X packets per frame time is given by the function F(X). Which of the following statements is/are correct about the throughput of this network?

(a) F(0.6) < F(0.5)	(b) F(0.4) < F(0.5)	(c) F(0.6) = 0.50
(d) F(0.5) = 0.18	(e)F(0.4) = 0.60	

19) The latency between the two stations furthest apart in an Ethernet network is T seconds. The network runs at a speed of M bits per second. What is the minimum frame length suitable for this network?

(a)	1500 bytes	(b)	2TM/8 bytes	(c)	TM bytes
(d)	T/(8M) bytes	(e)	M/T bytes		

20) Select the correct statements.

(a) HTTP uses TCP as the transport protocol.
(b) HTTP uses TCP as well as UDP as the transport protocol.
(c) SMTP uses UDP as the transport protocol.
(d) DNS uses UDP as the transport protocol.
(e) SMTP uses TCP as the transport protocol.

21) Select the correct statement(s).

(a) HTTP servers usually run on port 80.
(b) Both HTTP and SMTP can run on the same port on a given computer.
(c) UDP does not use port numbers.
(d) TCP port number range starts from 1024.
(e) IP uses its own set of port numbers.

22) Consider the following statements.
(i) CSMA/CD is a suitable access protocol for wireless local area(WLAN) networks.
(ii) The RTS/CTS protocol can be used to solve the hidden station problem in wireless Local Area networks.
(iii) The RTS/CTS protocol can be used to solve the exposed station problem in wireless Local Area networks.
Which of them is/are correct?

(a)	(i) only	(b)	(ii) only	(c)	(iii) only
(d)	(i) and (ii) only	(e)	(ii) and (iii) only		

23) Consider the following statements about the communication between three destined wireless stations A, B, and C. Note that the stations do not use a CDMA based access like protocol.

(i) If signal from C collides with the signal from A near the station A, but not at the station B, then B can correctly receive the signal from A.
(ii) If the signal from C collides with the signal from A at B, then B cannot correctly receive the signal from A.
(iii) If the signal from A collides with the signal from C at any point in the network then the collided signal propagates throughout the network.

Which of them is/are correct?

(a)	(i) only	(b)	(ii) only	(c)	(iii) only
(d)	(i) and (ii) only	(e)	(i) and (iii) only		

24) What is the wave length of an electromagnetic wave of 1KHz, given that the free space electromagnetic wave propagation velocity is 3×10^6 meters per second?

(a)	1000 meters	(b)	300 meters	(c)	150 meters
(d)	600 meters	(e)	300,000 meters		

25) Consider the following statements.

(i) DVMRP uses reverse path forwarding with pruning to implicitly build the multicat delivery tree.
(ii) In link state routing algorithms, all the participating routers eventually acquire the complete topology of the network.
(iii) The distance vector routing algorithms first acquire the complete topology of the network before applying a shortest path algorithm to calculate the routes.

Which of them is/ are correct?

(a)	(i) only	(b)	(ii) only	(c)	(iii) only
(d)	(i) and (ii) only	(e)	(ii) and (iii) only		

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