IT4503 : Data Communication and Networks
Part 1: Multiple Choice Question Paper

15th August, 2010
(ONE HOUR)

<u>**Important Instructions :**</u>

- The duration of the paper is **1 (one) hour.**

- The medium of instruction and questions is English.

- The paper has **25 questions** and **4 pages**.

- All questions are of the MCQ (Multiple Choice Questions) type.

- All questions should be answered.

- Each question will have 5 (five) choices with <u>**one or more**</u> 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.**

- **Non-programmable Calculators may be used.**

1) What is the maximum possible data rate on a noiseless channel with a bandwidth of 2000KHz and for a signal that uses two levels?

(a) 2000 bps   (b) 4000 bps   (c) 4 Mbps
(d) 4000 Kbps   (e) 2000 Kbps

2) A Gigabit (10 Gbps) LAN is to be setup. Which of the following transmission media is/are suitable for this network?
     i) CAT3 UTP Cable
     ii) CAT 6 UTP Cable
     iii) Coaxial Cable
     iv) Single mode fiber

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

3) Select the correct statement(s).

(a) The bit rate of a signal can be the same as its baud rate.
(b) The bit rate is always greater than the baud rate.
(c) The bit rate is not related to the baud rate in anyway.
(d) The bit rate can be increased without a limit in a noiseless channel for a given bandwidth.
(e) The bit rate is always twice the bandwidth in a noisy channel.

4) Which of the following statements is/are true with regard to multiplexing on a channel?

     i) Multiple users can share the same physical media by using different frequencies.
     ii) Multiple users can share the same physical media by using the whole bandwidth but at different time intervals.
     iii) Multiple users cannot use a wireless media at the same time using any technique.

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

5) Select the correct statement(s).

(a) Internet is a packet switched network.
(b) PSTN is a packet switched network.
(c) ATM provides end to end virtual circuits.
(d) Packet switched networks always deliver the packets along the same physical path.
(e) Circuit switched networks are more suitable to carry data traffic.

6) Select the connection oriented protocol(s).

(a) TCP   (b) UDP   (c) IP
(d) ICMP   (e) ARP

7) The minimum distance between two code words in a code is 5. If an encoding system uses this code, how many errors can it detect in a word?

(a) 4   (b) 5   (c) 2   (d) 7   (e) 8

8) The frame time in a slotted Aloha network is T seconds. What is the vulnerable period (in seconds) of a frame in this network?

(a) T   (b) 2T   (c) 0.5T   (d) 1/T   (e) T+5

9) Which of the following statements is/are correct regarding the error recovery method?

> (a) CRC is used to correct errors.
> (b) Parity bit can be used to correct errors.
>
> (c) Only even parity can be used for error detection.
> (d) Odd parity can detect single errors.
> (e) Types of errors that can be detected by using CRC depends on the generator polynomial.

10) The latency between the two stations that are furthest apart in a CSMA/CD LAN is T seconds. The network operates at 100 Mbps. What is the minimum frame size for this network?

> (a) 100,000,000 x T bits   (b) 200,000,000 x T bits   (c) T bits
> (d) 100 bits   (e) 1500 x 8 bits

11) Select the correct statements regarding wireless LANs.

> (a) RTS/CTS protocol can be used to solve the hidden station problem.
> (b) RTS/CTS protocol can be used to solve the exposed station problem.
> (c) If a signal collides with another signal at the sender, then the receiver cannot detect the signal.
> (d) RTS is sent by a receiver after transmitting a frame.
> (e) CTS is sent by the sender before transmitting a frame.

12) Select the correct statement(s).

> (a) Ethernet hub is a layer 2 device.
> (b) Ethernet switch is a layer 3 device.
> (c) An Ethernet switch based network is more secure than a Ethernet Hub based network.
> (d) Some computers can only be connected to Hubs and not to Switches.
> (e) An Ethernet switch forwards packets based on the IP header information.

13) A LAN uses a transmission technology consisting of a cable to which all the machines are identically attached. What could be the topology of this network?

> (a) Bus   (b) Ring   (c) Star   (d) Line   (e) Hub

14) What is the purpose of the ARP protocol?

> (a) It is used to find the hardware address of a machine with a given IP.
> (b) It is used to find the IP address of a machine.
>
> (c) It is used to resolve domain names.
> (d) It is used to dynamically configure a machine.
> (e) It is the protocol used to implement the ping command.

Questions 15 - 17 are based on the following:
A computer on a LAN is configured with the IP address 10.16.193.0 and the subnet mask 255.255.240.0.

15) What is the network address of this LAN?

> (a) 10.16.193.0   (b) 10.16.192.0   (c) 10.16.0.0
> (d) 10.16.0.1   (e) 10.0.0.0

16) What is the broadcast address of this LAN?

> (a) 10.16.193.0   (b) 10.16.193.255   (c) 10.16.207.255
> (d) 10.16.255.255   (e) 10.16.192.255

17) What is the maximum number of hosts that can be accommodated in this LAN?

| (a) 4094 | (b) 1024 | (c) 256 | (d) 254 | (e) 1023 |

18) Select the fields that are not in a typical UDP header.

| (a) Source port | (b) Destination port | (c) UDP length |
| (d) UDP checksum | (e) Sequence number | |

19) Select the correct statement(s) regarding Quality of Service expected by various types of traffic.

(a) Email is very sensitive to jitter.
(b) IP Telephony is very sensitive to jitter.
(c) Email requires a very high bandwidth.
(d) Videoconferencing is sensitive to jitter.
(e) High level of jitter can disrupt a file transfer.

20) Select the correct statement(s) about Network Address Translation (NAT).

(a) A NAT box can be used to connect a network that uses private IP addresses to the Internet.
(b) The NAT box does not change the source IP addresses of the packets forwarded by it.
(c) Firewalls by default do not have NAT functionality.
(d) NAT works at the transport layer.
(e) NAT enables mapping a single public IP address to multiple hosts in a private network.

21) Select the correct statement(s).

(a) Time division multiplexing and frequency division multiplexing cannot be used simultaneously over a channel.
(b) ADSL uses frequency division multiplexing.
(c) Frequency division multiplexing can be used only on wireless channels.
(d) Time division multiplexing is not suitable for wireless channels.
(e) Only frequency division multiplexing can be used for voice communication.

22) Select the correct statement(s).

(a) Coaxial cables have a higher bandwidth than category 3 UTP cables.
(b) Coaxial cables have a higher bandwidth than single mode fiber.
(c) Category 5 UTP cables have a higher bandwidth than that of Category 3 UTP cables.
(d) Fiber optic cables have a lower bandwidth than that of category 6 UTP cables.
(e) Category 6 UTP cables have lesser number of twists than category 3 UTP cables.

23) Speed of light in space is 3×10^8 m/sec. What is the wave length of a wave with a frequency 100MHz?

| (a) 3 m | (b) 60 m | (c) 300 m | (d) 6 Km | (e) 3 Km |

24) Select the correct valid IP address(es) that can be assigned to a host.

| (a) 10.16.456.10 | (b) 10.16.48.254 | (c) 10.16.255.236 |
| (d) 192.248.16.91 | (e) 192.248.16.3.1 | |

25) Select the correct statement(s).

| (a) HTTP uses UDP. | (b) SMTP uses UDP. | (c) DNS uses UDP. |
| (d) ping tool uses ICMP. | (e) DNS uses TCP. | |

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4