



UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

Academic Year 2016 – Semester 4 Examination

IT4405: Computer Networks

PART 1: Multiple Choice Question Paper

**2nd October, 2016
(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 **6 pages**.
- All questions are of the MCQ (Multiple Choice Questions) type.
- All questions should be answered.
- Each question has 5 (five) choices with **one or more** correct answers.
- All questions 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.
- **Completely read and follow the instructions given on the other side of the answer sheet before you shade your correct choices.**
- **No calculators are allowed.**

For each of the questions, identify the correct statement(s) from among the statements given.

- 1) Which of the following parameter(s) is NOT contained in *Shannon's channel capacity* equation?

- (a) channel bandwidth
- (b) channel signal to noise ratio
- (c) channel delay distortion
- (d) data sampling rate
- (e) data modulation type

- 2) With respect to *Manchester encoding*, which of the following statement(s) is/are correct?

- (a) It is a scheme only used in IBM Token Rings
- (b) Clock synchronization is automatically embedded in it
- (c) There is at least one signal level transition within each bit interval
- (d) It reduces the delay distortion of the signal
- (e) It is a NRZ (non-return to zero) type signal encoding

- 3) Consider the following statements about shielded and unshielded Twisted Pair copper cables.

- (i) Twisting reduces cross talk between two wires
- (ii) Shielding reduces external electromagnetic interference.
- (iii) Data rates of over 10Gbps can only be supported on shielded cables

Which of the above statements is/are true?

- (a) (i) only
- (b) (ii) only
- (c) (iii) only
- (d) (i) and (ii) only
- (e) All are true

- 4) Consider the following statements about multiple access schemes:

- (i) TDMA and FDMA employ reserved slots of time or frequency to carry data packets
- (ii) CSMA variants allow senders to probabilistically access the channel's full bandwidth for the duration of data transfer
- (iii) Under heavy traffic conditions, contention based schemes such as CSMA gives weak performance

Which of the above is/are true?

- (a) (i) only
- (b) (ii) only
- (c) (iii) only
- (d) (i) and (ii) only
- (e) All are true

- 5) The proper order of corresponding OSI layers having functionalities of end to end packet loss recovery, media access resolution, admission control by flow metering, and path discovery is

- (a) network, data link, presentation, transport
- (b) network, data link, transport, presentation
- (c) transport, data link, application, network
- (d) transport, data link, transport, network
- (e) transport, network, application, presentation

6) In packet switching, between the sending host and the receiving host, and end-to-end virtual circuit or a hop-by-hop virtual circuit can be established. Which of the following statement(s) is/are true?

- (a) The packet header can contain a virtual path identifier or a virtual circuit identifier or, simply the destination port
- (b) A VC guarantees delivery of a packet with a return acknowledgement
- (c) A VC can optionally allocate bandwidth resources at end points
- (d) A connection establishment phase precedes the data transfer
- (e) A packet may traverse different physical paths from the source to the destination on a hop-by-hop virtual circuit

7) A signal transmitted over a radio (wireless) link can be distorted by

- (a) The limited bandwidth of the radio channel
- (b) Inter-symbol-interference caused by data bits carried at different phase velocities
- (c) Multipath interference
- (d) Atmospheric absorption of radio energy
- (e) Exceeding the number of levels in Phase Shift Keying beyond what is supported by the SNR ratio

8) Which of the following statement(s) is/are true with regard to dynamic routing in IP networks?

- (a) Routing table entries show the next hop router address for a given destination network
- (b) Bellman-Ford algorithm finds the least cost path between a source node and a destination node subject to a minimum number of hops
- (c) RIP is a distance vector algorithm only used in small local networks
- (d) OSPF is a link state algorithm used within larger autonomous systems
- (e) Dijkstra's shortest path algorithm finds the least cost path between a source node and a destination node subject to a minimum number of hops

9) What protocol in the IP suite is used by a host to find the physical address of a host or a nearby router given its IP address?

- (a) ARP
- (b) DHCP
- (c) RARP
- (d) BOOTP
- (e) ICMP

10) Which of the following is/are correct with regards to IPv6?

- (a) A client can have an IPv6 address and an IPv4 address at the same time
- (b) Smallest routable subnet size in IPv6 is /64
- (c) A /128 address cannot be routed in a IPv6 network
- (d) NAT is a key feature supported in IPv6
- (e) IPv6 and IPv4 are not interoperable

- 11) Which of the following statement(s) is/are true with regards to real time traffic?
- (i) Device control traffic, voice and video can be considered as real time traffic
 - (ii) Real time traffic can be compressed
 - (iii) Real time traffic communication over packet networks require QoS guarantees
- (a) (i) only
 (b) (ii) only
 (c) (iii) only
 (d) (i) and (iii) only
 (e) All are true
- 12) Which of the following IP addresses is/are in the private IP address range according to RFC 1918?
- (a) 10.1.8.5
 (b) 192.160.22.1
 (c) 172.8.1.1
 (d) 172.16.5.11
 (e) 192.168.4.142
- 13) Which of the following is/are true about *software defined networks*?
- i. Is based on the principle of separating the data forwarding function from the network control function
 - ii. Objective is to flexibly manage extremely large scale networks
 - iii. As opposed to hardware switches and routers in a conventional network, the functionality of a data forwarding module is dynamically definable
- (a) (i) only
 (b) (ii) only
 (c) (iii) only
 (d) (i) and (ii) only
 (e) All are true
- 14) Which of the following application protocol(s) use TCP as transport layer protocol?
- (a) RTP (real time protocol)
 (b) DNS (domain name service)
 (c) HTTP (hypertext transfer protocol)
 (d) LDAP (lightweight directory access protocol)
 (e) DHCP (dynamic host configuration protocol)
- 15) TCP regulates end-to-end flow of packets by the use of
- (a) dropping packets when end buffer overflows
 (b) Limiting the rate of transmission at the source
 (c) Issuing a ICMP message from the nearest router to the sending host
 (d) Dynamically adjusting the sliding window
 (e) Binary exponential back-off
- 16) Which of the following protocol stacks is/are correct?
- (a) Network management: SNMP:UDP : IP
 (b) Network file system (NFS):TFTP:UDP:IP
 (c) IP Telephony: RTP:TCP:IP
 (d) Email: POP:TCP:IP
 (e) Database query:RPC:UDP:IP

17) Which of the following statement(s) is/are true with regard to IP multicast?

- (a) Multicast involves one-to-many and many-to-many communication
- (b) To coordinate an IP multicast IGMP (Internet Group Management Protocol) support is required
- (c) IP multicast is inherently reliable
- (d) TV broadcast over IP (IPTV) is a IP multicast application
- (e) Multiparty video conferencing is a IP multicast application

18) Which of the following statement(s) on Layer 3 switches is/are true?

- (a) Most effective when used for routing between VLANs
- (b) Most effective when used for routing between LANs
- (c) Less efficient than a table based router
- (d) Common servers of a data centre are typically connected to a L3 switch
- (e) End hosts are typically connected to a L3 switch via L2 switches

19) Which of the following statement(s) is/are correct about IEEE 802.11 wireless LAN standard?

- (a) For very short range device communications, 802.11 is preferred over 802.15 technology.
- (b) The 802.11 standard is based on CSMA/CA protocol
- (c) RTS/CTS handshake is used as part of the CSMA/CA mechanism
- (d) CSMA/CD cannot be used over wireless networks because of the hidden station problem
- (e) 802.11 can operate in infrastructure (hub based) as well as in ad-hoc modes

20) A data source and a receiver are connected over a bi-directional communication link whose bandwidth is 2Mbps with a roundtrip delay of 300ms. Assuming the full bandwidth is available for the source and the receiver to exchange packets of size 3kbytes and acknowledged with end-to-end-flow control, which of the following statement(s) is/are true?

- (a) A stop and wait protocol will utilize less than 100kbps of bandwidth
- (b) A stop and wait protocol will utilize only 4% of the available bandwidth
- (c) A sliding window protocol when operating will have 100 packets occupying the link
- (d) A sliding window protocol when operating will have 50 packets occupying the link
- (e) A stop and wait protocol will utilize the bandwidth more efficiently than a sliding window protocol

21) Which of the following statement(s) is/are true about CSMA/CD?

- (a) It uses a RTS/CTS handshake to avoid collisions
- (b) A linear back-off time as opposed to an exponential back-off time could also work well.
- (c) Will work well in wireless environments too.
- (d) Dedicated time slots are allocated to each of the senders
- (e) Performs worse when round trip propagation time becomes large compared to the packet transmit time

22) Which of the following statements is/are correct with regards to routing in mobile ad hoc networks?

- i. Maintaining a routing table at each node is inefficient due to mobility
- ii. Simple flooding is a good solution to reach a destination
- iii. MANET routing is categorized into reactive and proactive classes

- (a) Only(i) is true
- (b) Only (ii) is true
- (c) Only(iii) is true
- (d) (i) and (ii) are true
- (e) All are true

23) Select the correct statement(s) about the VLAN concept.

- (a) VLAN Trunk Protocol is used to propagate VLAN information across a trunked link.
- (b) A VLAN is a single collision domain.
- (c) Membership of a VLAN can be based on MAC address or IP subnet among others.
- (d) Implementing a large network with a VLAN concept makes its administration flexible.
- (e) Frame tagging functions at Layer 2 enables VLANs across several physical switches

24) The bit torrent protocol is based on which of the following paradigms?

- (a) peer-to-peer
- (b) client-server
- (c) message broker
- (d) Infrastructure-as-a-Service
- (e) Open source

25) Consider the following statements about HTML requests:

- i. A user requests a HTML page that consists of some text and three images. For this page, the client will send one request message and receive four response messages.
- ii. Two distinct HTML pages (for example, *www.mit.edu/research.html* and *www.mit.edu/students.html*) can be sent over the same persistent connection.
- iii. The *Date:* header in the HTTP response message indicates when the object in the response was last modified.

- (a) (i) only
- (b) (ii) only
- (c) (iii) only
- (d) (i) and (ii) only
- (e) All are true
