



UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

Academic Year 2017 – Semester 4 Examination

IT4405: Computer Networks

PART 1: Multiple Choice Question Paper

November, 2017
(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.**
- **Calculators are NOT allowed.**

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

- 1) According to *Shannon's channel capacity* theorem, given the channel bandwidth remains constant, if the channel signal to noise ratio is increased from 30dB to 60dB, the maximum allowable data rate will increase by

- (a) 4
- (b) 2
- (c) 1.5
- (d) $\log(2)$
- (e) will remain same

- 2) In communications, what is/are true about *'last mile solutions'*?

- (a) xDSL is a last mile solution over standard telephony copper wire
- (b) FTTH is a last mile solution over fibre cables
- (c) A last mile solution refers to how the end customer should be connected to a wide area data network
- (d) Last mile solutions can support telephony, data and streaming video (e.g. PeoTV) services
- (e) Broadband wireless communications such as 3G/4G can also provide last mile connectivity

- 3) Consider the following statements about wired and wireless media.

- (i) Wavelength Division Multiplexing allows optical fibres to accommodate Tens of Gbps data rates
- (ii) Free space communications are liable for signal fading that will cause sudden decrease in data rates
- (iii) Wireless communications is inherently broadcast compared to wired which is point to point.

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) CDMA uses a unique code specific to each transmitter to spread the data over the full channel bandwidth simultaneously

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 IP layers for having functionalities of: host name to IP address resolution, end to end packet loss recovery, real time streaming and shared access resolution is

- (a) network, transport, network, link
- (b) application, transport, application, network
- (c) application, transport, application, link

- (d) application, transport, network, link
- (e) network, transport, application, link

6) In the IP protocol stack, the network layer has a best effort delivery policy whereas the transport layer policy is kept open. Which of the following statement(s) is/are true?

- (a) The design principle behind IP stack is to keep everything simple so that the data delivery is scalable and robust.
- (b) Transport layer policy can be either best effort delivery or guaranteed delivery.
- (c) Some applications can manage a certain amount of lost packets and in such a case UDP is preferable for the transport layer.
- (d) Applications that are sensitive to packet loss and are longer in duration can use TCP as the transport layer.
- (e) TCP is a best effort delivery protocol.

7) Forward error correction is preferred over Automatic Repeat Request (ARQ) when

- (a) The channel noise is not Gaussian white noise
- (b) Error correcting codes with necessary properties are included in the data packet
- (c) Retransmissions are not cost effective as in interplanetary or military communications
- (d) Only simplex links are available
- (e) Simple error detecting codes are only used

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

- (a) Routing table entries show the recommended next hop router address for a given destination network
- (b) Within autonomous systems, RIP or OSPF based protocols can be used
- (c) BGP (Boarder gateway protocol) is a protocol for across autonomous systems
- (d) OSPF (Dijkstra) is a distance vector algorithm
- (e) RIP runs on UDP:IP stack

9) What protocol(s) in the IP suite can be used by a host to find a usable IP address for itself based on its own MAC address?

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

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

- (a) IPv4 and IPv6 are compatible addressing technologies
- (b) Smallest routable subnet size in IPv6 is /64
- (c) IPv6 interoperability with IPv4 can be obtained by tunneling
- (d) IPv6 will provide approximately 6 billion addresses
- (e) IPv6 has a 32 bit network prefix

- 11) Which of the following statement(s) is/are true with regards to real time traffic such as voice, video or device control?
- (i) Can be accommodated naturally in circuit switched networks
 - (ii) If packet switched networks are used, Quality of Service guarantees must be provided by the routers
 - (iii) Whereas voice and video are error sensitive, device control traffic is not error sensitive
- (a) (i) only
 - (b) (ii) only
 - (c) (iii) only
 - (d) (i) and (ii) only
 - (e) All are true
- 12) What is the best route summary for the following four subnets:
172.16.224.0/19, 172.16.128.0/20, 172.16.152.0/22, 172.16.144.0/21
- (a) 172.16.0.0/16
 - (b) 172.16.0.0/17
 - (c) 172.16.128.0/17
 - (d) 172.16.128.0/18
 - (e) 172.16.128.0/19
- 13) Which of the following statement(s) is/are true about *software defined networks (SDN)*?
- i. A device's data forwarding function is separated from its control function
 - ii. Objective is to flexibly manage extremely large scale networks and data centres by administrators
 - iii. Based on the concept of a programmable data forwarding device
- (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) can use UDP 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) NFS (network file system)
- 15) TCP typically uses a dynamically adjusting sliding window protocol
- (a) Which reduces the window to 1 when a packet drop at a router is detected
 - (b) Which causes lower performance in *large pipe* links
 - (c) Which reduces the window to 1 when a packet drop at the receive host buffer is detected
 - (d) To reduce overall congestion at intermediate routers in a wide area network
 - (e) Which causes lower performance in *small pipe* links
- 16) Consider a SQL like database query issued by a client to a database server over an IP network. The most likely protocol stack for this would be
- i. RPC:UDP:IP
 - ii. RPC:TCP:IP
 - iii. RPC:FTP:TCP:IP

- (a) (i) only
- (b) (ii) only
- (c) (iii) only
- (d) (i) or (iii) only
- (e) None of the above

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

- (a) Multicast involves group communications
- (b) UDP is the typical transport protocol used for IP multicast
- (c) IP multicast is inherently reliable
- (d) TCP is the typical transport protocol used for IP multicast
- (e) Group p2p interaction applications and video streaming are candidates for IP multicast

18) Which of the following statement(s) about data traffic Quality of Service (QoS) is/are true?

- (a) Typical QoS metrics include peak data rate, jitter (delay variation tolerance), average data rate etc.,
- (b) Guaranteeing bandwidth for a connection as done in circuit switching can provide QoS
- (c) Non-real time traffic requires QoS guarantees
- (d) variable packet lengths can help towards achieving QoS
- (e) Rate control and policing in routers is required for QoS

19) Which of the following statement(s) is an/are accurate comparison of IEEE 802.11 wireless LAN and Bluetooth (IEEE 802.15) technologies?

- (a) Whereas 802.11 can operate on master-slave or adhoc modes, 802.15 is a master-slave architecture
- (b) The 802.15 is transmits with low power and short range compared to 802.11
- (c) Personal or body area networks are mainly based on 802.15
- (d) Vehicular area networks are a type of MANET that can be made using 802.11
- (e) The 802.11 is transmits with low power and short range compared to 802.15

20) On a shared bus of 1km length running CSMA/CD access protocol at 6Mbps, there are two hosts at each end of the bus. Signal propagation speed is 3×10^8 m/s. Which of the following statement(s) is/are true?

- (a) Permissible minimum packet length is 512 bits
- (b) Permissible minimum packet length is 80 bits
- (c) Permissible maximum packet length is 1024bytes
- (d) One way round trip delay is $3.33 \mu\text{sec}$
- (e) Increasing the data rate to 10Mbps will decrease the minimum packet length to 60 bits

21) Which of the following statement(s) is/are true about Ethernet hub and Ethernet Switch (Layer 2)?

- (i) The Hub is a single collision domain as well as a single broadcast domain
- (ii) Each switched link is a separate collision domain but the whole switch is one broadcast domain
- (iii) Switch is more efficient than a Hub

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

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

- (i) Data dissemination occurs when nodes are within the broadcast range of each other
- (ii) Traditional table based routing can also be used efficiently in a MANET
- (iii) Simple flooding is a good solution to reach a destination

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

23) Which of the following statement(s) is/are true about the VLAN concept?

- i. Enables modular and flexible design of large scale organisational intranetworks
- ii. Within a VLAN, there is a single broadcast domain
- iii. VLANs make shared network infrastructure more secure

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

24) Which of the following cannot be associated with the concept of *Internet of Things (IoT)*?

- (a) A smart office with controlled lighting, air conditioning and access control
- (b) Public transport system with intelligent traffic monitoring and control
- (c) A national e-governance infrastructure linking all government offices
- (d) Intelligent hospital service with patient monitoring and alerts
- (e) A smart electricity grid with balanced power generation and distribution with customer monitoring and notification

25) Which of the following statement(s) is/are true about Virtual Private Networks (VPN)?

- i. A VPN gives the functionality of a single organisational local intranet over the public internet even if the organisation is physically dispersed
- ii. VPN may use PPTP (point to point tunnelling protocol) or IPSec or TLS (transport layer security) or similar protocol to provide secure tunnels to organisational branches
- iii. VLAN can provide the identical functionality to that of VPN

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