University of Colombo, Sri Lanka

University of Colombo School of Computing

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

Academic Year 2020— 2^{nd} Year Examination — Semester 4

IT4405 — Computer Networks

Part 1 - Multiple Choice Question Paper

(ONE HOUR)

Important Instructions

- The duration of the paper is **ONE HOUR**.
- The medium of instructions and questions is English.
- This paper has **25 questions** on **7 pages**.
- All questions are of the MCQ (Multiple Choice Questions) type.
- All questions should be answered.
- **Each question has 5 (five) choices with one correct answer.**
- 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 (All the incorrect choices are marked & no correct choices are marked) 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.**
- Calculators are **not** allowed.
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Answer questions **1 to 5** using the following information.

A machine in a network is configured with the IP address 192.248.16.10 and the broadcast address 192.248.16.31.

1). What is the subnet mask of this network?

(a) 255.255.255.0	(b) 255.255.0.0	(c) 192.248.16.192
(d) 255.255.255.224	(e) 255.255.255.248	

2). What is the subnet mask in this network in CIDR notation?

(a) /24	(b) /27	(c) /16
(d) /18	(e) /25	

3). What is the network address of the network?

(a) 192.248.16.128	(b) 192.248.16.0	(c) 192.248.0.0
(d) 192.248.16.192	(e) 192.248.16.255	

4). How many IP addresses can be allocated to machines in this network?

(a) 252	(b) 65	(c) 62
(d) 32	(e) 30	

5). Assume that the subnet mask of this network is denoted by /X in CIDR notation. This subnetwork is to be divided into two subnetworks of equal size. The subnetworks thus created have the subnet mask /Y. Which of the following describes the relationship between X and Y?

(a) $X = Y$	(b) $Y = X + 1$	(c) $Y = 2X$
(d) $X = 2Y$	(e) $X = Y + 2$	

6). Which of the following is **NOT** a field in the UDP header?

(a) Source Port	(b) Destination Port	(c) Destination IP address
(d) UDP Length	(e) UDP Checksum	

7). There is a TCP connection with the source IP address $IP(M)$ and port number $P(M)$ to a server S. Consider a **simultaneous** TCP connection to server Y ($S \neq Y$) with the source IP address $IP(X)$ and the port number $P(X)$. Which of the following statements **CANNOT** be correct?

(a) $(IP(X) = IP(M))\ and\ (P(X) = P(M))$
(b) $(IP(X) = IP(M))\ and\ (P(X) < P(M))$
(c) $(IP(X) \neq IP(M))\ and\ (P(X) = P(M))$
(d) $(IP(X) \neq IP(M))\ and\ (P(X) \neq P(M))$
(e) $(IP(X) = IP(M))\ and\ (P(X) > P(M))$

8). An application writes the contents of a file into a TCP connection starting from the first byte in the file in the order of the bytes appearing in the file. Which of the following statements can be true? Select the most appropriate answer.

(a) The receiver is guaranteed to receive the full content of the file
(b) The receiver has received the first, second and the third bytes in the file
(c) The receiver has received first 6 bits of the file
(d) The receiver has received the 10^{th} byte, but not the 7^{th} byte
(e) If the file size is less than a TCP segment size, all the content is guaranteed to be delivered in one segment

9). Which of the following is a field in the TCP segment header?

(a) Source IP address
(b) Source port
(c) Destination IP address
(d) Ether Type
(e) Source MAC address

10). Which of the following is the protocol used in the *traceroute* utility?

(a) ICMP (b) ARP (c) RARP
(d) HTTP (e) IMAP

11). Which of the following protocols can be used to discover the MAC address of an interface with a given IP address in a LAN?

(a) Address Resolution Protocol
(b) Dynamic Host Configuration Protocol
(c) Post Office Protocol
(d) Ethernet Protocol
(e) Domain Name System Protocol

12). What is the most abbreviated form of the following IPv6 address?

7001:0000:0000:1000:0321:4567:89AB:CDEF

(a) 7001:1::321:4567:89AB:CDEF
(b) ::4567:89ab:cdef
(c) 71::321:4567:89AB:CDEF
(d) 7001::321:4567:89AB:CDEF
(e) 7001::1000:321:4567:89ab:cdef

13). Which of the following is equivalent to the IPv4 address 8.8.8.8 in IPv6 notation (IPv4 compatible IPv6 address)?

(a) 8:8:8:8	(b) :8	(c) :8:
(d) ::8.8.8.8	(e) 8::8	

14). Which of the following is **not** a field in the IPv6 fixed header?

(a) Source address	(b) Destination address	(c) Payload length
(d) Hop limit	(e) Fragment offset	

15). What is the purpose of Class D addresses in IPv4?

(a) They are reserved for future use
(b) They are /10 addresses used for very large networks
(c) Class D addresses denote multicast groups
(d) They are addresses reserved for routers
(e) Class D addresses are mobile addresses

16). The bandwidth of a channel is 1 KHz and the noise level is found to be 1/511 that of the signal power. What is the maximum possible data rate in this channel?

(a) 1/511 Kbps	(b) 511 Kbps	(c) 512 Kbps
(d) 9000 bps	(e) 511 bps	

17). What is the Hamming Distance?

(a) It is the number of positions in which two codewords differ
(b) Distance between two points in a network
(c) Number of 1s in a message
(d) It represents the weight of a codeword
(e) It is the number of bit errors in a message

18). Which of the following statements regarding twisted pair cables is **NOT** correct?

(a) CAT 5 cables have more twists per inch than CAT 3 cables
(b) CAT 5 cables have more bandwidth than CAT 3 cables
(c) Twists in the cables reduces external noise
(d) Twisted pair cables are used for electrical wiring to carry high voltages
(e) Twisted pair cables are used in Public Switched Telephone Networks

19). Which of the following statements regarding 802.11 networks is correct?

(a) 802.11 networks can operate only in 5 GHz ISM band
(b) GSM networks also operate in the same frequency range as 802.11 networks
(c) Bluetooth networks do not interfere with 802.11 networks
(d) WiFi and 802.11 networks do not operate in the same frequency ranges
(e) Garage door openers also use the same frequency range as 802.11 networks

20). Consider the following statements regarding wireless networks

(i) RTS/CTS protocol is used as a solution to the Hidden Station Problem

(ii) OFDM is a physical layer technology of the 802.11 standard

(iii) In DCF mode 802.11 station acts without any central control

Which of the above statements is/are correct?

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

21). The latency between two stations S1 and S2 over a transmission line is 10ms. The transmission line can transmit data at the rate of 1Mbps. Station S1 transmits a stream of 1000 bytes to S2. What is the minimum amount of time it takes for S2 to receive all the bytes sent from the moment that S1 transmitted the first bit? Select the most appropriate answer. The speed of light is 300000Km per second.

(a) 18ms	(b) 8ms	(c) 8010ms
(d) 10ms	(e) 8000ms	

22). What is the Binary Exponential Backoff algorithm?

(a) It is a procedure used in CSMA/CD networks to avoid collisions

(b) It is a binary encoding system to detect errors

(c) It is used by ISPs to rate limit subscriber links

(d) It is a compression mechanism used for binary files

(e) A technique used to increase the data rate of a binary channel

23). What is the purpose of the AAAA record in DNS?

(a) It is four A records given as a single record

(b) It indicates that a domain name maps to four IP addresses

(c) The record type AAAA maps an IPv4 address to a name

(d) The record type AAAA maps an IPv6 address to a name

(e) It is a record reserved for future use

24). Which of the following statements is true regarding the ADSL service provided over a **category 3 UTP local loop**?

(a) ADSL provides very high upload bandwidth compared to download bandwidth

(b) It is highly unlikely that electrical interference affects the ADSL service

(c) The bandwidth of the local loop drops with the distance from the exchange

(d) ADSL is the best option to host a web server

(e) Service providers have to lay new high capacity cables to replace the existing local loop to provide the ADSL service

25). Consider the following statements.

(i) VLAN support in switches is required to deploy a Virtual Private Network (VPN).

(ii) It is always possible to replace a Network Address Translator (NAT) by an HTTP proxy to provide the same functionality.

(iii) Only addresses from private IP blocks can be assigned to machines in a VLAN.

Which of the above statements is/are **NOT** correct?

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

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