University of Colombo, Sri Lanka

University of Colombo School of Computing

BIT

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

Academic Year 2023— 2nd Year Examination — Semester 4

IT4506 — Computer Networks

Part 1 - Multiple Choice Question Paper
(2 Hours for both Part 1 and Part 2)

Important Instructions

- This paper has **two (2) parts, Part 1 and Part 2**.

- The total duration of **both Part 1 and Part 2 is 2 hours**.

- The final mark for the paper will be determined by averaging the scores of Part 1 and Part 2, each of which is graded out of **100**.

- The medium of instructions and questions is English.

- This paper (Part 1) has **25 MCQ questions** on **6 pages**. Answer **all** questions.

- Each question will have **5 (five)** choices with **ONLY ONE** correct answer.

- Answers should be marked on the **special answer sheet** provided.

- Note that questions appear on both sides of the paper. If a page or part of a page is not printed, please inform the supervisor/invigilator 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.**

- Any electronic device capable of storing and retrieving text, including electronic dictionaries, smartwatches, and mobile phones, is **not** allowed.

- Calculators are **not allowed**.

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1). What is the name of the **Protocol Data Unit (PDU)** used in the Transport layer in the OSI model?

(a) Frame	(b) Bit	(c) Packet
(d) SPDU	(e) **Segment**	

2). In the OSI model, which layer is responsible for ensuring process to process data delivery?

(a) Network Layer	(b) **Transport Layer**	(c) Physical Layer
(d) Datalink Layer	(e) Internet Layer	

3). What is the size of the **fixed header** of Transmission Control Protocol (TCP) Protocol Data Unit (PDU)?

(a) 1 bytes	(b) 10 bytes	(c) **20 bytes**
(d) 40 bytes	(e) 512 bytes	

4). Rank the following transmission media in order of their bandwidth, starting from the lowest and ending with the highest?

(a) Coaxial cable < Fiber optic cable < Twisted Pair

(b) Twisted Pair < Coaxial cable < Fiber optic cable

(c) Fiber optic cable < Twisted Pair < Coaxial cable

(d) **Coaxial cable < Twisted Pair < Fiber optic cable**

(e) Twisted Pair < Fiber optic cable < Coaxial cable

5). Which DNS resource record type specifies the servers responsible for receiving emails for a particular domain?

(a) SOA	(b) AAAA	(c) **MX**
(d) TXT	(e) SPF	

6). What is the flag need to be set to immediately send the segment to the network layer in Transmission Control Protocol?

(a) ACK	(b) **PSH**	(c) URG
(d) RST	(e) SYN	

7). Which component of the Software Defined Networks (SDN) architecture facilitates the programming of the network behaviour through the controller?

(a) Data Plane

(b) SDN Applications

(c) Network Operating System

(d) Southbound API

(e) **Northbound API**

8). Which of the following communication models best describes the network topology formed by Bluetooth devices?

|		
(a) Client-Server	(b) Peer-to-Peer	(c) **Master-Slave**
(d) Publish-Subscribe	(e) Sender-Receiver	

9). What is meant by byte stuffing used in the data link layer?

(a) Byte stuffing is used to expand a frame

(b) It is used to add randomness to a frame

(c) Byte stuffing is another name for encryption

(d) **Byte stuffing refers to inserting an escape byte before FLAG bytes inside the data**

(e) It refers to removing some bytes from a frame

10). What advantage do hardware routing tables offer compared to software-based routing tables in network devices?

(a) **Keep the high-speed links and to route packets at link speeds.**

(b) Increase the maintainability.

(c) Enable to configure from a central point.

(d) Possible to enforce policies centrally to the network.

(e) Ability of seeing the entire network at once.

Answer questions **11 to 20** based on the following network diagram. Device **R1** is a router and **SW1** and **SW2** are two network switches. **PC0** and **PC1** has only wired network interfaces. All the devices are connected using cables except the connection between **Smartphone** and the **Access Point.**
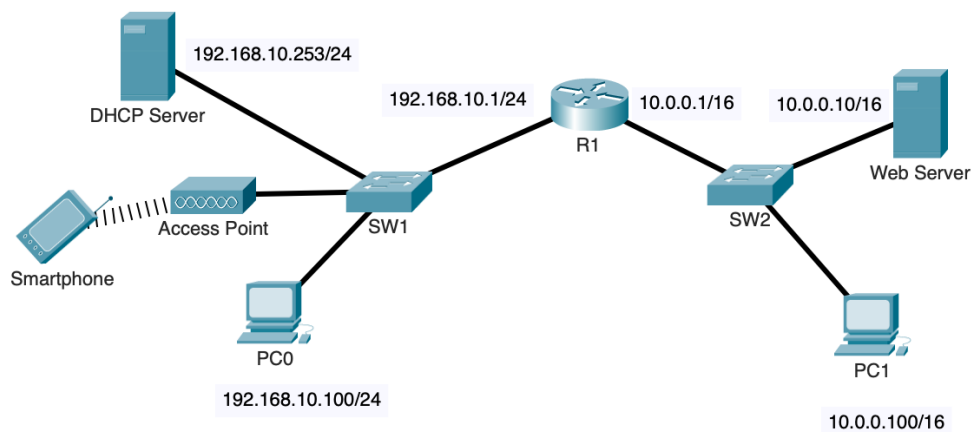
11). What is the Datalink layer protocol that can be used between PC0 and SW1?

(a) UDP	(b) IEEE 802.11	(c) TCP
(d) IP	(e) **Ethernet**	

12). What is the Datalink layer protocol that can be used to communicate between Smartphone and the AccessPoint?

(a) Ethernet	(b) IP	(c) TCP
(d) **IEEE 802.11**	(e) UDP	

13). Which of the following IP addresses can be used as the default gateway of the PC0?

(a) 192.168.10.100	(b) **192.168.10.1**	(c) 10.0.0.1
(d) 10.0.0.10	(e) 10.0.0.100	

14). What is the **transport layer** protocol used by PC0 when requesting the website from the Web server?

(a) HTTP	(b) **TCP**	(c) UDP
(d) FTP	(e) ARP	

15). What is the **application layer** protocol used by PC0 when requesting the website from the Web server?

(a) **HTTP**	(b) TCP	(c) UDP
(d) FTP	(e) ARP	

16). What should be the destination IP address included in the packet created by PC0 when requesting a web site from the web server?

(a) 192.168.10.1	(b) 10.0.0.1	(c) **10.0.0.10**
(d) 192.168.10.255	(e) 10.0.0.255	

17). What is the protocol used by PC1 to discover the MAC address of the Web server?

(a) DHCP	(b) ICMP	(c) EIJRP
(d) OSPF	(e) **ARP**	

18). Assume that the Smartphone is just connected to the WiFi network and needs the IP configuration. What message does the Smartphone should broadcast to locate a DHCP server?

(a) **DHCP DISCOVER**	(b) DHCP OFFER	(c) DHCP ACK
(d) DHCP REQUEST	(e) DHCP SYN	

19). What should be the destination MAC address of the message broadcasted by the Smartphone to locate the DHCP server?

(a) 00:00:00:00:00:00

(b) FF:FF:FF:00:00:00

(c) **FF:FF:FF:FF:FF:FF**

(d) FF:FF:FF:FF:FF:00

(e) 00:00:00:00:00:FF

20). Assume that the Smartphone has received the IP configurations from the DHCP server. What will be the Broadcast IP address assigned to the Smartphone?

(a) 192.168.1.0	(b) 192.168.1.255	(c) 192.168.10.0
(d) **192.168.10.255**	(e) 255.255.255.255	

Answer questions **21 to 25** using the following information.

A machine in a network (L) uses the IP address 8.8.8.8/25.

21). What is the subnet mask used in this network in dotted decimal notation?

(a) **255.255.255.128**	(b) 255.255.255.0	(c) 255.255.255.1
(d) 1.255.255.255	(e) 255.255.255.25	

22). What is the maximum number of machines that can be connected to L?

(a) 24	(b) 25	(c) **126**
(d) 130	(e) 255	

23). What is the broadcast address of the network L?

(a) 8.8.8.8	(b) 255.255.255.0	(c) 0.0.0.0
(d) 1.1.1.1	(e) **8.8.8.127**	

24). Assume that the network L is divided into 2 equal size sub networks, $L1$ and $L2$. A machine with the IP address 8.8.6.100 is in $L2$. What is the network address of $L2$?

(a) **8.8.8.8**	(b) **8.8.8.64**	(c) **0.0.0.0**
(d) **1.1.1.1**	(e) **8.8.8.255**	

25). Assume that the network L is divided into 4 equal size sub networks. Which one of the following is a broadcast address of one of those sub networks?

(a) **8.8.8.31**	(b) 8.8.8.32	(c) 8.8.8.65
(d) 8.8.8.128	(e) 8.8.8.256	

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