



PROGRAM : NATIONAL DIPLOMA
ENGINEERING : COMPUTER SYSTEMS
ENGINEERING : ELECTRICAL

SUBJECT : **NETWORK SYSTEMS II**

CODE : **CNS 211**

DATE : SUPPLEMENTARY EXAMINATION
JANUARY 2020

DURATION : 180 Minutes

WEIGHT : 40 : 60

TOTAL MARKS : 100

ASSESSOR : DR AA ALONGE

MODERATOR : PROF T SHONGWE

NUMBER OF PAGES : 7 PAGES AND 1 ANSWER SHEET

INSTRUCTIONS TO ALL STUDENTS

1. ATTEMPT ALL QUESTIONS.
 2. TOTAL MARKS = 100%.
 3. MARKS WILL BE DEDUCTED FOR UNATTRACTIVE AND UNREADABLE WORK.
 4. DIAGRAMS AND SKETCHES MUST BE DRAWN NEATLY.
 5. DIAGRAMS AND SKETCHES MUST BE LABELLED CORRECTLY.
 6. QUESTIONS MAY BE ANSWERED IN ANY ORDER, BUT ALL PARTS OF THE QUESTION MUST BE GROUPED TOGETHER
 7. QUESTION PAPERS MUST BE HANDED IN WITH EXAMINATION SCRIPTS
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SECTION A:

*Choose the most correct answer and mark an X over the corresponding letter on your answer sheet (Do all rough work at the back of the answer script). Each question attracts **1 marks**.*

QUESTION 1: TRUE OR FALSE STATEMENTS

*In this sections, answer true for a statement you agree with and false for a statement you disagree with. Please, boldly mark your selected answer with **X** using the answer sheet provided with your question paper.*

- 1.1 *Messages* is a generic term that encompasses web pages, e-mail, instant messages, telephone calls, and other forms of communication enabled by the Internet. T/F
- 1.2 Routing protocols are the set of rules by which routers dynamically share their routing information. As routers become aware of changes to the networks for which they act as the gateway, or changes to links between other routers, the information is passed on to other routers. T/F
- 1.3 Domain names were created to convert the numeric address into a simple recognizable name. To ensure a successful conversion, a protocol called the Domain Name System is applied on the network server. T/F
- 1.4 The most common UTP cable connector in LAN devices is an **RJ-11** connector. Most computers accessing a network through cable use an RJ-11 connector plugged into the computer network interface card at one end and a hub or switch device at the other. T/F
- 1.5 The application layer is responsible for human-computer interactions on the network via physical end devices. It is basically a software component which when installed can provide network access between client users and servers. T/F
- 1.6 According to CSMA/CD, a node should not send a packet unless the network is clear of traffic. If two nodes send packets at the same time, a collision occurs and the packets are lost. T/F
- 1.7 TCP is a simple, connectionless protocol, described in RFC 768. It has the advantage of providing low-overhead data delivery. The segments of communication in TCP are called datagrams. T/F
- 1.8 The MAC address table on a switch lists all the MAC addresses and the associated ports for the forwarding of packets to each MAC address. T/F
- 1.9 IPv4 addresses have two parts: the network portion and the host portion. For each IPv4 address, some portion of the most significant bits, or **high-order bits**, represents the network address. T/F
- 1.10 This gateway is a router interface connected to the local network. The gateway interface has a network layer address that matches the network address of the hosts. The hosts are configured to recognize that address as the gateway. T/F

[10]

QUESTION 2: MULTIPLE CHOICE QUESTION

Choose the most correct and appropriate answer and mark X over the corresponding letter on your answer (rough work must be done at the back of the answer script). Each question carries 2 marks.

- 2.1 Packet-switched technology is connectionless because_____
- A. It does not require an active call connection before packets are sent
 - B. It requires connected cable to transmit packets
 - C. It is a type of an efficient circuit switched network
 - D. It considers a fault tolerant approach to execute routing procedures
 - E. A network is required to initiate packet networks
- 2.2 Which of the following describes a virtual circuit?
- A. Is an error-detection technique
 - B. Provides an encapsulation technique
 - C. Is used only with point-to-point physical topologies
 - D. Establishes a logical connection between two network devices
- 2.3 The router performs one or more of the following tasks on a typical network:
- i. Connects two or more LANs together
 - ii. Enables autonomous LANs to access the greater internetwork highway
 - iii. Links up two or more switches in a network environment
 - iv. Allows segmentation of conversations over the network
- A. i and iv
 - B. i and ii
 - C. i, iii and iv
 - D. ii only
 - E. ii and iv
- 2.4 Match the following:
- | | |
|-------------|------------------------------------|
| 1. Segments | A. Associated with Data Link Layer |
| 2. Packets | B. Associated with Network Layer |
| 3. Frames | C. Associated with Transport Layer |
- A. 1 – A, 2 – B and 3 – C
 - B. 1 – A, 3 – B and 1 – C
 - C. 1 – C, 2 – B and 3 – A
 - D. 1 – B, 2 – A and 3 – C
 - E. None of the above
- 2.5 Which of the following terms defines dividing data streams into smaller pieces suitable for transmission?
- A. Protocol

QUESTION 2 (Continued)

- B. Multiplexing
 - C. Segmentation
 - D. Encapsulation
- 2.6 Which of the following is a feature of full-duplex transmission?
- A. It allows two devices to send and receive data simultaneously over a single Ethernet cable.
 - B. It doubles bandwidth between nodes.
 - C. It provides collision-free transmission.
 - D. All of the above are correct.
 - E. None of the above is correct.
- 2.7 Which of the following is a common data link sublayer used in LANs?
- A. Protocol data unit
 - B. Logic Link Control
 - C. FTP
 - D. Network interface card
 - E. Carrier access multiaccess
- 2.8 During data transfer, what is the receiving host responsible for?
- i. Encapsulation
 - ii. Bandwidth
 - iii. Segmentation
 - iv. Acknowledgment
 - v. Reassembly
- A. i and ii
 - B. i and iii
 - C. iv and v
 - D. iii and v
 - E. i and iv
- 2.9 Given an IP address 172.16.28.252 with a subnet mask of 255.255.240.0, what is the correct network address?
- A. 172.16.16.0
 - B. 172.16.0.0
 - C. 172.16.24.0
 - D. 172.16.28.0
 - E. 172.16.28.254
- 2.10 Category 5 and Category 5 UTP typically use which type of connector?
- A. STP
 - B. BNC

- C. RJ-45
- D. RJ-11
- E. SMC

[20]

TOTAL (SECTION A) = 30 MARKS

SECTION B:

To be answered in your examination answer booklet. Provide answers in clear and legible handwriting and show workings where necessary.

QUESTION 3: LAB WORK ASSESSMENT

3.1



IP ADDRESS: 192.168.47.63
SUBNET MASK: 255.255.255.192

Figure 3.1

Consider Figure 3.1 above, a client was allocated an IP address but is unable to connect to the Local Area Network and the internet. Logically resolve this network problem by technically explaining the issue. (12)

3.2 The table below represents the table chart for a crossover UTP cable. Using your knowledge, complete the last part of the table for plug #2 accordingly.

Plug #1 Pin number	Wire Colour	Plug #2 Pin number	Wire Colour
White/Orange	1	1	
Orange	2	2	
White/Green	3	3	
Blue	4	4	
White/Blue	5	5	Brown
Green	6	6	
White/Brown	7	7	
Brown	8	8	

(7)

- 3.3 Explain the functions of the following network commands when typed in the command prompt window.
- (a) Netstat (3)
 - (b) ipconfig (3)

[25]**QUESTION 4: THEORY AND ESSAY**

- 4.1 Define and describe the following terms:
- 4.1.1 DHCP
 - 4.1.2 IEEE
 - 4.1.3 LAN
 - 4.1.4 PDU
 - 4.1.5 OSI (10)
- 4.2 Network architectures rely on fundamental layered designs as specified by designated standard bodies. For many network users, the aim is to be able to send and receive data from their workstations, without regard for the underlying network designs. Using the OSI model, describe using appropriate terminologies, the process through which user PCs are able to send and receive data over the networks. You are to describe exhaustively the functions of each layers, the protocols and services therein and the PDUs generated per layer. Ensure you give FULL definitions and descriptions (7)
- 4.3 Given the IP address of a network end device, complete the missing parts of Table 4.1 in your answer booklet. Show ALL the calculations involved in the determination of the missing spaces..

Table 4.1

IP ADDRESS	192.127.120.119/23
SUBNET MASK	
NUMBER OF HOSTS	
NETWORK ADDRESS	
HOST ADDRESS RANGE	
BROADCAST ADDRESS	

(10)

- 4.4 The Ethernet LAN switch employs intelligent procedures in the forwarding of message frames within the LAN. Explain any **three** of these processes in detail. (6)
- 4.5 Describe extensively the differences and similarities between the two prominent IP addressing schemes of IPv4 and IPv6 as applied in network design. (6)
- 4.6 As an end user of a network, you type in a new URL address into your web browser and it presents your website to you obtained from the internet. How does your web

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browser know where to find your web pages when you enter the URL into the address line? What is the process that takes place that allows this to happen? Provide a full explanation but please note that this is not a question about OSI layers. (6)

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TOTAL (SECTION B) = 70 MARKS

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FULL MARK TOTAL = 100 MARKS

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STUDENT SURNAME: _____

STUDENT NUMBER: _____

ANSWER SHEET*(This sheet must be handed in with your examination script)**Mark your final answer with large clear cross (X) over the box you have chosen as your answer.***QUESTION 1**

1.1	True	False
1.2	True	False
1.3	True	False
1.4	True	False
1.5	True	False
1.6	True	False
1.7	True	False
1.8	True	False
1.9	True	False
1.10	True	False

(10 marks)

QUESTION 2

2.1	A	B	C	D	E
2.2	A	B	C	D	E
2.3	A	B	C	D	E
2.4	A	B	C	D	E
2.5	A	B	C	D	E
2.6	A	B	C	D	E
2.7	A	B	C	D	E
2.8	A	B	C	D	E
2.9	A	B	C	D	E
2.10	A	B	C	D	E

(20 marks)