UNIVERSITY OF JOHANNESBURG

| | | |
|---|---|---|
| **PROGRAM** | : | NATIONAL DIPLOMA<br>*ENGINEERING : COMPUTER SYSTEMS*<br>*ENGINEERING : ELECTRICAL* |
| **SUBJECT** | : | **NETWORK SYSTEMS 2** |
| **CODE** | : | **CNS211** |
| **DATE** | : | SUMMER SSA EXAMINATION 2017<br>10 JANUARY 2017 |
| **DURATION** | : | (SESSION 1) 08:00 - 11:00 |
| **WEIGHT** | : | 40 : 60 |
| **TOTAL MARKS** | : | 100 |

---

| | | |
|---|---|---|
| **ASSESSOR** | : | MR EM LOOTS |
| **MODERATOR** | : | MR V RAMESHAR 2411 |
| **NUMBER OF PAGES** | : | 7 PAGES AND 1 ANSWER SHEET |

---

**INSTRUCTIONS**

1. THE ANSWER SHEET MUST BE HANDED IN TOGETHER WITH THE SCRIPT
2. POCKET CALCULATORS PERMITTED.
3. ATTEMPT ALL THE QUESTIONS.

---

## INSTRUCTIONS TO STUDENTS

1. 100 MARKS = 100%. TOTAL MARKS AVAILABLE = 106
2. ATTEMPT ALL QUESTIONS.
3. ALL DIAGRAMS AND SKETCHES MUST BE DRAWN NEATLY, IN PROPORTION AND LABELLED CLEARLY.
4. THE MARK ALLOCATION SHOULD BE CONSIDERED WHEN ANSWERING QUESTIONS.
5. ALL WORK DONE IN PENCIL EXCEPT DIAGRAMS AND SKETCHES WILL BE CONSIDERED AS ROUGH WORK AND WILL NOT BE MARKED.
6. QUESTIONS MAY BE ANSWERED IN ANY ORDER, BUT ALL PARTS OF A QUESTION MUST BE KEPT TOGETHER.

## *SECTION A*

This section is to be answered on the sheet provided. Mark an **X** over the corresponding block on your answer sheet. Hand in your answer sheet with your answer script.

## QUESTION 1 - TRUE OR FALSE STATEMENTS

*Answer true for a statement which you agree with and false to statements that you disagree with.*

1.1. A router is a device which moves data between networks. T/F

1.2. Blog is short for weblog. T/F

1.3. A website where entries are made in journal style is known as a blog. T/F

1.4. The device that connects a device to the media is called a router. T/F

1.5. The passage of a data packet between two network nodes are known as a gateway. T/F

1.6. Insertion loss is a combination of the effects of signal attenuation and impedance discontinuities on a communications link. T/F

1.7. A network analyser is a type of software/hardware tool used to capture frames and packets passing over media. Network analysers assist networking engineers in troubleshooting the network. T/F

1.8. The process by which a networking devise chops packets into bits is termed packet switching. T/F

1.9. Queuing delay propagation is the process of holding frames or packets in memory until the interface out which the frame or packet needs to be sent becomes available. T/F

1.10. The user can make changes to the blog by altering the HTML code. T/F

[10]

**QUESTION 2 - MULTIPLE CHOICE**

*Choose the most correct answer and mark an x over the corresponding letter on your answer sheet (rough work can be done at the back of the answer script).*

2.1 What are the two base features of LLC? (Choose two) (2)

A. The ability to identify the type of data inside the data field of the frame.
B. The ability to verify valid MAC addresses
C. The ability to control how a token is passed.
D. The ability to control the transmission between two devices on a LAN, specifically to perform error recovery when frames are lost.

2.2 What do the first six hexadecimal numbers in a MAC address represent? (1)

A. The whole MAC address
B. Organisationally unique identifier
C. Interface unique identifier
D. None of the above

2.3 Which of the following best describes encapsulation? (1)

A. Segmenting data so that is flows uninterrupted through the network
B. Compressing data so that it moves faster
C. Wrapping data in a particular header
D. Moving data in groups so that it stays together

2.4 Where does the MAC address reside in a computer? (1)

A. Transceiver
B. Computer BIOS
C. NIC
D. CMOS

2.5 Which functions are associated with Ethernet framing? (1)

A. Identifies which computers are communicating with one another
B. Signals when communication between individual computers begins and when it ends
C. Flags corrupted frames
D. All of the above

2.6 Media access control refers to what? (1)

A. The state in which a NIC has captured the networking medium and is ready to transmit.
B. Rules that govern media capture and release
C. A formal byte sequence that has been transmitted
D. Rules that determine which computer in a shared-medium environment is allowed to transmit data

QUESTION 2 (Continued)

2.7 In an Ethernet or IEEE 802.3 LAN, when do collisions occur? (1)

A. When one node places a frame on a network without informing the other nodes
B. When two network nodes send frames to a node that no longer is broadcasting
C. When jitter is detected and traffic is disrupted during normal detection
D. When two stations listen for traffic, hear none, and transmit simultaneously

2.8 From a wireless laptop's perspective, to which of the following is a wireless AP most similar? (1)

A. Bridge
B. Switch
C. Router
D. Hub

2.9 What type of connector connects a router and an external CSU/DSU? (1)

A. RJ-45
B. RJ-11
C. Serial
D. Console

2.10 What type of cable connects a terminal and a console port? (1)

A. Straight-through
B. Crossover
C. Rollover
D. Coax

2.11 What is the maximum cable length for Ethernet over UTP? (1)

A. 185 m
B. 250 m
C. 100 m
D. 500 m

2.12 How many pairs of wires are used in the TIA-EIA-568-B wiring standard? (1)

A. Two
B. Four
C. Six
D. Eight

2.13 Category 5 and Category 5 UTP typically use which type of connector? (1)

A. STP
B. BNC
C. RJ-45
D. RJ-11

QUESTION 2 (Continued)

2.14 What advantage does coaxial cable have over STP or UTP? (1)

A. Coaxial cable is capable of achieving 10 to 100Mbps
B. Coaxial cable is inexpensive
C. Coaxial cable can run for a longer distance before a repeater must be installed
D. Coaxial cable takes less space to install

2.15 What does twisting the wires do in twisted-pair cable? (1)

A. It reduces noise problems through cancellation effect
B. It makes it less expensive
C. It allows six pairs to fit in the space of four pairs
D. It reduces the bandwidth range of the cable

2.16 How many fibre-optic strands are used in full-duplex connection between two networking devices? (1)

A. Two strands connect the two devices, one for sending in each direction
B. One strand receives and transmits simultaneously
C. Four strands are used to achieve full duplex
D. Eight strands are used, which is similar to UTP using eight

2.17 What is one advantage of using fibre-optic cable in networks? (1)

A. Fibre-optic cable is inexpensive as it is made from glass
B. Fibre-optic cable is easy to install
C. Fibre-optic cable is readily available at any electronics store
D. Fibre-optic cable is not susceptible to EMI

2.18 Which OSI model handles physical addressing, network topology, and network access? (1)

A. The physical layer
B. The data link layer
C. The transport layer
D. The network layer

2.19 What is the name of the access method used in Ethernet that explains how Ethernet works?(1)

A. TCP/IP
B. CSMA/CD
C. CMDA/CS
D. CSMA/CA
E. CDMA/CD

**[20]**

**SUB TOTAL SECTION A: 30**

## *SECTION B*

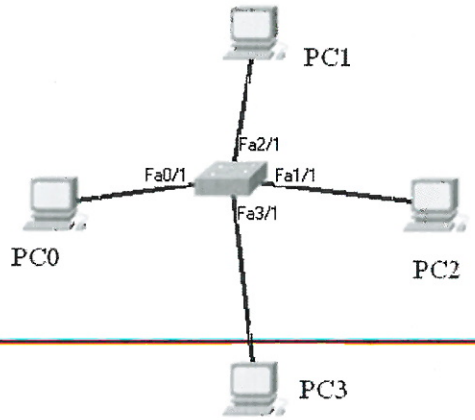
THIS SECTION IS TO BE ANSWERED ON YOUR ANSWER SCRIPT.

## QUESTION 3

3.1 A network device has four NIC's and four network protocols, how many network addresses will be on it? (1)

3.2 Draw and label a diagram illustrating the different OSI layers. Next to this diagram draw a diagram of the TCP/IP layers and show which layers correspond between the different levels in each model. The layers must be in order. Marks will be deducted for incorrect order. (11)

3.3 Consider the following diagram:




The MAC addresses are as follows:
PC0 = 00 11 00 11 12 13
PC1 = 00 11 00 11 11 11
PC2 = 00 11 00 01 12 1e
PC3 = 00 11 00 12 13 14

Assume all CAM entries are empty and PC0 sends a frame of data to PC2. Assume no other transmission takes place.

3.3.1 What ports on the switch will transmit the data? (3)
3.3.2 Would this be called filtering or forwarding? (1)
3.3.3 What would the resultant CAM table look like for all the ports on the switch? (2)
3.3.4 If PC2 responds with a frame back to PC0, what will the CAM tables look like and would the transmission be that of filtering or forwarding? (4)

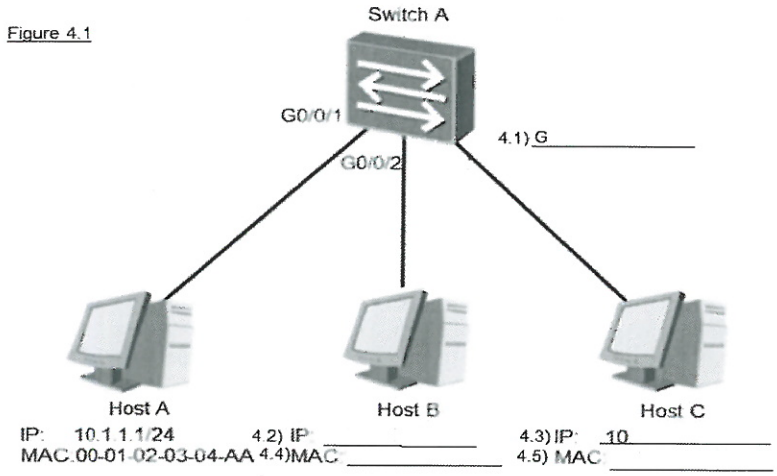
3.4 A router and a hub operate on certain layers of the OSI model. Specify on which layer each device operates on respectively. (2)

[24]

## QUESTION 4

4.1 Use Figure 4.1 to answer the following questions.

Figure 4.1




| | | |
|---|---|---|
| 4.1 | Provide the MAC interface for point 4.1 | (2) |
| 4.2 | What will be the IP address for Host B | (2) |
| 4.3 | Provide the IP address for Host C | (2) |
| 4.4 | What will be the MAC address for Host B | (3) |
| 4.5 | Provide the MAC address for Host C | (3) |
| 4.6 | Switches operate within the scope of which layer? | (2) |
| 4.7 | Define the following terms: | (10) |
| 4.7.1 | De-encapsulation | |
| 4.7.2 | HTML | |
| 4.7.3 | HTTP | |
| 4.7.4 | NAT | |
| 4.7.5 | OSPF | |

**[24]**

## QUESTION 5

| | | |
|---|---|---|
| 5.1 | Which forms of cabling can be used to support Gigabit Ethernet? | (2) |
| 5.2 | What is a collision domain? | (5) |
| 5.3 | What is the purpose of CSMA/CD? | (5) |
| 5.4 | Discuss five header field types in data link frames. | (10) |

**[22]**

SUB TOTAL SECTION B: **70**

**FULL MARKS: 100**

STUDENT SURNAME: _____

STUDENT NUMBER: | | | | | | | | | |

# ***ANSWER SHEET***

*(This sheet must be handed in with your examination script)*
*Put a 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) |

## 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 |
| 2.11 | A | B | C | D | E |
| 2.12 | A | B | C | D | E |
| 2.13 | A | B | C | D | E |
| 2.14 | A | B | C | D | E |
| 2.15 | A | B | C | D | E |
| 2.16 | A | B | C | D | E |
| 2.17 | A | B | C | D | E |
| 2.18 | A | B | C | D | E |
| 2.19 | A | B | C | D | E |
| 2.20 | A | B | C | D | E |

(20)
**[30]**