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**INFORMATION TECHNOLOGY: PAPER I
GRADE 11 THEORY
JULY EXAMINATIONS 2019**

MARKS: 120
TIME: 2 HOURS
READING TIME: 10 MINUTES

EXAMINER: J NOCTON-SMITH
MODERATOR: D KENCH

NAME:

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. The question paper consists of 18 pages – including 2 blank pages. Please check that your question paper is complete.
2. Read the questions carefully and make sure that you answer all parts of each question.
3. Answer on the question paper. Please make sure that you write your name number in the space above.
4. Answer ALL questions – there are no options in the paper.
5. Show all working where applicable.
6. A non-programmable calculator may be used.
7. It is in your own interest to write legibly and to present your work neatly.

There are two blank pages at the end of the paper. In case you run out of space when answering a question, use these pages. Clearly indicate the number of the question you are working on.

Q1	Q2	Q3	Q4	Q5	Q6	TOTAL
10	33	15	33	21	8	120

SECTION A**TERMINOLOGY****QUESTION 1****10 MARKS**

Write down the definition for each term:

1.1 Source Code (2)

1.2 Argument (2)

1.3 Compiler (2)

1.4 Over clocking (2)

1.5 Driver (2)

SECTION B**SYSTEM TECHNOLOGIES****SCENARIO**

Amanda creates and uploads DIY videos to YouTube. She is aiming to create an online presence by gathering a significant amount of followers. She currently uses the laptop webcam to record her videos. She also uses the laptop to edit her videos, send emails, write letters and use spreadsheets to draw up budgets. She has noticed significant performance issues with her laptop when editing video content.

Amanda's computer has the following specifications:

Processor	Intel Core i3 Dual Core 64 bit 5005U (Up to 2.00 GHz)
Memory	4GB DDR3 RAM L1 Cache (32KB), L3 Cache (4MB)
Storage	500GB 7200 rpm HDD SATA 3
Graphics Card	Intel® HD Integrated Graphics 5500
Ports	2 x USB 3.1 1 x USB 2.0 1 x Microphone-in/Headphone-out jack 1 HDMI 1 Ethernet Port
Media Card Reader	1 SD Card Reader
Webcam	HP Webcam with integrated digital microphone
Speakers	2 x Integrated Speakers
Screen	15.6-inch LCD Screen
Connectivity	802.11b/g/n Wireless Bluetooth 4.0

QUESTION 2**33 MARKS**

Amanda is not sure if she should upgrade her current laptop or if she should buy a new computer. Assist her by answering the following questions.

2.1 What is a Dual Core processor? (2)

2.2 Name the four stages of the machine cycle. (4)

2.3 The CPU and RAM are controlled off the same system clock but run at different speed. Explain how is this is achieved? (2)

2.4 What does it mean that the processor is 64 bits? (2)

2.5 Amanda's computer has a chipset.

2.5.1 What is the purpose of a chipset on a motherboard? (2)

2.5.2

a) Name **ONE** component from the specifications that will connect to the Northbridge. (1)

b) Give **ONE** reason why this component is connected to the Northbridge. (1)

2.5.3

- a) Name **ONE** component from the specifications that will connect to the Southbridge. (1)

- b) Give **ONE** reason why this component is connected to the Southbridge. (1)

2.6 Amanda's computer makes use of different types of memory.

- 2.6.1 State TWO important differences between standard RAM and cache memory in a computer system. (2)

Difference 1: _____

Difference 2: _____

- 2.6.2 How does cache memory improve performance on a computer? (2)

- 2.6.3 Give TWO reasons why cache memory is supplied in such small amounts as compared to RAM? (2)

Reason 1: _____

Reason 2: _____

2.6.4 Name and describe TWO types of cache found on modern PCs other than a processor cache. (4)

Type 1: _____

Type 2: _____

2.7 Virtual memory can enhance the performance of the computer.

2.7.1 When will virtual memory be used by the operating system? (2)

2.7.2 Explain the basic concepts of how virtual memory works. (2)

2.8 What is the purpose of HDMI? (2)

2.9 Give **ONE** benefit of the SD Card Reader for Amanda. (1)

QUESTION 3**15 MARKS**

Amanda is running Windows 10 as the operating system on her desktop.

3.1 List THREE functions of the operating system. (3)

Function 1: _____

Function 2: _____

Function 3: _____

3.2 One of the primary functions of an operating system is process management. Describe TWO process management functions that must occur. (2)

Function 1: _____

Function 2: _____

3.3 A process can be in in different stages while it is on the process of being executed. Name and describe TWO states. (4)

State 1: _____

State 1: _____

3.4 The operating system is responsible for memory management.

3.4.1 Describe TWO memory management functions that must occur. (2)

Function 1: _____

Function 2: _____

3.5 Operating systems use different processing techniques to handle many tasks at the same time.

Explain how an operating system working with a multicore processor incorporates **multiprocessing** and **multithreading** for maximum performance. (4)

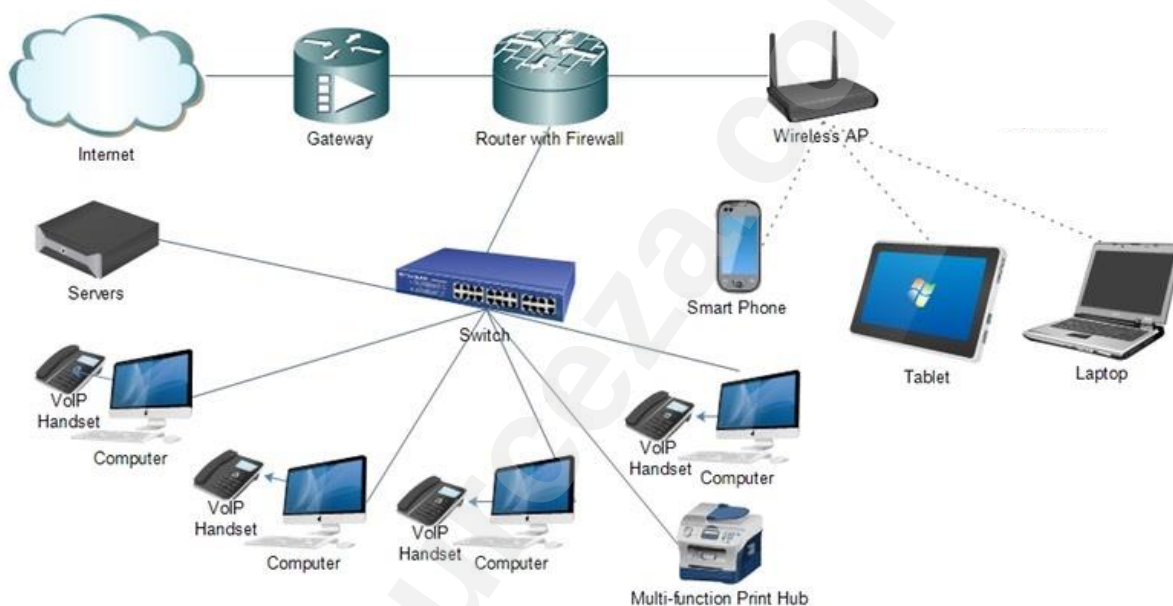
SECTION B NETWORKS

QUESTION 4

33 MARKS

Amanda has a part time job at XYZ Creative Printers. It is a commercial printing shop that employs graphic designers and has a number of large format printers attached to the network. The image below shows the basic layout of the network.

Basic Secure Network Diagram



4.1 A star topology is used within the network above.

4.1.1 Give TWO advantages of a star topology. (2)

Advantage 1: _____

Advantage 2: _____

4.1.2 Describe the function of each of the following devices in the network. (4)

Switch: _____

Network Interface Card: _____

4.2. Name and describe another topology that can be used in a LAN. (3)

4.3 The **LAN** has a wired and wireless component.

4.3.1 Name TWO types of cabling that can be used in the **wired** portion of the LAN. (2)

4.3.2 List TWO factors, other than cost, that they need to consider when choosing suitable cabling. (2)

Factor 1: _____

Factor 2: _____

4.4 When Amanda comes to work she will connect to the network using wireless technology.

4.4.1 Identify TWO advantages, other than cost, of using wireless technology rather than a cabled network. (2)

Advantage 1: _____

Advantage 2: _____

4.4.2 Which network device makes it possible to connect to the network wirelessly? (1)

- 4.4.3 One of the devices that could be used to connect to a wireless network would be a smartphone. Name and describe TWO different wireless methods used by a smartphone for transferring data. (4)

Method 1: _____

Method 2: _____

- 4.5 The network above makes use of **protocols**.

- 4.5.1 What is a protocol? (1)

- 4.5.2 What would the users of the network be **doing** if they were using the following protocols? **You must refer to the scenario.** (4)

HTTP: _____

FTP: _____

TCP/IP: _____

SMTP: _____

- 4.6 The diagram shows both a router and a gateway. Are both necessary to connect to the Internet? Justify your answer. (3)

4.7 The LAN will make use of Ethernet Technology.

4.7.1 Name two features of Ethernet technology. (2)

Feature 1: _____

Feature 2: _____

4.7.2 Explain how CSMA/CD works. (3)

SECTION D

SYSTEM TECHNOLOGIES

QUESTION 5

21 MARKS

XYZ Creative Printers studio needs a program to calculate the cost for the printing jobs they receive.

- They charge 55c per A4 page
- They charge 115c per A3 page
- When a client requests back to back printing the printing cost will be 80% of the calculated cost.
- paperSize is stored as a integer : A4 = 4
A3 = 3

They are going to use java to develop the program using object-oriented principles. They will make use of a PrintJob class.

You are given the class diagram for the PrintJob class below.

PrintJob	
- jobName	: String
- doubleSided	: boolean
- pageCount, numCopies	: int
- paperSize	: int
+ Constructor ()	
+ Constructor (String jn, int pc, int nc int ps, boolean ds)	
+ setJobName (String newJob)	
+ getPageCount : int	
+ setPageCount (String inPageCount)	
+ calcPrintJobCost : double	
+ toString() : string	

5.1 The class diagram illustrates the use of encapsulation. Define encapsulation.

(2)

5.2 Define an accessor method.

(2)

5.3 Give an example of each of the following from the class diagram: (2)

a) accessor method

b) mutator method

5.4 Constructors.

5.4.1 What is the purpose of a constructor method? (2)

5.4.2 The class diagram shows that the constructors are overloaded.

a) Define the term overloading (2)

b) What is the advantage of overloading a constructor? (1)

5.5. You are given the following algorithm for the method **calcPrintJobCost**. (10)

```

1  begin calcPrintJobCost
2  if (paperSize = 4)
3      cost ← 0.55
4  else
5      cost ← 1.15
6  endif
7  cost ← cost * pageCount * numberOfCopies
8  if (doubleSided)
9      cost ← cost * 0.8
10 endif
11 return cost
12 end

```

Create a trace table to test the algorithm using the following values

```

papersize = 4 (A4)
pageCount = 110
numberOfCopies = 5
doublesided = true

```

Line No	paper size	cost	papersize=4?	page count	numberof copies	double sided	doublesided =true?

QUESTION 6**8 MARKS**

6.1 This year you have learnt four sorting methods. Some are more efficient than others.

a) Explain in ENGLISH how the bubble sort works. (4)

b) Explain how the bubble sort with a flag is more efficient than the bubble sort. (2)

6.1 Explain why the binary search is significantly more efficient than any search that terminates once the element is found. (2)

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