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ST BENEDICT'S COLLEGE



SUBJECT	Information Technology
GRADE	11
EXAMINER NAME	Mrs Kench
CLASS	

PAPER

DATE

MARKS

MODERATOR

DURATION

Theory

July 2016

120

2 hours

COGNITIVE LEVELS

**LOW
ORDER**

50 %

**MIDDLE
ORDER**

25 %

**HIGH
ORDER**

25 %

Instructions

Write your answer on this paper in the spaces provided.

	Q 1	Q 2	Q 3	Q 4	Q 5	Q 6	Total
Possible Marks	10	10	28	18	18	38	120
Actual Marks							

SECTION A

QUESTION 1

TERMINOLOGY

10 MARKS

Match the definition in Column A with the term in Column B.

Give the number and matching letter e.g. 1.1 C

Column A		Column B	
1.1	The original code file written by the programmer with the .java extension.	A.	Interrupt
1.2	A signal that prompts the operating system to stop work on one process and start work on another.	B.	Source code
1.3	The part of the CPU that directs and coordinates most of the motherboard's activities	C.	SMTP
1.4	Increasing the speed of the system clock to improve the computer's performance.	D.	NIC
1.5	A protocol for sending email on port 25.	E.	Overclocking
1.6	A hardware address that uniquely identifies each node of a network.	F.	Object code
1.7	A protocol for securely sending web sites.	G.	MAC address
1.8	A wireless technology for sending data over short distances creating a PAN.	H.	Clock Multiplication
1.9	The hardware device that connects a computer to a LAN.	I.	Bandwidth
1.10	The process of recognising a device without turning off the computer.	J.	POP3
		K.	IP address
		L.	HTTPS
		M.	Control unit
		N.	Bluetooth
		O.	HTTP
		P.	Hot swapping
		Q.	Hotspot

Write your answers in the blocks below:

1.1		1.2		1.3		1.4		1.5	
1.6		1.7		1.8		1.9		1.10	

QUESTION 2**TERMINOLOGY****10 MARKS**

Write down the definition for each of the terms below:

2.1 Compiler

(2)

2.2 Interpreter

(2)

2.3 Crosstalk

(2)

2.4 Address Resolution Protocol

(2)

2.5 Wireless Mesh

(2)

SECTION B**SYSTEM TECHNOLOGIES****Scenario**

A new coding academy has been set up with corporate sponsorship, to help develop inspiring programmers and fill a growing need for skilled IT professionals in the market.

The academy has been set up in the city centre over two floors of a building. The first floor has a computer centre of desktop computers for the students learning programming. The code academy has employed facilitators to help the students if they experience difficulties.

The second floor is occupied by the administrative staff.

Refer to this scenario when answering the following questions:

QUESTION 3**HARDWARE****28 MARKS**

The academy is about to receive a new intake of student programmers and are reviewing the hardware specifications for the desktop computers they have just purchased.

Examine the hardware specifications below and answer the questions that follow.

3.2GHz quad-core Intel Core I5
 8GB (two 4GB) of 1867MHz DDR3 memory;
 1TB (7200-rpm) hard drive OR 256GB SSD
 AMD Radeon R9 M380 graphics processor with 2GB of GDDR5 memory.
 Four USB 3 ports (compatible with USB 2)
 10/100/1000BASE T Gigabit Ethernet (RJ-45 connector)

3.1 The chipset of the motherboard has two main components. The Northbridge and the Southbridge.

3.1.1 Describe the function of each of these components. (2)

3.1.2 For each of the components, identify a device or component in the hardware specifications that will be connected to it. (2)

Northbridge:
Southbridge:

3.2 The Core I5 processor has 8MB of L2 cache.

3.2.1 What is the function of processor cache? (2)

3.2.2 The concept of caching is frequently used in computers. Provide TWO other uses of caching and explain how each works. (4)

3.3 Name the FOUR steps of the machine cycle. (4)

3.4 The specifications allow the buyer to choose between a hard drive OR a Solid State Drive (SSD).

3.4.1 Give ONE distinguishing feature of each type of drive. (2)

Hard Drive:
SSD:

- 3.4.2 Which type of drive would you recommend as the most appropriate choice for the developers? Justify your choice using the scenario. (2)

- 3.5 Explain why desktop computers have been selected for the developers over a laptop or a tablet. Provide TWO reasons in your answer. (2)

- 3.6 The BIOS is still required in a computer system today. Motivate the need for the BIOS by stating TWO important tasks it performs. (2)

- 3.6.1 Many students confuse BIOS with CMOS. Define CMOS. (2)

- 3.6.2 Explain how CMOS and BIOS are using during the Power On Self Test (POST). (2)

- 3.7 The hardware specifications include the details of a GPU. Give TWO benefits of having a GPU. (2)

QUESTION 4

SYSTEM SOFTWARE

18 MARKS

- 4.1 List THREE functions the operating system must achieve for process management. (3)

- 4.2 Describe how interrupts are used to achieve multiprocessing. (3)

- 4.3 The processor listed in the hardware specs is a quad-core processor.

- 4.3.1 Explain the terms multiprocessing and multithreading. (4)

- 4.3.2 Explain how can multiprocessing and multithreading work together to improve the speed of processing instructions in a quad-core processor. (2)

- 4.4 The hardware specifications list 8 GB (two 4GB) DIMMS of RAM, however with an extra 2 DIMM slots.

Two of the developers are having an argument. John says that rather than getting extra RAM he is just going to configure extra virtual memory.

Peter disagrees with him and says he would rather pay for extra RAM.

- 4.4.1 What would the effect of adding extra memory be on the speed of the computer? (1)

- 4.4.2 Explain what virtual memory is and how it is used. (3)

- 4.4.3 Which viewpoint would you support? Why? (2)

QUESTION 5**NETWORKS****18 MARKS**

The computers at the academy need to share an internet connection: therefore, the computers will be networked.

5.1 Different topologies may be used to set up a cabled Ethernet LAN in the coding academy.

5.1.1 Draw a labelled sketch to illustrate the layout of the devices in a star topology. (3)

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5.1.2 Give TWO reasons why a star topology is used in most modern LANs. (2)

5.1.3 Name ONE other type of topology that can be used in a LAN. (1)

5.1.4 It has been suggested that fibre would be a good cable type to use within the LAN. Give TWO reasons why this is NOT a good idea. (2)

5.2 For each of the statements below, match the appropriate device from the following list:

access point, router, switch, server

5.2.1 A computer that is dedicated to managing network resources. (1)

5.2.2 A device that allows wireless connections to a network. (1)

5.2.3 A device that is used to network multiple computers together. It delivers the message to the intended destination. (1)

5.2.4 These devices connect networks with the same protocol. (1)

5.3 Give ONE advantage and ONE disadvantage of a WLAN compared to a cabled LAN. (2)

- 5.4 The directors of the academy have created a web site to advertise to their academy. They want the web site to be viewed on any device. Name TWO functions that the web browsers of the mobile devices need to be able to perform so that the web site can be successfully viewed. (2)

- 5.4.1 If the academy provides wireless connectivity, what would be the best wireless security protocol to use? Justify your answer. (2)

QUESTION 6

SOLUTION DEVELOPMENT

36 MARKS

- 6.1 The administrator create a Student class to store the details of each student and represents this class using a UML diagram. Examine the diagram and answer the questions that follow.

Student
- name : String - address : String - dob : String
+ getName (): String + setAddress(newaddress : String) + checkDOB (int month, int day) : boolean + toString (): String

- 6.1.1 Write down the name of the accessor method using the class diagram. (1)

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- 6.1.2 Write down the name of the mutator method using the class diagram. (1)

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- 6.1.3 The fields in the diagram are indicated to be private using the – sign. What does the + for the methods declaration? (1)

- 6.1.4 Why is it good practise to make to make fields private? (2)

- 6.1.5 The constructor is missing from the class diagram. What is the purpose of the constructor? (2)

- 6.1.6 Write down the method header in Java of the parameterised constructor method. (2)

- 6.1.7 The checkDOB () method needs to determine if the student has a birthday on a given day. The month and day will be sent as a parameters and the method will return true if the month and day are the same for the student's date of birth field (dob). The dob field is in the format yy/mm/dd. A method call to this method to check if a person is born on the 14th February using the Student object sObj would be

boolean bDay = sObj.checkDob(2,14);

Complete the Java method below.

(6)

```
public boolean checkDOB(int month, int day)
{
}
}
```

6.2 Sorting an array.

Write down the name of the sort that is described below.

- 6.2.1 For each pass through the array, the sort compares adjacent elements and swaps them with the smallest element progressively moved to the end of the array.

(1)

- 6.2.2 The sort takes the first element and then searches the rest of the array for the position of the smallest element, and then swaps the first element with the element indicated by the position. The process is repeated for the next element in the array after the first.

(1)

6.2.3 A programmer has a large array that is mostly sorted. Only one element is out of place. A bubble sort with a flag would be an efficient choice to sort this array.

a) Explain how a bubble sort with a flag works. (4)

b) How could a bubble sort with a flag efficiently to sort the large mostly sorted array? (2)

6.3 The administrator wants to create an array class to store all the students using an array of Student objects.

6.3.1 Write down the declaration of the array and a field to record the number of elements in the array. (4)

6.3.2 Explain why a parallel array would not be a suitable data structure for this solution. (2)

- 6.3.3 A method is needed in the array class to count the number of birthdays on the 14th February. Write down a Java method called countBDay() to return the number of birthdays on the 14th February as an integer. (7)

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EXTRA SPACE FOR QUESTIONS – WRITE DOWN THE QUESTION NUMBER NEXT TO YOUR ANSWER.

