ST BENEDICT’S COLLEGE



**INFORMATION TECHNOLOGY**

**NOVEMBER THEORY EXAMINATION**

**GRADE 11**

**MARKS:** 120 **TIME:** 2 hours

**EXAMINER:** Mrs D Kench

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**INSTRUCTIONS**

1. Ensure that your name appears on all folio sheets.
2. Answer all the questions on the folio paper - labeling your answers clearly.
3. All descriptions are to be brief and concise.
4. Use the mark allocation for each question to guide your answer length.
5. Calculators may not be used.
6. Read each question carefully!

|  |  |  |
| --- | --- | --- |
| QUESTION | POSSIBLE MARK | ACTUAL MARK |
| 1 | 10 |  |
| 2 | 21 |  |
| 3 | 7 |  |
| 4 | 11 |  |
| 5 | 33 |  |
| 6 | 24 |  |
| 7 | 14 |  |
| TOTAL | 120 |  |

**QUESTION 1 MULTIPLE-CHOICE QUESTIONS**

Various options are given as possible answers to the following questions. Choose the answer and write only the letter (A – D) next to the question number.

1.1 An approach to information technology in which departments and divisions of a company maintain their own information systems can be referred to as a …approach.

A centralised

B decentralised

C department/division

D head office (1)

1.2 A popular file format that refers to a version of a readable word document that looks exactly like the printed version, but is independent of the word processor that was used to create the document, is known as a … file.

A pdf

B pdl

C exe

D wav (1)

1.3 Overflow …

A occurs when you type too much information into a string variable.

B occurs when an integer is placed in a variable type used to represent real numbers.

C occurs when the result of a division is an extremely small fraction.

D occurs when a numerical result exceeds the range of the variable type which is being used to represent it. (1)

1.4 A virtual office is one ...

A that uses a LAN and intelligent terminals.

B where employees never enter a physical office, but rather conduct their business via the Internet.

C that implements virtual memory in a LAN using a suite of office software.

D that can only be used in a metropolitan area network (MAN). (1)

1.5 … are text files containing information about web pages you have visited.

A Web browsers

B Style sheets

C Cookies

D RSS feeds (1)

1.6 A … is a computer attached to a network that has had its security compromised and as a result is remotely controlled for a purpose other than what it was intended for.

A bot

B puppet

C Trojan horse

D zombie (1)

1.7 Software that monitors each keystroke a user types on a specific computer's keyboard, is referred to as …

A spyware.

B adware.

C a keylogger.

D a popup. (1)

1.8 … is a RAID storage technique that splits data, instructions and information across multiple disk drives.

A Striping

B Streaming

C Mirroring

D Partitioning (1)

1.9 A public wireless network that provides Internet access to mobile computers and handheld devices is referred to as a(n) …

A cybercafé.

B kiosk.

C hot spot.

D ISP. (1)

1.10 Validation is ...

A the process of checking if data satisfies a given criterion.

B not necessary for data input.

C the process of normalising a database.

D used to prevent errors in a spreadsheet when data is imported from a database. (1)

**[10 Marks]**

**QUESTION 2**

The Department of Welfare has embarked on a project to establish youth centres throughout the country. These centres will consist of facilities to support the improvement of computer literacy skills, crisis management, health issues and careers. You have been invited to be part of the planning committee to assist with the information technology part of establishing the youth centres.

2.1 The committee wants to know what hardware, apart from cables, will be required to set up the network. Motivate why EACH of the following items are required by briefly explaining the function of each item in a network:

(a) Network interface cards (3)

(b) Switch or hub (2)

2.2 Fibre-optic cables are mentioned by one of the committee members as an option to connect the computers in each centre. Explain why UTP cables, rather than fibre-optic cables, will be better suited to this application. (2)

2.3 You suggest that the network to be used should be a client-server network.

(a) Name an alternative type of network to a client-server network. (1)

(b) Give TWO reasons why a client-server network would be better suited for a centre than the other type of network that you named in QUESTION 2.3.(a). (2)

2.4 The computers will be connected with the Ethernet architecture.

(a) Explain how CSMA/CD provides rules for data to be transmitted. (3)

(b) List three topologies and select one that would be most likely used for a LAN. (4)

2.5 The committee is investigating the possibility of connecting all the youth centres in the country into a wide-area network (WAN).

(a) You are recommending the use of routers to set up the WAN. Motivate your recommendation by naming TWO advantages of routers. (2)

(b) Cables or wireless communication channels can be used in a WAN. Name TWO advantages of using wireless media for this WAN. (2)

**[21 Marks]**

**QUESTION 3: e-COMMUNICATION**

A pilot youth centre is set up with ten computers linked into a client-server network. Your task is to convince the committee to allow the centre to access the Internet. 3.1 The committee is concerned about some issues relating to the Internet.

3.1 Do you think it will be a good idea to give each youth member who uses the centre an email address with the youth centre as a domain name? Motivate your answer and explain the significance of the domain name. (4)

3.2 Each youth member has a cell phone; some have Blackberry’s, others have simple cell phones and 1 was donated an iPhone. The youth leader wants them to be able to communicate with each other using instant messaging. One member says that they can use BBM.

(a) Explain why this solution can be considered as creating a ‘Digital Divide’. (1)

(b) What cost effective solution would you suggest as a means of communication? (2)

**[7 Marks]**

**QUESTION 4: SOCIAL AND ETHICAL ISSUES**

The members of the committee insist on a workshop to educate the youth about legal issues surrounding the use of the Internet. As the IT person on the team, you are responsible to formulate relevant information to present at the workshop.

4.1 Differentiate between the terms *unethical* and *illegal* in terms of computer use. (2)

4.2 Define each of the following concepts:

(a) Copyright (1)

(b) Plagiarism (1)

4.3 Computer crime using the Internet is on the increase. Explain the following types of computer crime:

(a) Identity theft (1)

(b) Phishing (1)

4.4 The pilot centre has created a website to promote its activities and to encourage more public participation.

(a) State ONE way that the centre can earn revenue from the website. (1)

(b) Do you think it is wise to have a blog on the website where the public can enter comments? Motivate your answer. (2)

4.5 The youth centre must promote the concept of 'green computing'. Name TWO good habits that computer users must practise to ensure that this concept is encouraged. (2)

**[11 Marks]**

**QUESTION 5**

The youth centre has created its own website. The website of the youth centre contains resources for selecting a career, informative videos for download and articles related to HIV/Aids, relationships and other topics related to young people.

5.1 The youth centre has hosted their website on one of their own servers at the centre. This ensures that they are in control of the server hosting their site at all times.

5.1.1 Which protocol (give the full name) will be used to transmit the website data when another computer on the Internet requests information from the website on the youth centre's server? (2)

5.1.2 Explain why the youth centre would still require an account with an ISP even though it is hosting its own website. (1)

5.1.3 The youth centre currently has a 3GB cap on their ADSL account. One of the advantages of DSL is that it transmits at fast speeds on existing standard copper wiring. What is the specific advantage of ADSL which makes it suitable for Internet access? (2)

5.1.4 The youth centre is concerned that providing videos on its website will use too much of its bandwidth.

(a) Explain the meaning of the term *bandwidt*h. (2)

(b) Suggest a solution which will allow the centre to have videos on its website without using its own bandwidth. (2)

5.2 The youth centre manager has been told that if he has a URL for the website then he does not need to use the numerical IP address anymore. The manager chooses the URL http://www.youthlifecentre.org.za.

(a) When he visits the login page on the website, why does the manager see 'https' at the beginning of the URL instead of 'http'? (2)

(b) The manager needs to know whether he can use the same domain name for both the website and his e-mail address. Explain whether or not he can use the same domain name for both. (2)

(c) Explain why the youth centre's website needs both the numerical IP address as well as the URL. (2)

5.3 The designers of the website want to use pop-ups on the website.

(a) What is a pop-up? (1)

(b) Most web-browsers block pop-ups by default. Explain why most web browsers do this. (2)

5.4 The youth centre wants to provide a user portal for young people who use the website. This portal should allow young people to login to the site with a username and password and contribute their own content to a wiki. They will also be able to participate in online discussions on various topics including HIV/Aids and relationships.

(a) You insist that the website content includes a privacy policy. What type of information should be made clear to users in a website's privacy policy? (2)

(b) What is a wiki? (2)

(c) The youth centre needs to make a decision on whether to publish a user's full name or just its username when it contributes to an online discussion on the website. State whether you think it should show usernames or full names on the discussion forum. Justify your answer. (2)

5.5 The committee members are curious about the way e-mails are sent and received. Explain the concept packet switching. (4)

5.6 It will be difficult to find sponsors for the youth centre. Some of the committee members want to investigate the possibility of using the centre for e-commerce in order to generate income.

(a) Explain what e-commerce is. (1)

(b) Name TWO advantages of e-commerce for the youth centre. (2)

(c) Name TWO of the negative aspects of e-commerce. (2)

**[33 Marks]**

**QUESTION 6: ALGORITHMS AND PLANNING**

The youth centre has a collection of resources with information and advice on careers. They want to have a database of these resources so that young people can easily get access to the information.

6.1 A comma-separated file called resources.csv has been created which contains a list of all the resources. In a comma-separated file the fields are separated by means of commas. A sample of the contents of the file is as follows:

ResourceID,Title,ResourceType,Publisher,Contact

1,Engineering Careers,Book,Max McMillan,011 456 3212

2,Choosing a Degree,Website,SA University Council,033 456 3452

3,Becoming a Medical Practioner,Book,WHO,021 678 1244

4,Learning a Trade,Website,Artisans SA, 013 553 1123

5,Becoming a Teacher,Website,Education4All,012 948 4432

(a) How many different fields does each entry in the file have? (1)

(b) What is the purpose of the first line in the file? (2)

(c) Besides a comma, give another character that we use to separate the fields in a text file? (1)

6.2 You are required to develop software to process the .csv file (referred to in QUESTION 6.1) and to store the resulting data. You develop a simple high-level algorithm that can be used to process the file:

1. Enter the file name from the keyboard

2. Open the file for input

3. Read each line of data from the file

4. Extract each piece of data from the line

5. Store the data that has been extracted

6. Close the file

(a) In line 1 of the given algorithm the user has to enter the name of the file. Assume that the user has entered the correct filename. Give ONE possible error that may still occur when line 2 of the algorithm is executed, that is when trying to open the file. (1)

(b) Assume that the user has entered the wrong filename. Indicate any TWO appropriate actions that your software should perform in order to handle this error. (2)

(c) To read the data from the file one line at a time you need to use a loop. You have to choose between a counting (for) loop or a conditional (while) loop. Explain why you would rather choose a conditional loop. (2)

(d) When extracting the contact number from each entry in the file, which data type would you use for the variable to store the contact number? Explain your choice. (2)

6.3 One of the requirements when writing programming code is that it should be easy for other programmers to maintain. Two techniques that can be used to write easily maintainable code are object-oriented programming and good programming conventions.

6.3.1 Give TWO advantages of using object-oriented programming when there are multiple developers involved in coding a piece of software. (2)

6.3.2 Object-oriented programming makes use of encapsulation. Give a definition of encapsulation. (2)

6.3.3 Indicate whether the following statements about object-oriented programming are TRUE or FALSE:

(a) You can have only one object for each class that you write. (1)

(b) Methods in a class can have the same name as long as their parameters are different. (1)

(c) It is not possible to have an array as an attribute in a class. (1)

6.3.4 The algorithm given below searches an array (called c) of ten strings for all occurrences of the word Career and displays the word each time it is found.

**LINE**

**1** a 🡨 0

**2** b 🡨 ''Career''

**3** LOOP WHILE a < 10

**4** IF c[a] EQUALS b

**5** DISPLAY c[a]

**6** END IF

**7** a 🡨 a + 1

**8** END LOOP

The algorithm given is difficult to read because it does not follow good coding conventions. Rewrite the entire algorithm and apply good coding techniques so that it is easier to read and understand. (4)

6.3.5 Give TWO reasons why programmers might make use of comments in their code. (2)

**[24 Marks]**

**QUESTION 7: DATA REPRESENTATION**

7.1 Represent -65 in 8 bits using:

(a) Sign and size (2)

(b) Twos Complement (2)

7.2 Explain why we do not use sign and size to represent numbers. (2)

7.3 Calculate the largest and smallest number that be represented in 10 bits if:

(a) the number is signed (4)

(b) the number is unsigned (3)

**[13 Marks]**

**TOTAL 120**