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**INFORMATION TECHNOLOGY IN A GLOBAL SOCIETY
HIGHER LEVEL
PAPER 2**

Tuesday 16 November 2010 (morning)

2 hours

INSTRUCTIONS TO CANDIDATES

- Do not open this examination paper until instructed to do so.
- Answer three questions.

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Answer **three** questions.

Area of impact: Education / Health

1. The Kindle is an electronic book (e-book) reader that has been developed by *Amazon.com* for purchasing and downloading their e-books. Over 230 000 e-books are available for the Kindle. An e-book can be downloaded directly to the Kindle using the same 3G wireless technology used by cell (mobile) phones. All of the e-books that a customer purchases are listed in the customer’s personal online *Amazon* record and can be downloaded again if necessary. Customers can also access blogs and subscribe to newspapers that are downloaded automatically to the Kindle.

Features of the Kindle include:

- supports a range of formats for documents (TXT, DOC, PDF, HTML and AZW which is specific to the Kindle), graphics (JPG, GIF, PNG), and audio (AA, MP3)
- ability to search for a word or phrase through all the e-books stored on the Kindle
- notes can be added to the text or in the margins using the Kindle keyboard and these can be exported
- pages can be bookmarked for future use
- built-in dictionary and wireless access to *Wikipedia*.

[Source: <http://amazon.com/Kindle-Amazons-Wireless-Reading-Generation/dp/B00154JDAI>, 3 July 2009]

- (a) Identify **two** methods that can be used to create a PDF file from a file saved in DOC format. [2 marks]
- (b) A customer is already registered at *Amazon.com* as an e-book customer. Describe a step-by-step process that could be used by the customer to login, purchase and download an e-book from the *Amazon.com* server directly to their Kindle. [4 marks]
- (c) Explain **two** features that could be included in the Kindle to allow improved access to e-books by persons with impaired vision. [4 marks]
- (d) Instead of purchasing printed textbooks, the Bay City International School is considering providing all IB teachers and their students with a Kindle and e-books. Discuss the advantages and disadvantages, for IB students, of using the Kindle and e-books instead of printed textbooks. [10 marks]

Area of impact: Politics and government / Arts, entertainment and leisure

2. Photo editing is often used to improve the appearance of photos that are published in print or posted on the Internet. Organizations such as the *National Press Photographers Association* have published a “Digital Manipulation Code of Ethics” that states: “As journalists we believe the guiding principle of our profession is accuracy; therefore, we believe it is wrong to alter the content of a photograph in any way that deceives the public.”

[© National Press Photographers Association 2010 www.nppa.org. All Rights Reserved.]

Recently, the following photo showing missile testing with four missiles (Image 1) was replaced with the correct photo showing three missiles (Image 2).

Image 1

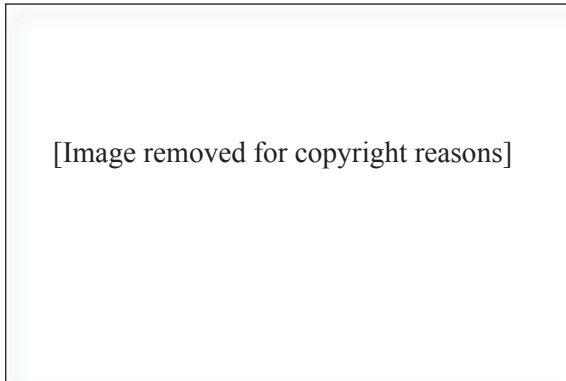
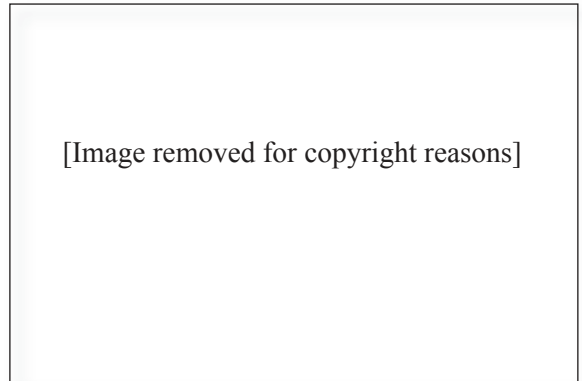


Image 2



[Source: <http://thelede.blogs.nytimes.com/2008/07/10/in-an-iranian-image-a-missile-too-many/?hp>, 4 July 2009]

Some mischievous persons quickly responded to the political situation and posted the following photo on the Internet (Image 3).

Image 3



[Source: <http://snappedshot.com/archives/2408-BWAHAHAHA-More-Iranian-Faux-tography-REALtography.html>. Used with the permission of the creators.]

(This question continues on the following page)

(Question 2 continued)

- (a) Identify **two** file formats that are used to post images on the Internet. *[2 marks]*

- (b) Describe **two** different graphics techniques that could be used to create the photo in Image 3 by using elements from the photo in Image 1 or from other digital sources. *[4 marks]*

- (c) Publishers, such as *News Magazine*, may use the same photos in both their weekly colour magazine and on their web site. Explain the problems that may arise in the weekly colour magazine or on the web site from trying to use the same image files for both purposes. *[4 marks]*

- (d) Private individuals often eyewitness news events as they occur. Using cell (mobile) phones they can immediately capture a photo and post it to a public web site. This type of posting is very different from the reporting of a news photographer to a news agency, which follows well-defined processes for editing and submitting photos.

Discuss the ethical implications of an amateur photographer posting images to a public web site. *[10 marks]*

Area of impact: Science and the environment

3. David Hanson, Chief Executive of *Hanson Robotics Inc*, is a leader in creating robots that are among the most advanced in the world. He has created Jules, an example of a “social robot” that uses artificial intelligence, integration of natural language processing, automatic speech recognition and text-to-speech. It is possible to have a natural, interactive conversation with Jules. Frubber is an elastic material that has been developed by *Hanson Robotics Inc* which looks like natural skin and makes Jules’ realistic facial movement and speech possible.

Jules also uses “computer vision” through a device in his eye which captures the image of the person talking to him. “Computer vision” includes face recognition and face tracking to simulate complete verbal and non-verbal interaction, such as maintaining eye contact and turning the head to follow the movement of the human to whom Jules is talking.

David Hanson also teaches his robots their history, vocabulary, and develops their basic “personality”, either based on a real person or an imaginary character. Hanson’s robots have been used in games and toys, research and psychiatry scenarios, military training and animations.



[© Hanson Robotics Inc. Reproduced with permission.]

- (a) Identify **two** input devices that are required in order for Jules to interact with a real person. [2 marks]
- (b) Describe the steps that Jules would take in order to follow the movement of the person talking to him. [4 marks]
- (c) Jules may have difficulty understanding a sentence in a conversation with a human. Explain why this could happen. [4 marks]

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(Question 3 continued)

- (d) The organizers of an important tennis tournament are considering using a robot similar to Jules, named Tennis-Umpire, for the purpose of umpiring some of the games. This robot, which remains seated throughout the match, uses its own cameras to analyse the game and then communicates its decisions to the human spectators using speech.



[Image reproduced by permission of Mark Chandler, UK Student Life]

Evaluate whether the organizers should go ahead with this decision to replace human umpires with robotic umpires such as Tennis-Umpire.

[10 marks]

Area of impact: Business and employment

4. The recording industry is taking court action against private individuals and peer-to-peer (P2P)* file sharing services that are involved in the illegal downloading of music files.

A US federal jury has found a woman guilty of sharing copyrighted music online, and ordered her to pay US\$222 000 in damages to the six record companies represented by the *Recording Industry Association of America*.

The woman had downloaded 24 songs without permission and shared them online through a P2P file sharing account. However, the woman denied the charges and testified that she did not have an account. During the trial, the woman’s Internet service provider (ISP) presented evidence that copyrighted songs were offered by the woman as a P2P file sharing user under the name “tereastarr”.

[Source: <http://cbsnews.com/stories/2007/10/04/national/main3330186.shtml>, 4 July 2009]

* peer-to-peer (P2P): technology that allows Internet users to locate each other through the use of an online server and exchange files directly between their computers

- (a) Identify **two** characteristics of a P2P network. [2 marks]
- (b) Users of illegal P2P file sharing networks run the risk of downloading viruses. Describe **one** indication that a computer has a virus and **one** preventative measure that a user can take to avoid viruses on their computer. [4 marks]
- (c) Explain **two** kinds of evidence that could have been presented in court to prove that copyrighted songs were offered by the woman using a P2P file sharing account. [4 marks]
- (d) A range of online solutions have been developed to provide customers with legal access to music files.

To what extent have online solutions been made available to meet customers’ needs? Use specific examples in your response. [10 marks]