J A M E S   R U S E
AGRICULTURAL HIGH SCHOOL

2009
HIGHER SCHOOL CERTIFICATE
INTERNAL EXAMINATION

Information Processes and Technology

HSC TRIAL ASSESSMENT TASK

General Instructions
- Reading time – 5 minutes
- Working time – 3 hours
- Write using black or blue pen
- You must provide your own writing paper
- Draw diagrams using pencil
- Mark allocations are provided for each question

Total marks – 125

(Section A)   Pages 2–7
20 marks
- Attempt Questions 1–20
- Allow about 25 minutes for this section

(Section B)   Pages 8–17
105 marks
- Attempt Questions 21–26
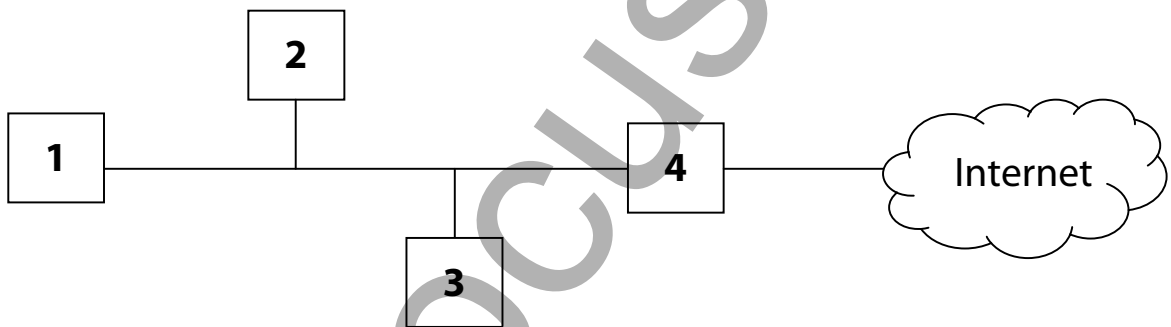- Allow about 2 hours 35 minutes for this section

SECTION A
Multiple Choice

1. A department store has abandoned its proposed internet shopping website because the website would discourage customers from using the physical department store.

   Which if the following best describes the reason why this decision was made?

   A. The website was not technically feasible.
   B. The website was not economically feasible.
   C. There was insufficient time to implement the website.
   D. The website did not fit the objectives of the department store.

2. In the following diagram, the boxes represent devices on a network.

   Which device on this network represents a router?

   A. 1
   B. 2
   C. 3
   D. 4

3. Which of the following are ALL tools that help overcome physical boundaries to enable virtual organisations?

   A. Email, decision tree, video-conferencing
   B. An intranet, the internet, teleconferencing
   C. Gantt chart, file sharing, web-conferencing
   D. Chat rooms, discussion groups, system flowchart

Use the following information to answer Questions 4–7.

The Sheriff's Office in NSW is responsible for organising citizens to participate as members of juries for court cases. Courthouses are located in Sydney and regionally throughout NSW. A relational database is used by the Office in Sydney to record names, contact details, previous jury service and the court in which that citizen is a juror. This central data can be accessed by each courthouse in the state via a network.

4. An entity forms part of the schema for any relational database. Which of the following are examples of possible entities for this database?

   A. The first and second names of jurors
   B. The computer running the database and the file server hosting it
   C. The juror and the court
   D. The link between court case and juror and the link between juror and court number

5. Which of the following is an example of a suitable key field for the juror table?

   A. Jury members' surnames
   B. Jury members' first names combined with their surnames
   C. Jury members' date of birth combined with surnames
   D. An invented numeric code uniquely assigned to each jury member

6. Due to the nature of the data stored within it, help desk operators must often perform urgent and accurate searches of the database.

   Which of the following is a suitable search method?

   A. Trained database managers to perform the searches
   B. Query by example (QBE)
   C. Prepared reports
   D. Structured query language (SQL)

7. Network communication between the courts and the Sheriff's Office has been established. This network is known as which of the following?

   A. An Ethernet network
   B. A WAN
   C. A LAN
   D. An ISDN network

8. Two nodes on a LAN attempt to communicate at the same time. A collision occurs.

    Which of the following correctly outlines what will take place after the collision so that eventually both nodes communicate successfully?

    A. Each node waits for a free token before attempting to communicate.
    B. Each node waits a random amount of time before checking if a token is free.
    C. Each node waits a random amount of time before attempting to communicate.
    D. Each node waits until it has permission to communicate from the network controller.

9. In October 2006, the rock band Wolfmother streamed the first live concert to mobile phones. The show was encoded and compressed, then uploaded to a web server. A journalist reported that during fast sections of the guitar, the audio was distorted and broken.

    What would most likely have caused this distortion?

    A. The speed of the server
    B. Electromagnetic interference
    C. Limitations of mobile bandwidth
    D. Limitations of the speakers in mobile phones

Use the following information to answer Questions 10-11.

The following SQL statement generates a report from a flat file database. The database is used as part of a music store's CD catalogue system.

```
SELECT songcode, artistfirstname, artistsurname, releaseyear,

FROM songfile

WHERE releaseyear=2007 AND genre IS rock

ORDER BY artistsurname DESC
```

10. Which of the following describes the final order of the artists in the report?
    A. Artists alphabetically Z to A by surname
    B. Artists alphabetically A to Z by surname
    C. Songs alphabetically Z to A by title
    D. Songs alphabetically A to Z by title

11. Which of the following statements is true?
    A. Output will be all songs released by each artist in the catalogue
    B. Output will be all rock songs released in 2007 by each artist in the catalogue
    C. Output will be all rock songs released by each artist in the catalogue
    D. Output will be all songs released in 2007 by each rock artist in the catalogue

12. A database stores data about players in an Under 15 basketball team. The field for a player's date of birth only accepts dates in the form DD/MM/YYYY and does not accept dates earlier than 01/01/1994.

    What are two issues addressed here?

    A. Data integrity and the Y2K bug
    B. Data validation and data integrity
    C. Data redundancy and the Y2K bug
    D. Data redundancy and data validation

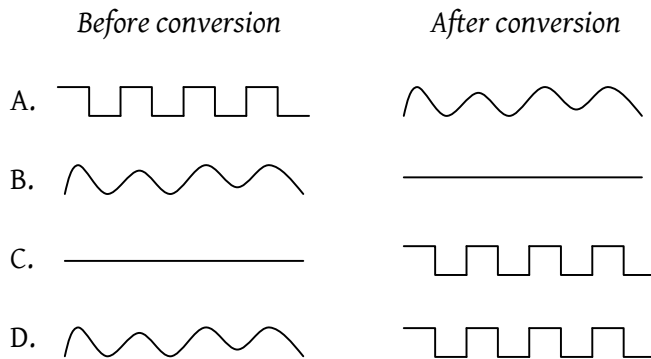13. Sebastian is using an internet search engine to investigate the extinction of the Golden Toad species.

    What search phrase will locate the most relevant information?

    A. "extinction + golden + toad"
    B. extinction + golden + toad
    C. extinction + "golden toad"
    D. extinction – golden + toad

14. The Roads and Traffic Authority uses a secure database in its offices to update information about licensed drivers in New South Wales. This database is accessed by authorised staff at their computer terminals through an online authentication service.

    Which option correctly identifies participants and data/information within this system?

	Participants	**Data/information**
A.	Drivers	Licence number, driver's details
B.	Drivers	Computer terminal, Internet
C.	RTA employees	Licence number, driver's details
D.	RTA employees	Computer terminal, Internet

15. Which of the following graphically represents analogue to digital conversion of a telecommunications signal?

	Before conversion	*After conversion*

A.

B.

C.

D.

16. In 2007, Centrelink installed a new data warehouse that stores detailed information on its clients. This information is available to other agencies in charge of welfare, employment and social policy.

   What technique will allow these agencies to retrieve detailed information from Centrelink's data warehouse?

   A. Data back-up
   B. Data mining
   C. Normalisation
   D. What-if analysis

17. Jean investigates the use of a personal information system to produce party invitations. She is uncertain if she has the software on her computer to produce the invitations. She has only one week to complete the task.

   What feasibilities apply to Jean's situation?

   A. Economic and ethical
   B. Technical and schedule
   C. Operational and technical
   D. Schedule and organisational

18. A free-text search is undertaken on the following hypertext document.

> **Definition of BANDWIDTH**
>
> **In general, <u>bandwidth</u> is associated with telecommunications in which a wide <u>band</u> of frequencies is able to transmit information.**
>
> **Related terms are <u>wideband</u> (a synonym), <u>baseband</u> (a one-channel <u>band</u>), and <u>narrowband</u> (sometimes meaning just wide enough to carry voice, or simply 'not <u>broadband</u>').**

In the free-text search, a * can be used to replace from 0 to 7 characters in a word. Which of the following searches would locate all the words containing 'band'?

   A. *band
   B. band*
   C. *band*
   D. * band *

19. A new online system is being developed to allow doctors to access patient records in hospital wards. Which of the following does NOT relate to potential social and ethical issues of this new system?

   A. Protection of the system from unauthorised access
   B. Inclusion of data validation techniques to ensure only accurate data is entered
   C. Production of user documentation that helps doctors to easily access required data
   D. Production of accurate system design documentation for future system development

20. Which option correctly identifies activities used for testing, evaluating and maintaining an information system?

	Testing	**Evaluating**	**Maintaining**
A.	Checking that the original objectives are met	Using live data	Deciding on a system conversion method
B.	Ensuring performance specifications are met	Checking that the original objectives are met	Applying a software upgrade
C.	Using live data	Checking that the original objectives are met	Creating a prototype
D.	Deciding on a system conversion method	Using live data	Backing up system data

SECTION B

Extended Answer

QUESTION 21 [15 marks]

The organisers of next year's school athletics carnival propose to use information technology to accurately calculate finishing times for all track events. Competitors will have a timing device attached to their shoes prior to each race. Computerised timing mats will be placed at the start and finish lines to record exactly when the runner begins and ends. Results for each race will be uploaded directly to school staff laptops and posted onto the intranet immediately. After the carnival is completed, videos of each race will be uploaded and embedded beside the results, and photos of each of the competitors will also be viewable on each race page.

a. Describe ONE social issue and ONE ethical issue related to the display of results on the school intranet. **[3]**

b. Describe each of the following components in the context of the proposed information system, and explain how these components interact to achieve the goals of the system: **[4]**

- Purpose
- Participants
- Data/information
- Information technology

c. Describe criteria that could be used to judge the success of the new information system and explain how to determine if the criteria have been satisfied. **[4]**

d. After the completion of the athletics carnival, the same technology used to assist with calculating and tabulating the results of each race is repurposed for use in the school's ongoing fitness program. Students are allowed to borrow timing devices and laptops linked to them, in order to record their progress. Software installed on each of the laptops monitors the training of each student and provides statistics including (but not limited to) total distance run, average distance run per training session, average running speed and standard levels of adolescent fitness for comparison. **[4]**

Describe how each of the following processes is integral to the functioning of this new information system:

- Collecting
- Analysing
- Storing & retrieving
- Displaying

QUESTION 22 [19 marks]

Shown below is a screenshot taken from the official website for the popular Channel Ten series, *MasterChef Australia.* Use it to answers parts (a) – (d) on the next page.

Video   Contestants   The Show   Episodes   Recipes   Photos   Trivia   Forums

Latest Episode: The Grand Finale

Three rounds decide who is Australia's first MasterChef.

See more

Recipes
Sage and Garlic Chicken with Celeriac Puree and Sp...

Episodes
The Grand Finale...

Forums
Catch up on the latest hot topics...

Contestant Call
Are you Australia's next MasterChef?...

MasterChef Trivia
How well do you know the show?...

Exclusive Video Recipes

Poh – Sambal Petai and Glutenous Rice Dumpling
Winning Recipes – Sambal Petai and Glutenous Rice Dumpling...

Andre – Loose Polenta and Semolina with Bug Bisque
Winning Recipe – Loose Polenta and Semolina with Bug Bisque...

Justine - Terrine of Zucchini
Winning Recipe –Terrine of Zucchini stuffed with Prawns and Ricotta

More ▶

The Masterclass

Lamb Brain Cereal
Masterclass Recipe - MasterChef...

Lobster Linguine
Masterclass Recipe - MasterChef...

Fried Lambs Brains with Bacon Crumble and Apple Vinaigrette
Masterclass Recipe - MasterChef...

More ▶

SHARE THIS   Type your search here

JavaScript/Standard Tags:

MasterChef Podcast

Q & A with the Judges
Listen to Matt Preston, George Calombaris and Gary Mehigan answer questions from viewers

© Copyright Channel Ten

a. The main image in the centre of the page is 512 by 288 pixels in size, and it is stored in 24-bit colour.

    (i) Demonstrate how to calculate the size of the image, in kilobytes. Explain what each number in the calculation represents. Do NOT calculate the answer. **[3]**

    (ii) Explain why GIF compression would be an unsuitable method to reduce the file size of this image. **[2]**

b. Identify and describe FOUR different multimedia elements displayed on the website. **[3]**

c. Identify the types of software that you would use to design and create a website such as *MasterChef Australia.* Justify your selection of each type of software. **[5]**

d. The *MasterChef Australia* website is an example of the merging of many different media on one website. **[6]**

Identify the developments in hardware and telecommunications that have enabled the integration of media, and discuss the issues and implications of this integration.

QUESTION 23 [21 marks]

Mobile information technology has changed the way people live and function on a day-to-day basis.

a. On June 29, 2007, Apple Inc. released the *iPhone,* an Internet-connected, multimedia smartphone. Its main distinguishing feature was a multi-touch screen, though it also included a digital camera and media player equivalent to a video-playing iPod. It has sold roughly 21 million units worldwide since it was launched, and was named *Time* magazine's *Invention of the Year* in 2007. **[6]**

The iPhone's integration with ubiquitous internet access offers opportunities for users to access multimedia-rich services and content anywhere at any time, such as videos on demand, interactive television, gaming, shopping and online education.

Discuss issues that may arise from the widespread use of these services and content. In your response you may consider aspects such as:

- Ownership of data,
- Changing nature of work,
- Interpersonal and social relationships,
- Equity of access.

b. Jack Dorsey designed the *Twitter* social networking and micro-blogging service in 2006. It enables its users to send and read 140-character text-based messages known as *tweets*. Tweets are displayed on their author's profile page on Twitter's website, and they are also delivered to the author's subscribers who are known as *followers*. Tweets can be published either by sending a mobile phone SMS to the website, or by using the website directly from a computer. The majority of tweets are composed in response to the question, "What are you doing?"

While the service is mainly used for personal purposes, it has also begun to play a key role in breaking news of world events. Information about the Mumbai attacks (November 2008) and the crash-landing of a commercial plane in the Hudson River in New York (January 2009) were transmitted via Twitter before many of the mainstream news channels had the story.

   (i)   Draw a data flow diagram that illustrates the movement of data around the Twitter information system when a user sends a single tweet. **[4]**

   (ii)   Critically analyse the effect of using Twitter on a regular basis. In your response you may consider aspects such as: **[6]**

- Globalisation,
- Virtual communities,
- Privacy,
- Emerging trends in communications.

c. The *Digital Education Revolution* is an initiative of the Australian government aimed at embedding information and communications technologies into Australian schools. Its principal component is the $2.1 billion National Secondary School Computer Fund, which provides netbooks (small laptops) to selected high school students free-of-charge for educational use. **[5]**

To provide internet access for the netbooks, dedicated wireless networks are to be installed in schools nationwide. Consultants have been asked by the Department of Education to prepare a feasibility study for the new networks.

Discuss the issues that should be considered by these consultants. In your response you may consider aspects such as:

- Technical issues,
- Economic issues,
- Staff expertise,
- Other relevant issues.

QUESTION 24 [16 marks]

Use the following information to answers the questions below.

> ## Clever camera promises improved safety
>
> **An Australian company is developing an automotive safety product to detect when a car's driver is likely to fall asleep. The product, called *SleepCam*, is to be mounted on a car's dashboard.**
>
> **To estimate the positioning of the driver's eyes, SleepCam continually monitors the more easily-determined position of the driver's head, based on its larger features (ears, nose and chin). It calculates where the driver is looking by measuring the shape of the eyes and the position of the iris.**
>
> **SleepCam also monitors how frequently the driver blinks, matching this data to predetermined blinking patterns that indicate a person is drowsy. From this information, the system determines the probability that the driver is falling asleep, and sounds an alarm if moderate drowsiness is detected. If severe drowsiness is detected, a voice-over warns the driver and instructs them to pull over and rest.**

a. The heart of SleepCam is an intelligent decision support system.

   i. Draw a simple decision tree that illustrates the conditions, rules and actions that govern SleepCam's basic operations. **[2]**

   ii. Determine if SleepCam is being used in a structured, semi-structured or unstructured situation, and justify your answer. **[3]**

   iii. Identify the type of decision support system used to implement SleepCam's functionality, and explain how this system would *analyse* the data. **[5]**

b. A large transport company is considering the use of SleepCam technology to monitor fatigue in its long-distance truck drivers. **[6]**

Discuss implications that may arise for the company and the truck drivers. In your response you may consider aspects such as:

- Potential misuses of SleepCam,
- Responsibility for decision making,
- The changing nature of technology.

QUESTION 25 [13 marks]

The *20Q* website was invented by Robin Burgener in 1996 based on work he began eight years earlier. A player thinks of an object and *20Q* asks a series of questions to which the player usually answers 'Yes' or 'No'. Other choices such as 'Unknown', 'Irrelevant' or 'Probably' are also possible.

The *20Q* website claims that *20Q* guesses the secret object correctly about 80% of the time by asking only 20 questions (sometimes less). It also states that the game uses a neural network and every time one of the 30,000–50,000 daily users plays the game, it continues to 'learn'. A subset of data from the *20Q* website has been captured in the form of a handheld toy, although this version does not 'learn' after each game.

A Help screen from the website and a typical game are reproduced below.

> **When it guesses the player's object incorrectly—something that happened frequently in the first months of the game's use—the player types in the correct answer and that object becomes part of 20Q's growing neural network. The Artificial Intelligence then looks back over all the questions it just asked and associates the player's answers with the object it just learned. As more people play, 20Q gets better and better at understanding how each object is characterised.**

Help

Play

To start...
Think of an object, it can be anything as long as it is general. A cat is a good object, but my cat, Pepper, would be a bad object.
Once you think of an object, 20Q will ask you a series of questions that begin: "Is it Animal, Vegetable, Mineral, or Unknown?" When thinking of your object, keep in mind that Animal, Vegetable, and Mineral each have their own broader meaning.
Take into consideration the primary substance of the object of which you're thinking. For example, if you're thinking of a jumper, and it's a wool jumper, you should answer "yes" to the "Is it Animal?" question (not to put too fine a point on it, but wool comes from sheep, and sheep are animals.) Answer "yes" to the Mineral question if you are thinking of a jumper made of polyester, because polyester is made mainly of petroleum products, and that's mineral based. If your jumper is made of cotton, you'd answer "yes" to the Vegetable question, because cotton is a plant.
A tricky example might be an arrow: you'd answer "yes" to the Mineral question if you were thinking of an arrow made mainly of metal, but the choice is more difficult if you are thinking of an arrow with a wooden shaft, metal arrowhead and a vane made of feathers or plastic - a multiplicity of materials and a conundrum for the player. Make the choice you think is best.
Note This game is "G" rated and is suitable for audiences of all ages.

Answering a general question

You should be able to answer "Yes" or "No" to the rest of the questions. However, there are questions where the answer is not that simple. A horse is larger than a breadbox, but, water is not larger than a breadbox, neither is it smaller. Other questions seem silly: "Does a camel have four wheels?" No! And neither does a motorcycle.
Yes You are sure about your answer of Yes.
No You are sure about your answer of No.
Unknown You are unsure of how the question relates, or you don't know. The question will not be counted.
Irrelevant The question does not apply to your object.
Probably You are not sure but you think the answer might be Yes.
Doubtful You are not sure but you think the answer might be No.

This is a printout of a typical *20Q* game where the secret object was an egg:

1. Is it Animal, Vegetable, Mineral, or Other? **Animal.**
2. Does it have short fur? **Irrelevant.**
3. Does it make a good pet? **No.**
4. Can it scratch? **No.**
5. Does it have ears? **No.**
6. Does it have feelings? **No.**
7. Does it dig holes? **No.**
8. Does it breathe? **No.**
9. Is it a specific colour? **Yes.**
10. Does it taste good when fried? **Yes.**
11. Do you use it in public? **Sometimes.**
12. Does it roll? **Yes.**
13. Can it be used in a pie? **Probably.**
14. Can it be dried? **No.**
15. Does it reflect objects? **No.**
16. Is it healthy? **Sometimes.**
17. I am guessing that it is an egg?

a. Despite its simple appearance, the *20Q* site is actually supported by an immensely powerful decision support system.

   i. Describe how the *20Q* website might use the principles of a neural network to guess that the object in the example above was an egg. **[4]**

   ii. Describe how *20Q* could acquire new facts about an egg. **[4]**

b. A General Practitioner in a large medical centre proposes customising the 20Q application for the field of medical diagnosis. The doctor wishes to have patients complete a 20Q session consisting of 20 diagnostic questions about their symptoms while in the waiting room. **[5]**

Discuss the technical, social and ethical issues which should be considered before considering implementation.

QUESTION 26 [21 marks]

Mobs roam restless Urumqi[1]

Mobs wielding makeshift weapons continued to roam the city on Wednesday, despite a massive show of force by Chinese troops.

By Robert J. Saiget
July 8, 2009

In Urumqi, the capital of the remote northwest Xinjiang region where 197 people died in unrest on Sunday, army helicopters circled overhead as thousands of soldiers and riot police filled the city shouting out "protect the people".

"We support this," said a 45-year-old Han Chinese as he watched the troops roll by in trucks. "But they should have got here sooner. It took them three days to do this. Why so long?"

Chinese paramilitary police patrol in Urumqi, western Jina's Xinjiang province. Photograph taken by Eugene Hoshiko / Associated Press

President Hu Jintao abandoned a G8 (Group of Eight) summit in Italy, in what observers said was an unprecedented move, to tackle one of China's worst spikes in ethnic tensions in decades. After authorities blamed Muslim Uyghurs for Sunday's unrest that also left more than 1,700 people injured, Han Chinese took to the streets with shovels, meat cleavers and other improvised weapons vowing to defend themselves.

After a night-time curfew was declared on Tuesday, Chinese authorities appeared determined to show they were able to maintain order. Thousands of riot police wearing helmets and carrying shields lined up on a main road in Urumqi dividing the city centre from a Uyghur district, with columns of soldiers behind them.

Internet access was revoked in parts of Urumqi after the deadly riots erupted, to stop the flow of information that it saw as a dangerous threat. "We cut the Internet connection in some areas of Urumqi in order to quench the riot quickly and prevent violence from spreading to other places," Li Zhi, a Communist Party official, told a news conference. Further, Li accused exiled Uyghur leader Rebiya Kadeer of orchestrating the violence over the Internet and through telephone calls. She denied the charge. Nur Bekri, governor of the region, further accused protesters of using the internet and text messages to mobilise rioters.

A technical official working for state-owned telecommunications company said shutting down the Internet in Urumqi, or only parts of the city, was easy. "You can do it in one second. There is a big backbone network and all you need to do is to switch off the telecom route," the official told AFP, speaking on condition of anonymity due to the sensitivity of the topic.

Despite Chinese officials' decision to cut off the Internet and mobile phones, pictures, videos and updates from Urumqi poured into websites such as Twitter, YouTube and Flickr. Media watchdog Reporters Without Borders accused authorities of wanting to see Urumqi "cut off from the rest of the world." In an endorsed statement, they asserted that "once again, the Chinese government has chosen to cut communications in order to prevent the free flow of information. We firmly condemn this behaviour."

---

[1] Reproduced by permission from http://news.smh.com.au/breaking-news-world/mobs-roam-chinas-restive-urumqi-20090708-dd8m.html;
sections adapted from http://newsinfo.inquirer.net/breakingnews/infotech/view/20090707-214343/China-says-Web-access-cut-off-due-to-riots

China restores limited internet access after Urumqi violence[2]

Block on calls from China to overseas numbers and on most text messages remains in place.

By Tania Branigan
Beijing, China
July 28, 2009

Officials have begun to allow users access to a small number of sites. Photograph remains the property of The Guardian (guardian.co.uk)

Normal internet access in China's troubled north-western region of Xinjiang may not be resumed for months, it has emerged, as officials begin to allow users to visit a small number of sites. The internet was blocked across the region three weeks ago after inter-ethnic violence in Urumqi killed at least 197 people. Authorities also shut down text message services.

Mobile phone users are now receiving texts again – but only in the form of a daily update from the authorities and weather reports. The first, on Sunday, told them the security situation had improved and urged them not to believe rumours.

A block on calls to overseas numbers – from any phone – also remains in place.

Authorities told media groups that there was now access to a small selection of sites including internet banking, the online stock exchange and university enrolment services. A statement from the Telecommunications Administration this weekend said that business and government-related sites would also reopen, although it did not indicate when.

"We have received no instruction on when to fully resume the public internet connection in Xinjiang," said Haimiti Mijiti, vice-president of China Telecom's Xinjiang branch. Some have speculated that normal access would not be restored until after 1 October, the 60th anniversary of the founding of the People's Republic of China. When asked to comment on this, Mijiti responded: "There is no set time given yet."

Nur Bekri, the governor of Xinjiang, told reporters recently: "Internet control was necessary ... It became a tool to spread false information." The authorities said yesterday that false rumours were still circulating in the city – such as claims that people had taken hostage pensioners, women and children, demanding the release of suspects detained after the unrest.

"Cutting off the Internet and short messaging service is the action that Chinese government decided to take. Under extreme circumstances, such as after the Urumqi riot, it is understandable," said Nigel Hickson, the acting director of the UK Department for Business Innovation & Skills. "But I don't think it is a long-term solution because the Chinese government cannot block the Internet and short messaging service forever."

Most citizens agree – some more than others. "No Internet, no business for me," said Li Fenfa, an Urumqi resident who runs an online business selling dry fruit and has seen no transactions after the Internet was cut.

---

[2] Reproduced by permission from http://www.guardian.co.uk/world/2009/jul/28/china-restores-limited-internet-access; sections adapted from http://www.chinadaily.com.cn/china/2009-07-28/content8479195.htm

a. Identify the *types of technologies* (NOT specific examples of those technologies) that the government was aiming to restrict. **[3]**

b. Explain how communications systems were related to the riots. **[3]**

c. Analyse the aspects of the situation in Urumqi that led to the government's response. **[4]**

d. Propose an argument that supports or opposes the deactivation of Urumqi's telecommunications during the riots, with reference to relevant social & ethical issues. **[5]**

e. Compare and contrast communications with mobile phones and internet access to communications with non-computer-based systems. In your response you may consider aspects such as: **[6]**

- Technologies,
- Quality of information,
- Impacts on users.

- END OF EXAM -

- BLANK PAGE -