

NT213 English for IT

Examination

Student \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Student ID number \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

***January A 2021***

**Time** 1 hour 30 minutes

# Instructions to students

Do not open this question paper until you are told to do so.

**Write your name and ID number.**

Read the instructions for each part of the paper carefully.

Answer all the questions.

You mustcomplete the answer sheets within the time limit.

**INFORMATION FOR STUDENTS**

There are 60 questions in this paper.

Questions 1 – 20 carry 1 mark (Part 1, Part 2).

Questions 21 – 26 carry up to 2 marks (Part 3, Part 4).

Questions 27 – 45 carry 2 marks (Part 5).

Questions in Part 6 carry 10 marks (Part 6).

# Part 1 Multiple-choice cloze

For questions **1 – 10**, read the text below and decide which answer **(A**, **B**, **C** or **D**) best fits each gap. There is an example at the beginning (**0**). Mark your answers **by circling the correct answer. (10 x 1 = 10 points)**

**Example:**

**0 A** educational Bqualification **C** gender **D** sex

*Women in computing - there is good news and bad*

**I've been told two stories in recent days about the** (0) *\_\_\_\_\_* **gap in computing education.** The good news: a major university has doubled the number of women arriving to study computer science in the space of a year. The bad: the latest GCSE[[1]](#footnote-1) (1) \_\_\_\_\_ show the number of girls getting any kind of computing qualification at school continues to decline.

The optimism comes from Durham University, where 45 women are starting a computer science (2) \_\_\_\_\_ this year, up from 22 last year. They make up 30% of this year's student (3) \_\_\_\_\_ (who are allowed to enter a college) compared with a national average of 16%.

This is the result of a determined effort to recruit more female students - led by an inspirational figure. Prof Sue Black, who (4) \_\_\_\_\_ a successful campaign to save the wartime coding centre Bletchley Park, has for years been running all sorts of initiatives to get more women involved in technology. In 2018, Durham (5) \_\_\_\_\_ her with a specific brief to persuade more female A-level students to think about coming to the university to study computing. Prof Black remembers the (6) \_\_\_\_\_ of department, Gordon Love, telling her he wanted to make Durham computer science "the number one destination for women in tech". So what made the difference?

She says she and a whole team of people from across the university started a range of activities, many of them not aimed directly at A-level students. There was a new Women in Tech group at the university, female students were taken to external events (7) \_\_\_\_\_ prominent women technologists, and at open days they made sure that half the academics and students talking about the computing course were women. Just as with her Bletchley Park campaign, Sue Black says social media played a crucial role.

"It's partly by (8) \_\_\_\_\_ because students that are having a great time tell their siblings or tell their friends," she explains.

"Teachers will see what we're doing as well, probably mainly through social media. And so they might be more inclined to encourage girls to apply to Durham."

Recent graduates also got involved, with inspiring stories about the opportunities available to those studying the subject.

Zulia Shavaeva, who now works at Amazon's cloud computing division AWS, said: "It was incredible to be part of a university and department that is not only incredibly supportive, but is so committed to (9) \_\_\_\_\_ the gap between women studying and working in technology."

Prof Black admits it is hard to know exactly why the campaign was successful, but says the new (10) \_\_\_\_\_ will be surveyed to find out what made them choose Durham.

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| --- | --- | --- | --- | --- |
|  | **A** estimates | **B** integers | **C** figures | **D** ciphers |
|  | **A** degree | **B** certificate | **C** diploma | **D** examination |
|  | **A** amount | **B** intake | **C** number | **D** figures |
|  | **A** organized | **B** executed | **C** realized | **D** mounted |
|  | **A** recruited | **B** organized | **C** made | **D** asked |
|  | **A** dean | **B** head | **C** chief | **D** principal |
|  | **A** participating | **B** advertising | **C** disregarding | **D** featuring |
|  | **A** word of mouth | **B** the grapevine | **C** viva voce | **D** hearsay |
|  | **A** leaving | **B** bridging | **C** filling | **D** creating |
|  | **A** graduates | **B** juniors | **C** undergraduates | **D** seniors |

# Part 2 Open cloze

For questions **1 – 10**, read the text below and think of the word which best fits each gap. Use only **one** word in each gap. There is an example at the beginning (**0**). **(10 x 1 = 10 points)**

**Example: (0)** May

*Superintelligent AI (0) May Be Impossible to Control; That's the Good News*

It may be theoretically impossible for humans to control a superintelligent AI, a new study finds. Worse still, the research also quashes any hope for detecting such an unstoppable AI when it’s on the verge of (1) \_\_\_\_\_\_\_\_ created. Slightly less grim is the timetable. By at least one estimate, many decades lie ahead before any such existential computational reckoning could be in the cards for humanity. Alongside news of AI besting humans (2) \_\_\_\_\_\_\_\_ games such as chess, Go and Jeopardy have come fears that superintelligent machines smarter than the best human minds might one day run amok. “The question about whether superintelligence could be controlled if created is quite old,” says study lead author Manuel Alfonseca, a computer scientist at the Autonomous University of Madrid. “It goes back at least to Asimov’s First Law of Robotics, in the 1940s.”

The Three Laws of Robotics, first introduced in Isaac Asimov's 1942 short story “Runaround,” are as follows:

1. A robot may not injure a human being or, through inaction, allow a human being to come to harm.
2. A robot (3) \_\_\_\_\_\_\_\_ obey the orders given it by human beings except where such orders would conflict with the First Law.
3. A robot (3) \_\_\_\_\_\_\_\_ protect its own existence as long as such protection does not conflict with the First or Second Laws.

In 2014, philosopher Nick Bostrom, director of the Future of Humanity Institute at the University of Oxford, not only explored ways in which a superintelligent AI could destroy us (4) \_\_\_\_\_\_\_\_ investigated potential control strategies for such a machine—and the reasons they might not work. Bostrom outlined two possible types of solutions of this “control problem.” One is to control what the AI can do, such as keeping it (5) \_\_\_\_\_\_\_\_ connecting to the Internet, and the other is to control what it wants to do, such as teaching it rules and values so it would act in the best interests of humanity. The problem with the former is that Bostrom thought a supersmart machine could probably break free from any bonds we could make. With the (6) \_\_\_\_\_\_\_\_, he essentially feared that humans might not be smart enough to train a superintelligent AI.

Now Alfonseca and his colleagues suggested it (7) \_\_\_\_\_\_\_\_ impossible to control a superintelligent AI, due to fundamental limits inherent to computing itself. They detailed their findings this month in the Journal of Artificial Intelligence Research. The researchers suggested that any algorithm that sought to ensure a superintelligent AI cannot harm people had to first simulate the machine’s behavior to predict the potential consequences of its actions. This containment algorithm then would need to halt the supersmart machine (8) \_\_\_\_\_ it might indeed do harm.

However, the scientists said it (9) \_\_\_\_\_ impossible for any containment algorithm to simulate the AI’s behavior and predict with absolute certainty whether its actions might lead to harm. The algorithm could fail to correctly simulate the AI’s behavior or accurately predict the consequences of the AI’s actions and not recognize such failures.

“Asimov’s first law of robotics has been proved to be incomputable,” Alfonseca says, “and therefore unfeasible.”

We may not even know if we have created a superintelligent machine, the researchers say. This is a consequence of Rice’s theorem, (10) \_\_\_\_\_ essentially states that one cannot in general figure anything out about what a computer program might output just by looking at the program, Alfonseca explains.

Although it may not be possible to control a superintelligent artificial general intelligence, it should be possible to control a superintelligent narrow AI—one specialized for certain functions instead of being capable of a broad range of tasks like humans. “We already have superintelligences of this type,” Alfonseca says. “For instance, we have machines that can compute mathematics much faster than we can. This is [narrow] superintelligence, isn’t it?”

# Part 3 Word formation

For questions **1 – 8**, read the text below. Use the word given in capitals at the end of some of the lines to form a word that fits in the gap **in the same line**. There is an example at the beginning (**0**). **(6 x 2 = 12 points)**

**Example: (0)** HIDDEN

|  |  |
| --- | --- |
| *Deep Learning at the Speed of Light*  Deep learning, which is to say artificial neural networks with many (0) \_\_ layers, is regularly stunning us with solutions to real-world problems. And it is doing that in more and more realms, including natural-language processing, fraud detection, image recognition, and (1) \_\_\_\_\_\_\_\_ driving. Indeed, these neural networks are getting better by the day.  But these advances come at an enormous price in the computing resources and energy they consume. So it’s no wonder that engineers and computer scientists are making huge efforts to figure out ways to train and run deep neural networks more (2) \_\_\_\_\_\_\_\_\_\_\_\_.  An (3) \_\_\_\_\_\_\_\_ new strategy that’s coming to the fore this year is to perform many of the required mathematical calculations using photons rather than electrons. In particular, one company, ­Lightmatter, will begin marketing late this year a neural-network accelerator chip that calculates with light. It will be a refinement of the prototype Mars chip that the company showed off at the virtual Hot Chips conference last August. The (4) \_\_\_\_\_\_\_\_ component in Lightmatter’s chip is a Mach-Zehnder interferometer. This optical device was jointly invented by Ludwig Mach and Ludwig Zehnder in the 1890s. But only recently have such optical devices been miniaturized to the point where large numbers of them can be integrated onto a chip and used to perform the matrix (5) \_\_\_\_\_\_\_\_ involved in neural-network calculations.  Keren Bergman, a professor of electrical engineering and the director of the Lightwave Research Laboratory at Columbia University, in New York City, explains that these feats have become possible only in the last few years because of the maturing of the manufacturing ecosystem for integrated photonics, needed to make photonic chips for communications. “What you would do on a bench 30 years ago, now they can put it all on a chip,” she says.  It’s clear, though, that the computing resources being dedicated to artificial-intelligence systems can’t keep growing at the current rate, doubling every three to four months. Engineers are now keen to harness integrated photonics to address this challenge with a new class of computing machines that are dramatically different from (6) \_\_\_\_\_\_\_\_ electronic chips yet are now practical to manufacture. Bergman boasts: “We have the ability to make devices that in the past could only be imagined.” | **HIDE**  **AUTOMATIC**  **EFFICIENT**  **AMBITION**  **FUND**  **MULTIPLY**  **CONVENE** |

Part 4 Key word transformations

For questions 1-6, complete the second sentence so that it has a similar meaning to the first sentence, using the word given. **Do not change the word given.** You must use between **three** and **eight** words, including the word given. Here is an example (**0**). **(6 x 2 = 12 points)**

**Example:**

**0** James would only speak to the head of department alone.

**ON**

James \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the head of department alone.

The gap can be filled with the words ‘insisted on speaking’, so you write:

**Example: 0** INSISTED ON SPEAKING

|  |  |
| --- | --- |
|  | I advised him to take a year off from school to allow additional recovery time.  **RECOMMENDED**  I \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ a year off from school to allow additional recovery time. |
|  | UDP enables multiple clients to use the same port number and different IP addresses.  **MAKES**  UDP\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the same port number and different IP addresses. |
|  | Big data and privacy are often in conflict with each other.  **ODDS**  Big data and privacy are often \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. |
|  | This project will take me two months to finish.  **HAVE**  In two months’ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ this project. |
|  | I didn't have the money so I didn't buy the 13-inch MacBook Pro.  **HAVE**  If I \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the 13-inch MacBook Pro. |
|  | We decided to try again later.  **WOULD**  It was \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ try again later. |

Part 5 Multiple Choice (Reading)

You are going to read a text about the Genetrix program. For questions 1 – 6, choose the answer (A, B, C or D) which you think fits best according to the text. **(6 x 1 = 6 points)**

*Faxes from the Far Side*

|  |
| --- |
| On the 10th of January 1956—about a decade into the Cold War and about a year into the Space Race—the United States Air Force launched the first vehicle in its top secret Genetrix program. The vehicle was a balloon—an enormous, 200-foot-tall, 100-foot-wide helium balloon—the first of hundreds that the US would ultimately launch from sites in Scotland, Norway, Germany, and Turkey. Upon release, each balloon ascended into the stratosphere, where the winter jet stream was perfectly situated to carry it over and across the interior of the USSR. A coffin-sized gondola dangled from the bottom of each balloon, housing a set of downward-facing high-resolution cameras. Whenever an on-board photocell detected that the surface below was illuminated by daylight, these cameras snapped periodic photographs. The Genetrix balloons were some of the original high-altitude spy cameras—precursors to spy planes and satellites.  Whenever a balloon cleared Soviet airspace, the US Air Force sent an encoded radio signal that would detonate a small explosive charge on the gondola’s attachment line. If all went according to plan, a specially equipped C-119 airplane would be loitering in the nearby airspace, ready to snag the parachuting payload of photographic film in mid-air. Once retrieved, the film was sent back to the states to be developed and analysed.  The Genetrix balloons were designed to be practically invisible to radar, using very thin balloon film and a gondola much smaller than a typical aircraft. And this might have worked were it not for the fact that one of the steel rods in the balloon rigging was 91 centimetres long. US Air Force engineers didn’t realize it at the time, but 91 centimetres happened to correspond to one of the frequencies used by Soviet early-warning radar. This caused the otherwise inconsequential rod to resonate and glint like a mirror on Soviet radar screens.  Soviet leaders were understandably annoyed when their military pilots reported back regarding the nature of these radar reflections. US officials replied that these were innocuous weather balloons for the study of cloud formations, a claim which was roundly ridiculed. During the day, there was little the Soviets could do about it apart from political posturing—the balloons cruised at 55,000 feet, which was higher than Soviet weapons could reach. But MiG fighter pilots soon discovered they could shoot the balloons out of the sky at sunrise. The chill of the night robbed the balloons of some of their buoyancy, and they dipped down into weapons range.  The Genetrix program lasted only 27 days. It had originally been planned to continue indefinitely, but president Eisenhower cancelled any further spy balloon launches due to the Soviets’ strenuous diplomatic protests. Of the 500 or so spy balloons that were launched, only about 50 camera gondolas were successfully recovered by the US Air Force. These provided over 10,000 reconnaissance photos of inland Soviet Union and China, including first peeks at nuclear and radar facilities.  The Soviets recovered a number of the gondolas themselves, and engineers began to dissect them, seeking useful information. To their surprise, they found something inside that happened to solve a little problem they had been having with one of their upcoming space missions: temperature-resistant and radiation-hardened photographic film. |

**1** Why did the US Air Force launch the secret Genetrix program?

(a) To test the flight speed of helium balloons.

(b) To map the surface of remote terrain.

(c) To spy on its enemies.

(d) To carry packages to Scotland, Norway, Germany and Turkey.

**2** The Genetrix balloons

(a) preceded spy planes.

(b) were the first spy cameras.

(c) illuminated the surface.

(d) could carry coffins.

**3** Explosives were attached to the Genetrix balloons

(a) so they could be used as remotely activated bombs.

(b) so the packages would be released and picked up by an airplane.

(c) in case they were spotted while in the USSR airspace.

(d) in case the attachment line broke.

**4** Why did Genetrix balloons fail to be invisible to radar?

(a) Because they were 200-foot-tall.

(b) Because they were 100-foot-wide.

(c) Because they had a 91 centimetres long steel rod.

(d) Because they were too reflective.

**5** The Genetrix program was cancelled

(a) even though it had been planned to last only 27 days.

(b) due to the election of president

(c) because of strenuous failed missions.

(d) after relentless protests from the Soviets.

**6** Upon finding some of the gondolas, the Soviets felt

(a) annoyed.

(b) surprised.

(c) grateful.

(d) frustrated.

Part 6 Writing

You have completed your internship at a big company. As a part of your job placement programme you should write a report to your university counsellor. In your report you should describe the company you worked at, the problems you encountered and propose any additional training you feel is necessary.

*Your report should be between* ***220-260 words*** *long. Going over the limit is not penalized, but potentially leads to more mistakes. However, if your text is under 220 you will have points deducted from your overall score.*

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***This is the end of your examination. Thank you***.

1. The General Certificate of Secondary Education (GCSE) is an academic qualification in a particular subject, taken in England, Wales, and Northern Ireland. [↑](#footnote-ref-1)