Please check the examination details below before entering your candidate information

Candidate surname	Other names

Pearson Edexcel
International
Advanced Level

Centre Number | | | | | |

Candidate Number | | | | |

Friday 15 January 2021

Afternoon (Time: 2 hours) | Paper Reference **WEN03/01**

English Language

International Advanced Level
Unit 3: Crafting Language (Writing)

You must have:
Source Booklet (enclosed)

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*

Information

- The total mark for this paper is 50.
- The marks for **each** question are shown in brackets
  – *Question 1 (20), Question 2 (30)*
  – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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SECTION A

Read texts A, B, C and D in the Source Booklet before answering Question 1.

Write your answer in the space provided.

1 Using the texts in the Source Booklet, write the text for a speech about the challenges faced by computing pioneers.

You must use the information in the Source Booklet to create your speech.

You may include additional material drawn from your own knowledge and experience.

Choose your own audience, purpose and context and complete the grid below.

Genre	Audience	Purpose	Context
Speech			

(20)

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(Total for Question 1 = 20 marks)

TOTAL FOR SECTION A = 20 MARKS

SECTION B

Write your answer in the space provided.

2 Write a commentary on your new text.

In your commentary you should:

- analyse and evaluate the language choices you have made
- show how you have reshaped the source material to meet the new genre, audience and purpose
- comment on how contextual factors have influenced your language choices.

You should support your analysis with evidence.

(30)

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(Total for Question 2 = 30 marks)

TOTAL FOR SECTION B = 30 MARKS
TOTAL FOR PAPER = 50 MARKS

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Source Booklet
Do not return this Source Booklet with the question paper.

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CONTENTS

Topic: Computing Pioneers

The following texts deal with the history of computing and some of the people who were pioneers in their particular fields of computing.

Text A: This is a transcript of a video from the Geek Gurl Diaries, a series of video logs and interviews about and with inspiring women in the fields of ICT, Computing, Engineering and Science.

Hi, my name's Carrie Anne and welcome to Geek Gurl Diaries. Lately, I've been reminiscing about some of the geeky jobs I've done over the past few years, and when I was an IT systems engineer I was the only girl on the team. When I was a web designer, I was the only girl on the team. And now I'm an IT teacher and, guess what, I'm the only girl on the team. Why is this? So, it got me thinking, has it always been like this? Even for really inspirational geeky women? Even some hundreds of years ago like Ada Lovelace?

I'm reliably informed that deep in the heart of the Pentagon there's a computer network that controls the US military. I'm told that it runs a computer programme called Ada. What an odd female name for a computer programme! That's what your thoughts sound like in my head. Well, it's named after Ada Lovelace. She was a 19th-century mathematician and, wait for it, woman! If I had to draw up an ultimate geek girl list of all time, Ada Lovelace would definitely be near the top and not just because she's got this cool sounding name. Neither is it because she's the daughter of Lord Byron, who was a really famous poet, but because she understood, perhaps before anyone else, what a computer could really be.

She's sometimes referred to as the first computer programmer because in her notes she created an algorithm* to compute numbers. This is considered to be the first algorithm ever tailored to be made to be used on a computer. Some people don't think she was the first programmer because she used to hang out with a guy called Charles Babbage. Charles Babbage was a professor of mathematics and he was kind of a celebrity in his time because he had started to devise machines that would calculate. Charles Babbage and Ada Lovelace had quite unconventional personalities and they became lifelong friends.

In a letter that Charles Babbage wrote to Faraday*, he referred to Lovelace as, "the enchantress who has thrown her magical spell around the most abstract of sciences and has grasped it with a force which few masculine intellects (in our own country at least) could have exerted over it." Tragically however, Ada died of cancer when she was only 36. I think her thwarted potential and her vision for what computing could be is one of the reasons that she's such a popular, inspirational person for women in computing.

So, I refer back to my original question: was Ada the only girl on the team? Yes. Did it matter? No. Why? Because her male contemporaries recognised her mad maths skills and shouted about it.

Glossary

**algorithm* – a process or set of rules to be followed in calculations or other problem-solving operations, especially by a computer

**Faraday* – Michael Faraday, an influential British scientist who contributed significantly to the study of electromagnetism and electrochemistry

Text B: This is an edited article from a news website about Feng-hsiung Hsu (nicknamed 'Crazy Bird'), the computer scientist who helped to create the IBM* Deep Blue chess-playing computer.

Feng-hsiung Hsu is most at ease when he's talking shop. Shop, for him, is all about computer processors and computer chips, and how he and his IBM team were able to design a machine that beat chess Grandmaster Garry Kasparov at his own game in 1997.

"We set out to do something, and we figured out what to do with it. The whole thing for me was just an engineering feat."

But for Kenneth Lee, a New York actor born in Singapore, the IBM engineer from Taiwan was more than just the architect of a revolutionary chess computer. Lee immersed himself into Hsu's life when he portrayed the engineer in British playwright Matt Charman's "The Machine," a play based on the rematch between Deep Blue and Kasparov.

Lee sees Hsu as a man whose own successes and failures in life shaped the soul of his machine. "Just based on the script, he was a very passionate person," Lee said. "He would trail blaze, and he was certain about that. He was a person who had a lot to prove, and he was underestimated. For him, it wasn't so much about credit as it was about respect."

"He's a role model," Lee said of Hsu. "It's always good to have people in positions of success that younger Asian Americans can look up to and aspire to."

Things might have turned out differently for Hsu, Kasparov and the world had Hsu not discovered computer science as an engineering student at prestigious National Taiwan University, in Taipei, during the late 1970s. It was there that Hsu signed up for a microprocessor project during his sophomore* year, an experience that in 1982 earned him a spot at Carnegie Mellon University, in Pittsburgh, Pennsylvania, where he began a Ph.D.* in computer science.

In his book "Behind Deep Blue: Building the Computer that Defeated the World Chess Champion," Hsu recalls the competing egos among faculty and students at Carnegie Mellon. He became, he wrote, part of a ragtag group of unsupervised Ph.D. candidates vying against another elite crew of classmates to create the ultimate chess computer.

Those efforts eventually culminated with IBM hiring Hsu in 1989, when he and his team set out to create Deep Blue. In 1996, Deep Blue earned a chance to face off against Kasparov, in a match covered widely by the media. Hsu was sitting at the controls.

"At that point, you are the operator, so everything is beyond you," recalled Hsu. "You don't want to show anything emotional to Kasparov, so that he has nothing to read." But Kasparov defeated Deep Blue 4 to 2, sending Hsu and his team back to retool their machine. One year later, Kasparov and Deep Blue met again; this time Deep Blue was rigged with a new chip that made it run faster than before.

"As an engineer, you try to do things differently," explained Hsu. "Whether you are successful depends on whether you are different."

The second time, that difference spelled success. Deep Blue defeated Kasparov 3½ to 2½ in the rematch, causing the Grandmaster to allege that some human force, and not Deep Blue, had tilted the outcome.

To hear Hsu talk about Deep Blue today is to know he doesn't just see his creation, part of which is housed in Washington D.C.'s Smithsonian Institute, as a collection of microchips in a box. It is also a portal, he said, for us to understand just how great man can be.

"It is how man can open man himself," Hsu said. "And that's how we all become more successful."

Glossary

**IBM* – a multinational American information technology company

**sophomore* – second year university student

**Ph.D.* – the highest academic degree awarded by universities

Text C: This edited article from the online version of Popular Mechanics, an American science and technology magazine, reviews and comments on the 2016 film 'Hidden Figures'.

Adapted from Margot Lee Shetterly's book, the film Hidden Figures focuses on three real-life African-American female pioneers: Katherine Johnson, Dorothy Vaughan, and Mary Jackson, who were part of NASA's* team of "human computers". This was a group made up of mostly women who calculated by hand the complex equations that allowed space heroes like Neil Armstrong, Alan Shepard, and John Glenn to travel safely to space. Through sheer tenacity, force of will, and intellect, they ensured their stamp on American history – even if their story has remained obscured from public view until now.

Women working as so-called "human computers" dates back decades before space exploration. In the late 19th century, the Harvard College Observatory employed a group of women who collected, studied, and cataloged thousands of images of stars on glass plates. These women were every bit as capable as men despite toiling under less-than-favorable conditions. Williamina Fleming, for instance, classified over 10,000 stars using a scheme she created and was the first to recognize the existence of white dwarfs. While working six-day weeks at a job demanding "a large capacity for tedium," they were still expected to uphold societal norms of being a good wife and mother.

In 1935, the NACA (National Advisory Committee for Aeronautics, a precursor to NASA) hired five women to be their first computer pool at the Langley campus. "The women were meticulous and accurate… and they didn't have to pay them very much," NASA's historian Bill Barry says, explaining the NACA's decision. While they did the same work as their white counterparts, African-American computers were paid less and relegated to the segregated west section of the Langley campus, where they had to use separate dining and bathroom facilities. They became known as the "West Computers".

Katherine Johnson, the movie's protagonist, was something of a child prodigy. Hailing from the small West Virginian town of White Sulphur Springs, she graduated from high school at 14 and the historically black West Virginia State University at 18. In 1938, as a graduate student, she became one of three students – and the only woman – to desegregate West Virginia's state college. In 1953, Johnson was hired by NACA and, five years later, NACA became NASA thanks to the Space Act of 1958.

Johnson's first big NASA assignment was computing the trajectories* for Alan Shepard's historic flight in 1961. Johnson and her team's job was to trace out in extreme detail Freedom 7's exact path from liftoff to splashdown. Since it was designed to be a ballistic flight – in that, it was like a bullet from a gun with a capsule going up and coming down in a big parabola – it was relatively simple, at least in the context of what was to come. Nonetheless, it was a huge success and NASA immediately set their sights on America's first orbital mission.

The film primarily focuses on John Glenn's 1962 trip around the globe. Johnson's main job in the lead-up and during the mission was to double-check and reverse engineer the newly-installed IBM 7090's* trajectory calculations. There were very tense moments during the flight that forced the mission to end earlier than expected. And John Glenn did request that Johnson specifically check and confirm trajectories and entry points that the IBM spat out. As Shetterly wrote in her book, Glenn did not completely trust the computer. So, he asked the head engineers to "get the girl to check the numbers… If she says the numbers are good… I'm ready to go."

While Johnson is the main character, Hidden Figures also follows the trajectories of Dorothy Vaughan and Mary Jackson as they work on the Friendship Seven blast-off. Vaughan was one of NACA's early computer hires during World War II. She became a leader and advocate for the "West Computers." In 1948, she became NACA's first black supervisor and, later, an expert FORTRAN* programmer.

Despite these successes and her capability, she was constantly passed over for promotions herself. Vaughan struggled with the same things all female computers did while at NASA. "The conflict of working outside of the home to provide the best life for your children and, yet, not physically being there. But she knew she was changing the world."

While Mary Jackson is also considered a "hidden figure," she certainly stood out during her time at NASA. After graduating with dual degrees in math and physical science, she was hired to work at Langley in 1951. After several years as a computer, Jackson took an assignment in assisting senior aeronautical research engineer Kazimierz Czarnecki and he encouraged her to become an engineer herself. To do that, however, she needed to take after-work graduate courses held at segregated Hampton High School. Jackson petitioned the City of Hampton to be able to learn next to her white peers. She won, completed the courses, and was promoted to engineer in 1958, making her NASA's first African-American female engineer – and, perhaps, the only one for much of her career.

Johnson would go on to work on the Apollo program, too, including performing trajectory calculations that assisted the 1969 moon landing. She would retire from NASA in 1986. In 2015, President Obama gave Katherine Johnson the Presidential Medal of Freedom. Last May, a NASA computational research facility in her hometown of Hampton, Virginia was named in Johnson's honor. And yet, despite the accolades and getting the Hollywood treatment, she told the audience in May that she was just doing her job and "it was just another day's work."

Sometimes changing the world is just that.

Glossary

**NASA* – National Aeronautics and Space Administration

**trajectories* – the curved paths objects follow after they are thrown or shot into the air, or of objects that are travelling through space

**IBM 7090* – one of IBM's earliest transistor-based computers, used for scientific computing

**FORTRAN* – a computer programming language

Text D: This timeline has been adapted from an infographic showing significant dates in the history of technology and computing.

2400 BC	The abacus, the first known calculator, is invented in Babylonia
300 BC	Pingala invents the binary number system
60 AD	Heron of Alexandria invents machines that follow a series of instructions
1492	Leonardo Da Vinci depicts flying machines, the first mechanical calculator and one of the first programmable robots
1642	Blaise Pascal invents the 'Pascaline', a mechanical adding machine
1822	The Analytical Engine is invented by Charles Babbage
1835	Samuel Morse invents Morse code
1880	Alexander Graham Bell invents a telephone called the Photophone
1895	Radio signals are invented by Guglielmo Marconi
1911	IBM is formed
1924	Electromechanical television system is invented by John Logie Baird
1937	Alan Turing develops the concept of a theoretical computing machine
1939	William Hewlett and David Packard start Hewlett Packard
1943	Alan Turing develops the code-breaking machine Colossus
1949	Claude Shannon builds the first machine that plays chess
1950	The first electronic computer is created in Japan by Hideo Yamachito
1953	The IBM 701 becomes available and a total of 19 are sold to the scientific community
1964	IBM introduces the first word processor
1971	Email is invented by Ray Tomlinson
1972	Atari releases Pong, the first commercial video game
1975	Microsoft is founded by Bill Gates and Paul Allen
1976	Apple Computers is founded by Steve Jobs and Steve Wozniak
1982	The Commodore 64 becomes the bestselling computer of all time
1985	The Nintendo Entertainment System makes its debut
1991	The World Wide Web is launched to the public
2002	Approximately 1 billion personal computers (PCs) sold to date

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Sources taken/adapted from:

Text A: Sourced from: https://www.youtube.com/watch?v=Ag_zPbo_9Qk&feature=share

Text B: Sourced from: https://www.nbcnews.com/news/asian-america/deep-blue-creators-life-story-moves-stage-big-screen-n225311

Text C: "The True Story of Hidden Figures and the Women Who Crunched the Numbers for NASA", from Popular Mechanics, February 2017 By Matt Blitz, reprinted with permission of Hearst Magazine Media, Inc.

Text D: Sourced from: https://www.infograde.com/technology-infographics/brief-history-of-computers/