
GLOBAL PERSPECTIVES & RESEARCH

9239/13

Paper 1 Written Examination

May/June 2019

1 hour 30 minutes

INSERT (RESOURCE BOOKLET)

READ THESE INSTRUCTIONS FIRST

This Resource Booklet contains Documents 1 and 2 which you should use to answer the questions.

You should spend approximately 10 minutes reading the documents before attempting to answer the questions. This is allowed for within the time set for the examination.



This document consists of **3** printed pages and **1** blank page.

The following documents consider issues related to technology and lifestyles. Read them **both** in order to answer **all** the questions on the paper.

Document 1: adapted from *What Happens to Society When Robots Replace Workers?*, an article written by William H Davidow and Michael S Malone in 2014 and published in the Harvard Business Review, USA. Davidow is an author, high technology industry executive and venture capital advisor. Malone is an author on high technology and a contributor to The Wall Street Journal, a US business-focused newspaper.

The technologies of the past replaced human muscle, increased productivity and achieved rapid economic progress. The technology of the future, by replacing man's senses and brain, will speed up economic progress further. However, it risks leaving millions of people without employment.

In the past, progress came more slowly. Henry Adams, the historian, measured technological progress by the increase in power generated from coal. He estimated that power output increased by about 7% per year between 1840 and 1900. By contrast, progress today comes rapidly. Between 1960 and 2003 the capacity for information storage in computer memory has increased by 60% per year. Semiconductor technology has also progressed at a rapid rate for more than 50 years. The rapid development in these two areas has helped create intelligent machines, from robots to automobiles to drones. These machines will soon dominate the global economy and so drive down the value of human labour with astonishing speed. This is why we will soon be looking at masses of citizens with zero economic value.

If you doubt the speed that technology is replacing workers, look at Foxconn. It is the world's largest manufacturer of gadgets such as the iPhone and iPad. It employs more than one million workers in China. In 2011, it installed 10,000 robots, called Foxbots. Today, it is installing them at a rate of 30,000 per year to perform routine jobs more cheaply such as spraying, welding, and assembly. In 2013, Foxconn's Chief Executive Officer reported "We have over one million workers and in the future we will add one million robotic workers." This means that the company will avoid hiring those next million human workers.

Technological progress has always displaced workers, but created new opportunities for human employment, at an even faster rate. This time, however, things may be very different, especially as the human factor is taken out and computers do business only with other computers. One of the main features of this new virtual economy is the replacement of workers with intelligent machines.

Suppose, today, that these robots and smart machines are only capable of doing the work of a person of average intelligence. Imagine that the technology in those machines continues to improve at the current rate. By 2025 these machines will have an IQ greater than 90% of the US population and would put another 50 million jobs in the US within reach of smart machines. Impossible? In fact, the first of those high-IQ machines is already here. The minds of highly educated medical doctors are no longer needed in some applications. In 2013, the US Food and Drug Administration approved Johnson & Johnson's Sedasys machine, which sedates patients without the need for an anaesthesiologist. And a recent study published by the Royal Society showed that computers considerably outperformed radiologists in identifying the appearance of dark images on X-rays.

Politicians, economists, and scientists might debate these estimates, but this misses the larger point. Machine intelligence is already having a major effect on the value of work. This effect will continue to increase, leaving humans without employment.

Document 2: adapted from *In Japan, the Rise of Machines Solves Labor Shortage*, an online article written by Yoshiaki Nohara in 2015 for Bloomberg news. Bloomberg is a New York private financial software, data and media company. The author is an economics reporter for Bloomberg news, Tokyo, Japan.

The rise of machines in the workplace has US and European experts predicting massive unemployment and rapidly falling wages. Not in Japan, where robots are welcomed by the government as a solution to the country's aging population, shrinking workforce and public dislike for immigration.

Japan is already a robotics powerhouse. Prime Minister Abe wants more and has called for a "robotics revolution". His government launched a five-year plan to deepen the use of intelligent machines in manufacturing, supply chains and construction. This will expand the robotics market from ¥660 billion (USD 5.5 billion) to ¥2.4 trillion (USD 20 billion) by 2020.

The head of the Asia-Pacific technology practice at Boston Consulting Group Inc. says "The labor shortage is such a serious issue that companies have no choice but to boost efficiency." He added that by 2025, robots could cut 25% off factory labor costs in Japan.

Automation has huge potential for the distribution industry. Toho Holdings Company has recently built a ¥10 billion distribution center which employs about 130 workers. This is about half the number of workers at another center of similar size. According to the company, productivity per worker at the new center is 77% higher, with robots handling most of the item-picking. The company's executive managing director says "We wanted to lower manpower requirements by using robots because we found it hard to recruit people, including part-time workers." Arai, a 27-year-old worker states "It's easy for women to work here. You don't need to lift heavy things."

Japan has been a leader in factory robots, especially in the car industry, for years. However, with China and South Korea making automated machines of their own, the new focus is on service robots. The Japanese government aims to make the service robot market twenty times bigger, reaching ¥1.2 trillion by 2020. Cyberdyne Inc. leads this industry. It has developed a bionic suit that detects signals from the wearer's brain to their muscles. This assists movement, reduces physical exertion and means less strain for factory and construction workers. The president of Cyberdyne thinks robotic suits will someday be so embedded in people's lives that they will forget they're wearing them.

Some companies are adopting these bionic suits and power-assist systems to boost efficiency and lower the burden on their workers. Yutaka Tanikawa, who runs the Tokiwa Koutai Company, an aluminium processing firm, wants this new technology to boost productivity and ease backaches for older workers. Yoshinao Kawasaki, a 54-year-old worker says "I can hardly stand on my feet when my back aches a lot. I don't know how the robot will work, but I'm looking forward to it." Robots are also a recruiting tool. Tanikawa has to search for recruits at schools and job fairs. He hopes robotic suits and power-assist systems will add a cool touch to dusty, sweaty factory jobs and attract younger employees in the face of the worst labor shortage in 23 years.

It would seem then, that as the president of Cyberdyne thinks, robots aren't a threat, but a solution to social issues in Japan.

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