



VICTORIA JUNIOR COLLEGE, SINGAPORE  
General Certificate of Education Advanced Level  
Higher 3

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**ECONOMICS**

Paper 1

**9808/01**

**September 2016**

**3 hours 15 minutes**

Additional Materials:      Answer Paper

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**READ THESE INSTRUCTIONS FIRST**

Write your index number and name on all the work you hand in.

Write in dark blue or black pen on both sides of the paper.

You may use a soft pencil for any diagrams, graphs or rough working.

Do not use staples, paper clips, highlighters, glue or correction fluid.

**Section A**

Answer **all** questions.

**Section B**

Answer **two** questions.

At the end of the examination, fasten all your work securely together.

The number of marks is given in the brackets [ ] at the end of each question or part question.

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**This document consists of 8 printed pages.**

## Section A

Answer **all** questions on this section

## Disruptive Technology

### Extract 1: The rise of Artificial Intelligence (AI)

Google DeepMind's artificial intelligence system beat a top-ranked player of the board game Go in a televised match in South Korea, providing the first evidence that the company's software has attained superhuman status at a challenging 2,500-year-old strategy contest. "It'll never get tired and it'll never get intimidated," said DeepMind cofounder Demis Hassabis, at a press conference Tuesday ahead of the match. "These are the main advantages."

The breakthrough astounded experts, who'd previously thought it would be five to 10 years before AI would be good enough to play Go, and positions Google as a leader in the next generation of super smart computing. The search giant already uses AI in a range of products automatically writing emails, recommending YouTube videos, helping cars drive themselves.

What sets DeepMind's approach apart from traditional Goplaying software is its use of a technology called a neural network, which lets computers learn from experience, rather than specific programming. This enables it to learn by studying example games, then by playing millions of games against itself, inferring the rules and, eventually, developing long-term strategies it can use to try to win.

*Adapted from Bloomberg Business 9<sup>th</sup> March 2016*

**Table 1**

**Research and Development Expenditure as a percentage of Gross Domestic Product**

Country Name	2008	2009	2010	2011	2012	2013
East Asia & Pacific (developing only)	1.42	1.45	1.70	1.68	1.90	1.84
India	0.84	0.82	0.80	0.82	0.82	0.82
Malaysia	0.79	1.01	1.07	1.06	1.13	1.13
Low & middle income	0.99	1.05	1.14	1.20	1.42	1.42
Middle income	1.00	1.06	1.15	1.20	1.42	1.42
Upper middle income	1.04	1.17	1.23	1.29	1.45	1.64
Euro area	1.89	1.99	1.99	2.04	2.10	2.10
Finland	3.55	3.75	3.73	3.64	3.42	3.31
Greece	0.66	0.63	0.60	0.67	0.69	0.80
Israel	4.39	4.15	3.96	4.10	4.25	4.21
United States	2.77	2.82	2.74	2.77	2.81	2.81
Singapore	2.62	2.16	2.01	2.15	2.00	2.00
High income: OECD	2.41	2.49	2.46	2.49	2.55	2.55
World	2.03	2.06	2.06	2.06	2.18	2.18

\*2014 and 2015 data not available as of 17<sup>th</sup> June 2016. Some 2013 are expected value from 2012

*Adapted from World Bank 17<sup>th</sup> June 2016*

**Table 2****Number of Research and Development Staff per million population**

Country Name	2008	2009	2010	2011	2012	2013
East Asia & Pacific (developing only)	1188.24	735.05	914.57	970.91	1051.82	1089.19
Malaysia	600.96	1070.39	1467.07	1653.38	1793.55	1793.55
Upper middle income	973.96	758.08	812.01	865.17	998.89	998.89
Euro area	3177.26	3254.00	3364.77	3398.45	3508.50	3580.31
Finland	7692.44	7648.88	7717.47	7413.63	7460.10	7187.93
Singapore	5740.84	6148.96	6306.52	6495.99	6442.28	6442.28
High income: OECD	3794.36	3856.00	3859.78	3958.75	4028.91	4028.91
United States	3911.75	4071.79	3866.96	4010.84	4018.63	4018.63

\*2014 and 2015 data not available as of 17<sup>th</sup> June 2016. Some 2013 are expected value from 2012

*Adapted from World Bank 17<sup>th</sup> June 2016*

### **Extract 2: Will Amazon take over the world?**

Companies like Google, Facebook, Apple and Amazon have used the Great Recession as an opportunity to think big, invest and take the world by storm with their products and services. All four of these firms' success is obviously and irrevocably linked to technology. But one of these companies — Amazon — is a tech company that is firmly rooted in the age old industry of retail, in the everyday business of getting the products from the people who make them to the people who want them. And because of this — and Amazon's ceaseless innovation — it is perhaps the most disruptive company of the four, and it's poised to integrate itself in Americans' lives in ways that no other company is capable of.

According to Greg Girard, an analyst in the retail industry, Amazon's greatest strength is that "its customer relationships are inherently one to one, more akin to what telecoms and banks have with their customers." While brick and mortar stores are black boxes — customer behaviour inside the store is effectively invisible to managers — Amazon is able to collect endlessly useful information about shoppers and use it to sell more stuff by targeting customers through email and the website itself.

*Adapted from TIME 16<sup>th</sup> July 2012*

### **Extract 3: When cheap is not so cheap**

When managers are choosing where to locate a new factory, their decision depends on many things. Cost is one of them. But costs come in many forms and change constantly. Alongside labour costs, there are also those for raw materials, energy, transport and much else besides. Currencies move too. Yesterday's low cost location may turn out to be tomorrow's money pit.

Rising Chinese wages have received much attention in recent years, with observers wondering what the next cheap Asian country will be to take a chunk of China's manufacturing job growth. Average factory wages have more than quintupled, in nominal, Renminbi

denominated terms since 2004. Productivity levels have also grown, but China's currency has appreciated, offsetting some of the savings.

Costs matter in different ways to different manufacturers; low cost labour matters more to firms that make clothes, whereas cheap energy is much more important to the chemicals industry, notes Justin Rose of a consulting company.

Proximity to markets, for example, remains a great strength for some manufacturing bases. Once they are established, local clusters—of employees, infrastructure and knowhow—become a durable advantage, as in China's case. But Mr Rose argues that as the cost advantage of a country like China or Russia deteriorates, hard-to-measure factors such as corruption assume greater significance. If a "low-cost" country is just a few percentage points cheaper when it comes to routine costs, but more troublesome in other ways, the comparison can become "a wash", he says.

*Adapted from the Economist 2<sup>nd</sup> Sept 2014*

#### **Extract 4: Chinese Part-Time Workers Soar As Economy Deteriorates**

Squeezed by high costs and unpredictable demand, some factories in southern China's manufacturing heartland are turning to a new strategy to survive: hiring workers by the day. Factory owners in this leatherworking town, and in those nearby, say just-in-time labour allows them to stay competitive, even if day wages can be higher, individually, than full-time salaries.

Workers, operating in a legal grey area, say they tolerate the conditions because many fear factories offering permanent jobs could fail to pay if clients dry up and the manager runs off.

"We never used to hire temporary workers, because labour costs were not very high. Our workers were permanent staff," said Huang Biliang, who runs a button factory in the southern city of Dongguan. "But recently we've started to hire more temporary labour." In a stainless steel factory in the nearby town of Jiangmen, David Liang, a manager agrees: "Every additional (permanent) worker I hire is an additional risk."

*Adapted from zero.hedge website assessed on 28<sup>th</sup> June 2016*

#### **Extract 5: China Wants to Replace Millions of Workers with Robots**

China is laying the groundwork for a robot revolution by planning to automate the work currently done by millions of low-paid workers.

The government's plan will be crucial to a broader effort to reform China's economy while also meeting the ambitious production goals laid out in its latest economic blueprint, which aims to double per capita income by 2020 from 2016 levels with at least 6.5 percent annual growth. The success of this effort could, in turn, affect the vitality of the global economy.

Many of the robots on show at various conference's exhibition hall were service or entertainment robots such as automated vacuum cleaners, cheap drones, or quirky looking machines designed to serve as personal companions. But there were also many industrial robots that signalled the real impetus for China's robot push: its manufacturing sector.

China is already the world's largest producer of everything from clothes to electronics, but much of it depends on low-cost, low-skill labour. And even as economic growth has slowed,

wages continue to rise across the country as the economy evolves. The Chinese government is also eager to see its workforce diversify and its manufacturing industries become more technologically advanced.

Robots might offer a clever solution to some of these challenges. If more robots can be deployed successfully in many manufacturing plants, this would increase efficiency while also allowing some workers to be replaced. At the same time, because more capable robots will require advanced sensing, manipulation, and intelligence, the drive could help promote the technical expertise of the remaining manufacturing workers, as well as those employed in designing, building, and servicing these manufacturing machines.

The scale of this robot revolution could be enormous. Two years ago China became the world's largest importer of robots, and the International Federation of Robotics, an industry group, estimates that China will account for more than a third of all industrial robots installed worldwide by 2018. Yet the number of robots per worker in China is far lower than in many industrially advanced countries, indicating a huge potential for growth.

A more comprehensive effort to upgrade China's manufacturing base is already underway, under a program announced in May known as Made in China 2025, which aims to make China an innovative and green "world manufacturing power" by that year. The effort involves adding connectivity and intelligence to manufacturing equipment and factories, to improve overall flexibility and efficiency. It was inspired by Germany's Industry 4.0 effort, launched in 2011, and by similar efforts to promote more advanced manufacturing in the U.S.

*Adapted from MIT Technology Review, Will Knight, 7<sup>th</sup> December 2015*

### **Extract 6: The Sharing Economy Doesn't Share the Wealth**

Every time Ian Haines rents out his spare room in the Australian port city of Albany, Airbnb takes a 13 percent cut. Haines, who's semi-retired, uses the extra money to supplement his income running a local farmers market. He says he's careful to pay taxes on the Airbnb money, because the San Francisco company may report the transactions to the Australian government.

For Airbnb, things are different. Because it manages its finances via units in Ireland and tax havens like Jersey in the Channel Islands, only a small part of its share of the revenue is ever likely to be taxed by Australia or the U.S. A review of Airbnb's overseas regulatory filings shows it has a far more extensive web of subsidiaries than it has publicly acknowledged—more than 40 in all.

This is the challenge that Airbnb, like Uber and other companies in the so-called sharing economy, poses for the world's treasuries. In the five years since these businesses began their spiralling growth, some cities and states around the globe have fought hard to make them play by the same rules as traditional hotels or taxis and collect various local taxes—often as not, they've lost. As the new breed of companies moves toward profitability, transforming larger chunks of the economy, policy experts say the battle is likely to shift to the national level, where billions of dollars a year in corporate taxes could be at risk.

Irish law makes it easy for multinationals to shift profits to tax havens by assigning valuable intellectual-property rights there. Airbnb has two subsidiaries, Airbnb International Holdings and Airbnb 2 Unlimited, on Jersey, which has no corporate tax. Tax experts say that if Airbnb assigns its software IP to a Jersey unit, the company could shift much of the profit to the haven through royalty payments from its Irish subsidiary. Pharma and tech companies have used similar strategies to cut their overall tax rates to the low single digits.

*Adapted from Bloomberg 6<sup>th</sup> April 2016*

### **Extract 7: AI could increase unemployment and inequality?**

The future is supposed to be a glorious place where robot butlers cater to our every need and the four hour work day is a reality.

But the true picture could be bleak. Top computer scientists in the US warned over the weekend that the rise of AI and robots in the work place could cause mass unemployment and dislocated economies, rather than simply unlocking productivity gains and freeing us all up to watch TV and play sports.

*Adapted from Business Insider 15<sup>th</sup> February 2016*

### **Extract 8: Why Silicon Valley's Success Is So Hard to Replicate**

After decades of bafflement and frustration, the world is still struggling to guess the secret of Silicon Valley's success. Sure, the towns and cities at the San Francisco Bay's southern end have plenty of high-tech talent, but that's scarcely an explanation.

You can list the features that brought so many of them to the valley, but the riddle remains. Yes, the surrounding area has its share of universities, government research centres and commercial labs. And a start-up could hardly ask for more encouraging circumstances: a large pool of highly educated workers; access to plentiful venture capital; and a highly entrepreneurial, risk taking culture.

But Silicon Valley has no monopoly on any of those features. To be sure, pockets of innovation have emerged on a smaller scale elsewhere in the U.S., like North Carolina's Research Triangle and the Route 128 Corridor outside Boston.

Countries around the world are doing their best to copy the valley's magic. Take China, where companies in a variety of industries have boosted their research and development spending by an average of 64 percent every year for the past five years, and the Beijing government is making huge investments in the country's university system. The hope is that such an infusion of resources will generate a Silicon Valley-style synergy between industry and the research sector. The effort has been massive, but so far the results are anything but satisfactory.

What are the valley's emulators missing? As authors of *The Culture of Innovation: What Makes San Francisco Bay Area Companies Different?*, a 2012 joint study by the Bay Area Council Economic Institute and Booz & Co., we attempted to answer that question.\* What we found was a special trait that distinguishes Silicon Valley's firms from ordinary companies: the ability to integrate their innovation strategies with their business strategies. That one trait can make the difference between success and mediocrity—or worse. Our survey reported that Silicon Valley firms are almost four times as likely as the average U.S. company on Booz & Co.'s

annual Global Innovation 1000 study to have a tight alignment of their overall corporate strategy with their innovation strategy. Not coincidentally, the corporate culture of a Silicon Valley firm is also two and a half times more likely to be attuned to the company's innovation strategy.

*Adapted from American Scientific 14<sup>th</sup> March 2014*

### **Extract 9: MAS Proposes a "Regulatory Sandbox" for FinTech Experiments**

The Monetary Authority of Singapore (MAS) today released a consultation paper on proposed guidelines for a "regulatory sandbox" that will enable financial institutions (FIs) as well as non-financial players to experiment with financial technology (FinTech) solutions.

The FinTech landscape is fast evolving, with a proliferation of technological innovations and solutions. MAS encourages FIs to test and introduce these innovations if they are relevant, and do their own due diligence. However, there may be circumstances where it is less clear whether a particular FinTech solution complies with regulatory requirements or poses unacceptable risks. The uncertainty may stifle promising innovations, and may result in missed opportunities.

MAS recognises that failure is often a feature of such experiments and the purpose of the regulatory sandbox is to provide appropriate safeguards to contain the consequences of failure for customers rather than to prevent failure altogether.

*Adapted from Monetary Authority of Singapore 6<sup>th</sup> June 2016*

### **Questions**

- a Explain plausible reasons for the differences in research and development expenditure across countries. [6]
- b How has China maintained dominance in manufacturing goods for global consumption despite rising wage rates? [6]
- c Discuss the implications on economies which adopt disruptive technology. [8]
- d Critically assess how governments should respond to disruptive technology. [10]

[Total: 30]

## Section B

Answer **two** questions from this section

- 2 In his 2004 book 'Fooled by Randomness', Nassim Nicholas Taleb said of economic sciences: "You can disguise charlatanism under the weight of equations, and nobody can catch you since there is no such thing as a controlled experiment." [35]
- Discuss the extent to which this view of economics as being fraudulent is valid.
- 3 The economist's solution to climate change can be summarised in a single statement: "get the prices right!" [35]
- Otaviano Canuto, Senior Adviser and former Vice President, World Bank
- Explain the theories that economists have offered on the cause of global warming and evaluate the suggestion that this problem can be solved by getting the price of carbon emission right.
- 4 'Advertising expenditure is an economic waste.' Discuss. [35]
- 5 To what extent do you agree that natural resources determine world trade patterns? [35]
- 6 The use of strategic trade policy would only serve to stifle a country's progress and countries should instead embrace greater economic integration. Discuss. [35]
- 7 Outsourcing, foreign direct investment, multinational companies, free movement in capital and free trade do not resonate with the average person on the street. They only resonate with a privileged few. Discuss this view. [35]

- End -