

SECTION A

Answer **all** questions in this section.

Question 1 Research & Development (R & D)

Extract 1: The importance of R&D, intellectual works and innovations

The importance of R&D, intellectual works and innovations has been much debated in recent years. Software companies develop new programmes and applications for entertainment or professional activities, new and more effective drugs are discovered by pharmaceutical companies and artists write books and songs to entertain their fans.

Entrepreneurs would not invest money in innovation if it were not for the prospect of earning large profits. But if an innovation can be copied and reproduced by other firms, the original inventor is unlikely to recover the money invested in creating new products, as the competition by the firms that have “borrowed” their ideas will drive the price down to the marginal cost of production.

Given that the social rates of return to R&D are substantially above private rates of return and their paramount importance to foster economic growth and increase consumers’ utility, these provide the main justifications for government subsidies to R&D. In an effort to increase their level of innovation, many countries have turned to fiscal incentives for R&D, often involving substantial sums of taxpayers’ money.

Intellectual works have also received protection through intellectual property (IP) laws, in particular in the form of copyrights and patents. IP laws are necessary as ideas, once invented, can be imitated by others. Patents are granted rights provided to manufacturers or innovators in different fields, for example the pharmaceutical industry, to exclude others from making or selling the innovation. These patents usually last for a period of time before it expires. Many countries aim to grant patents only to innovations that were useful and genuinely novel, but many are also struggling to determine which innovations are really worth being patented. Although patents have its drawbacks, one cannot deny the importance of patents to protect one’s innovation.

Adapted from How Important is Business R&D for Economic Growth and Should Government Subsidise it?
Rachel Griffith, IFS, 2000

Extract 2: Singapore - Drugs not working, biomed still down

Anyone holding their breath for the long-awaited rebound in the important but highly volatile pharmaceutical industry could be disappointed. The indications are that the sector – a star performer in recent years – may not provide the much-needed shot in the arm to local manufacturing any time soon.

Expiring drug patents, delayed approvals for new treatments and the rise of generic drugs are clouding the industry’s immediate outlook, says the Singapore Government. An MTI statement said the short-term outlook for biomedical output will be weighed down by strong competition from generic drugs and delays in approvals for new pharmaceuticals.

The companies that operate plants here are global companies like GlaxoSmithKline and Schering-Plough, which invent and make their own drugs. But as patents for popular products run out, companies making copycats have been giving the big boys a run for their money. Analysts also noted that with the small number of big players here, of which one is said to account for 40 per cent of the industry’s output, company-level issues can have vast effects on industry figures – or even those of the economy. A company going bust can actually derail the economy and cause problems in the job market.

Adapted from The Straits Times, Thursday, 14 June 2008

Extract 3: A Competitive Economy

In 2011, MTI (Ministry of Trade and Industry) stated that they will continue to support the Economic Strategies Committee's goal of making skills, innovation and productivity the basis for attaining sustained economic growth of 3-5% for Singapore in the next decade. They will continue to invest in raising the capabilities of companies, and grow the talent base to support industry development. Further, MTI will step up efforts to nurture innovation capital by investing in R&D to drive higher value-add economic activities.

Productivity is critical to Singapore's sustainable long term economic growth, and to the improvement of standards of living for our people over time. The competitiveness of our industry clusters also needs to be supported by a strong intellectual and knowledge capital base.

The government has allocated \$16.1 billion to boost research, innovation and enterprise over FY2011-2015. Of this, MTI has been allocated \$9.26 billion to promote research and innovation-driven growth. The aim is to grow Gross Expenditure on R&D to 3.5% of GDP by 2015, through increased private sector R&D expenditure.

Adapted from Singapore Budget 2011

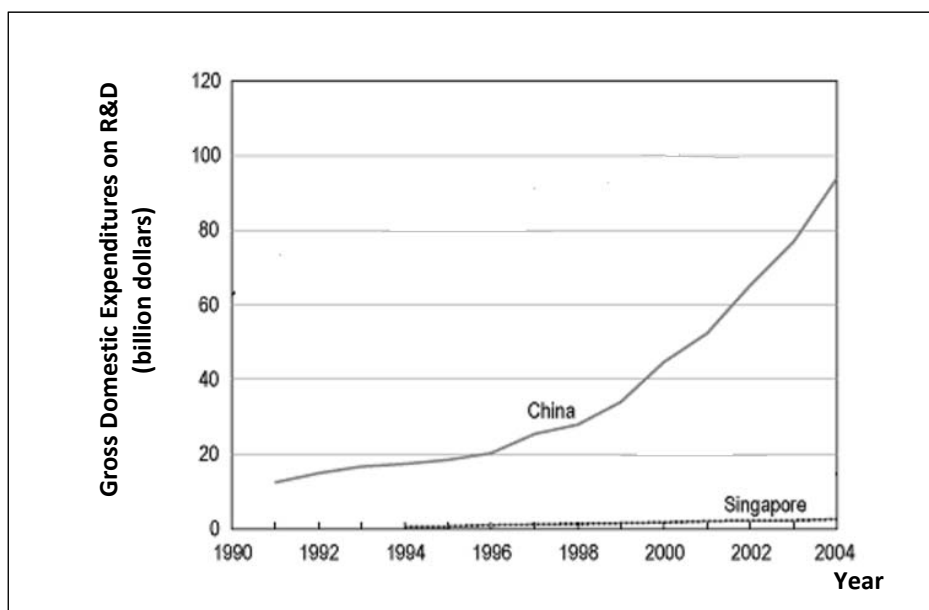
Table 1: Singapore's Multifactor Productivity: Contributions to Growth in Real GDP

	1997	2002	2003	2004	2005	2006	2007
Percentage Change in Real GDP	8.0	4.1	3.4	8.6	7.0	7.9	7.4
Contribution to Real GDP Growth (percentage points) by:							
- Capital Input	5.2	1.7	1.4	1.7	1.6	2.1	2.8
- Labour Input	2.8	-0.7	-0.6	0.8	1.9	2.9	3.7
- Multifactor Productivity *	-	3.1	2.6	6.1	3.5	2.9	0.9

Source: Singapore Department of Statistics

**: A change in multifactor productivity reflects the change in output that cannot be accounted for by the change in combined inputs. As a result, multifactor productivity reflects the joint effects of many factors including new technologies, economies of scale, managerial skill, and changes in the organisation of production.*

Figure 1: Gross Domestic Expenditures on Research & Development, 1990-2004



Source: Organisation for Economic Co-operation and Development, "Main Science and Technology Indicators" (2006)

Questions

- (a) (i) Compare gross domestic expenditures on R&D between Singapore and China from 1994 to 2004. [2]
- (ii) What can you conclude about the relative importance of multifactor productivity to Singapore's real GDP growth over the period 2002-2007? [2]
- (b) With reference to the data,
- (i) With the aid of a diagram, explain the impact on the drug market when its patent expires. [3]
- (ii) Identify the type of externality that exists in the pharmaceutical industry and explain how it leads to inefficiency in resource allocation. [5]
- (c) Discuss whether patents are better than subsidies in encouraging innovation in the pharmaceutical industry. [8]
- (d) In the light of the data provided, evaluate the importance of innovation in achieving sustained economic growth for Singapore. [10]

[Total:30]

Question 2 The Debt Crisis in Europe

Extract 4: Greece's Painful Road to Economic Recovery

Greece came under International Monetary Fund (IMF) supervision of its own will on 9 May 2010. That is when a memorandum of understanding between the government, the IMF, the European Central Bank and the European Commission passed into law, binding the Greeks to reform their economy in return for €110 billion over three years. With each instalment, the Greeks have to prove that they have taken specified steps to cut its budget deficit.

The Greek government called its restructuring plans the most ambitious fiscal adjustment ever undertaken by a European country. The gambit is to eradicate a €29.2 billion deficit over three years – no small feat for an economy which is now over €292 billion in debt. The government twice raised consumer taxes like VAT (from 19% to 23%), twice reduced public sector salaries and increased taxes on fuel, alcohol and tobacco. Other austerity measures announced in May 2010 included a three-year freeze in public sector pay and state pensions, reinstating of a special tax on high pensions, raising of the average retirement age from 61 to 63 (early retirement is restricted) and reduction in public-owned companies from 6,000 to 2,000.

If the government cannot cut the deficit by collecting tax revenues - a challenge in a country where people have long evaded income tax - it may be forced to impose a new indirect tax on the petrol that is used to heat homes in winter. Greece could be caught in a vicious circle as attempts to tackle debt will only further stifle economic growth. Unemployment is already at 12% and retail sales are at a seven-year low. Ingrained problems such as the underground economy, which now compromises about 30% of economic activity, as well as a bloated public sector and a dearth of competitive businesses, have hurt the country's productivity.

Adapted from The Times, September 2009 and The Irish Times, November 2010

Extract 5: Singapore 'not at risk yet from debt crisis'

The European debt crisis that has sent global markets into a frenzy is unlikely to have a significant impact on Singapore's economy - for now. Greece, Portugal and Spain - the European countries most burdened by expensive debt - account for only 0.3 per cent of Singapore's total exports, said DBS economist Irvin Seah. Singapore's economy is officially forecast to grow at a healthy 7 to 9 per cent this year.

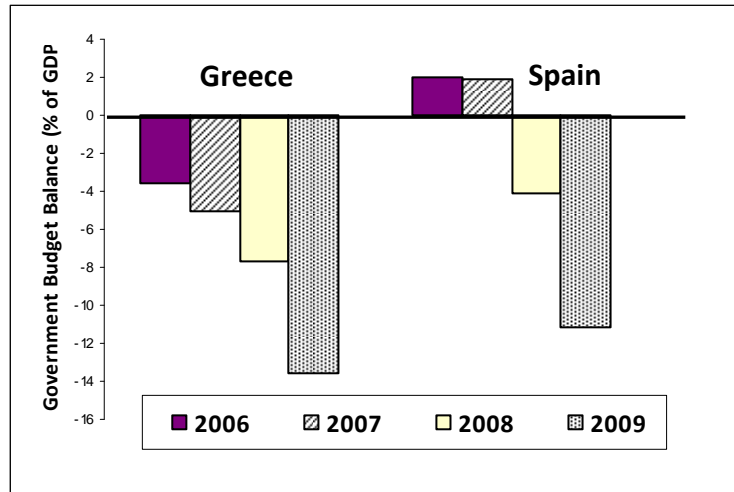
Many economists say that unless the European debt problem escalates into a global issue like the US sub-prime disaster, Singapore's economy will probably not be badly hit. Barclays economist, Leong Wai Ho, said that the European debt problem is relatively small in scale. Before the US sub-prime crisis, mortgage-related debt held outside the US was about US\$1.5 trillion (S\$2.1 trillion). In contrast, the combined Greek, Spanish and Portuguese debt held outside Europe is less than US\$150 billion, so the problems should be contained within Europe, he said. Greece also has the benefit of backing from the European Union, which will not allow the situation to degenerate.

'If the problem is quickly contained in Greece, then we are all okay,' said CIMB-GK economist Song Seng Wun. Indeed, Singapore might benefit if investors shy away from Europe and pour their money into fast-growing Asia instead, Mr Song said.

Nevertheless, it is too early to tell if Singapore will be largely insulated from the events in Europe. The region remains one of Singapore's largest export markets, buying about 12 per cent of the Republic's exports. Fortunately, in terms of exports to Europe, Singapore firms ship mainly industrial goods, such as pharmaceutical ingredients and high-value electronics components, rather than end-user consumer products.

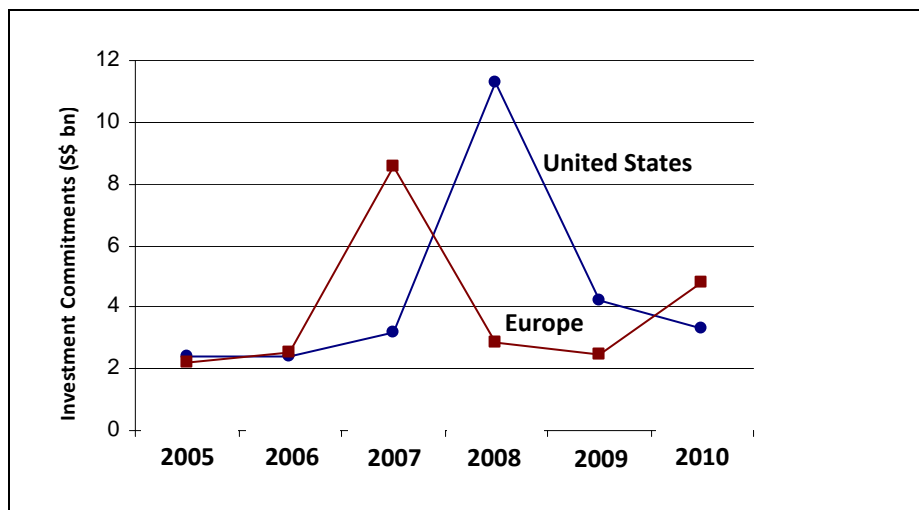
Adapted from The Straits Times, 10 May 2010

Figure 2: Government Budget Balance (% of GDP)



Source: <http://ec.europa.eu/eurostat>

Figure 3: Investment Commitments in Manufacturing & Services by Country of Origin (\$ billion)



Source: Singapore Yearbook of Statistics, 2011

Table 2: Singapore's Major Trading Partners, 2010

Top 10 Export Destinations	% share	% growth	Top 10 Origins for Imports	% share	% growth
Malaysia	11.9	27.5	EU	12.3	5.2
Hong Kong	11.7	23.9	Malaysia	11.7	19.7
China	10.3	29.8	United States	11.2	14.7
EU	9.8	26.9	China	10.8	22.0
Indonesia	9.4	18.8	Japan	7.9	22.5
United States	6.4	21.1	Taiwan	6.0	35.9
Japan	4.7	25.4	South Korea	5.8	20.5
South Korea	4.1	7.3	Indonesia	5.4	11.0
India	3.8	34.8	Saudi Arabia	3.6	30.2
Taiwan	3.6	38.4	Thailand	3.3	17.6

Source: Economic Survey of Singapore 2010

Table 3: Selected Macroeconomic Indicators

Greece	2006	2007	2008	2009	2010
Real GDP growth (%)	5.2	4.3	1.0	-2.0	-4.5
Unemployment Rates (%)	8.9	8.3	7.7	9.4	12.5
Inflation Rates (%)	3.3	3.0	4.2	1.4	4.7

Spain	2006	2007	2008	2009	2010
Real GDP growth (%)	4.0	3.6	0.9	-3.7	-0.1
Unemployment Rates (%)	8.5	8.3	11.3	18.0	20.1
Inflation Rates (%)	3.6	2.8	4.1	-0.2	2.0

Singapore	2006	2007	2008	2009	2010
Real GDP growth (%)	8.7	8.8	1.5	-0.8	14.5
Unemployment Rates (%)	2.7	2.1	2.2	3.0	2.2
Inflation Rates (%)	1.0	2.1	6.6	0.6	2.8

Source: OECD Statistics & Singapore Department of Statistics

Questions

- (a) (i) Compare Spain's budget balance as a percentage of GDP between 2006 and 2009 with that of Greece over the same period. **[2]**
- (ii) Explain possible reasons for your observations in a (i). **[4]**
- (b) Explain a possible opportunity and challenge of belonging to an economic union such as the European Union. **[4]**
- (c) (i) Describe the trend in Singapore's real GDP from 2006 to 2010. **[2]**
- (ii) To what extent would a prolonged economic downturn in Europe affect the performance of the Singapore economy? **[8]**
- (d) 'Greece could be caught in a vicious circle as attempts to tackle debt will only further stifle economic growth.' Discuss. **[10]**

[Total: 30]

SECTION B

Answer **one** question from this section.

- 3 (a)** Explain why pollution is a source of market failure. **[10]**
- (b)** Evaluate the impact of an anti-pollution tax to mitigate pollution in a country like China, on her economic growth and balance of payment. **[15]**
- 4 (a)** Explain why governments should be concerned with high inflation. **[10]**
- (b)** To what extent is gradual appreciation of the Singapore Dollar the best policy in maintaining low inflation in Singapore? **[15]**