Question 1

The Mobile Network Industry

Table 1: Real GDP Growth Rate and Mobile Phone Penetration Rate for Singapore

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Real GDP growth rate (%)	9.0	-1.2	4.2	4.6	9.2	7.4	8.8	8.9	11.7	-1.0	14.8	4.9
Mobile Phone Penetration Rate (%)	74.8	69.2	77.8	84.5	92.7	99.8	105.4	122.5	131.0	137.4	143.6	149.6

Figure 1

Global ICT developments, 2000-2010*



Extract 1: 'Cut-throat' competition among telcos likely to hurt margins

INTENSE competition within the local telecommunication industry is driving the service providers to adopt strategies to increase their share of the market. While competition is healthy for the industry, the ongoing price war among the telcos may hurt profit margins.

An analyst points out that competition now is a different game. The price war is confined to the growing prepaid* segment. The prepaid market segment has a high churn rate or low brand loyalty.

To increase the stickiness or loyalty of subscribers, mobile service providers will have to offer very competitive tariffs for same network calls. The mobile operators are increasingly tying subscribers to long-term contracts and subsidies for handsets, especially for the popular range of smartphones.

* prepaid: A **prepaid mobile phone** is a mobile phone for which credit is purchased in advance of service use. Users are able to to top up their credit at any time using a variety of payment mechanisms.

Source: The Star July 7, 2012

Extract 2: The Hidden Dangers of Electromagnetic Radiation

The cellular phone industry was born in the early 1980s, when communications technology that had been developed for the Department of Defense was put into commerce by companies focusing on profits. This group, with big ideas but limited resources, pressured government regulatory agencies—particularly the Food and Drug Administration (FDA)—to allow cell phones to be sold without pre-market testing.

According to a scientist named Dr. George Carlo, "Mobile cellular phones are low-powered radio frequency transmitters which produce microwave radiation. Cell phone users are being exposed every day to the dangers of electromagnetic radiation (EMR). Those phones and the signals from the tower-based antennas are slowly prompting a host of health problems."

Studies have linked the radiation from the handsets and from the tower-based antennas carrying the signals to development of brain tumors, genetic damage, and other exposure-related conditions like sleep disorders and headaches.

The debate over the cancer risks from this radiation has been going on for years. Yet the lack of any conclusive evidence has allowed the industry to claim phones and the towerbased antennas are safe and led to skeptics being dismissed as scaremongers. A wellfunded cell phone industry media machine continues to mislead the unwary public about the dangers of a product used by billions of people although they are fully aware of the dangers.

Unfortunately, many of us have little control over the location of cell phone towers and other broadcasting antennas that emit powerful radio frequency waves. There is an urgent need to increase public awareness of this issue and to get the governments do a better job of regulating the placement of cell phone towers and antennas. Governments in Austria, Switzerland, and many Eastern European countries have already created protective standards for human exposure to radio frequency radiation. In Scotland, towers are not allowed to be located near hospitals, schools, and homes.

Source: Adapted from Life Extension Magazine, 2007 & http://www.dailymail.co.uk, October 2010

Extract 3: Telecom Gear Makers Feel the Pinch in India

Telecom gear giants that make wireless network equipment such as Anglo-French company Alcatel-Lucent, Sweden's L.M.Ericsson Telephone Co., Finnish-German joint venture Nokia Siemens Networks and China's Huawei Technologies Co., had banked on strong demand from wireless operators in India for equipment to offer high-speed data services via third-generation mobile phone technology.

But these companies now face a major challenge in India as the telecommunications industry, struggles to regain its momentum. The Indian market is one of the largest in the world, but India's telecom operators are facing regulatory uncertainty as well as brutal tariff war.

India's Supreme Court revoked the telecom licences of several companies earlier this year, citing corruption in their allotment of the 2008 sale of spectrum for second-generation mobile phone services.

The pace of addition of new users has weakened considerably. Newer technologies, like 3G mobile phone services, also have struggled to take off in India. And the low penetration of high-end mobile handsets which can send and receive data at high speeds is preventing the development of a 3G ecosystem.

To add to the woes of foreign gear makers, the Indian government is proposing restrictions on the import of electronics and telecommunications equipment, arguing that it wants to stimulate domestic manufacturing and local job creation

Source: Adapted from various internet articles, July 8, 2012

(a)	(i)	Explain how it is possible for Singapore's mobile phone penetration rate from 2006 to 2011 to exceed 100%.	[2]
	(ii)	Consider whether the information in Table 1 suggests that higher rate of economic growth results in higher mobile phone penetration in Singapore.	[3]
(b)	(i)	With reference to Figure 1, compare the changes in mobile cellular telephone subscriptions and fixed telephone line subscriptions between 2000 and 2010.	[1]
	(ii)	Explain two possible reasons besides income for the observations identified above.	[4]
(c)		Using price elasticity of demand, explain why the 'price war is confined to the growing prepaid segment' in the local telecommunication industry rather than the postpaid market segment.	[4]
(d)		Explain one source of market failure present in the cellphone industry and evaluate a possible measure that the Singapore government can adopt to reduce this market failure.	[8]
(e)		"The Indian government is proposing restrictions on the import	[8]

of electronics and telecommunications equipment, arguing that it wants to stimulate domestic manufacturing and local job creation."

To what extent do you support this view?

TOTAL

[30 marks]

(a)	(i)	Explain how it is possible for Singapore's mobile phone penetration rate from 2006 to 2011 to exceed 100%.	[2]
		With rising economic growth in Singapore, consumers' incomes are rising and hence, their purchasing power also rises. As mobile phones are considered as normal goods, demand for it will rise. This may results in consumers owning more than one phone which leads to Singapore's mobile phone penetration rate to exceed 100%. (2m)	
		OR	
		There may be different subscriptions plans offered by different telecommunications operators. Thus, consumers may purchase more than one phone to enjoy the different services offered which leads to Singapore's mobile phone penetration rate to exceed 100%.(2m)	
	(ii)	Consider whether the information in Table 1 suggests that higher rate of economic growth results in higher mobile phone penetration in Singapore.	[3]
		There are some years where there is a direct relationship between rate of economic growth and mobile phone penetration, e.g. between 2000-2004 and 2005-2008.	
		However, this relationship was not observed for 2004-2005 and 2008-2009.	
		*Students who give both thesis and anti-thesis with evidences will be awarded full 3 marks. However, if students are only able to give a one-sided answer with evidences, only a maximum of 2 marks will be awarded.	
(b)	(i)	With reference to Figure 1, compare the changes in mobile cellular telephone subscriptions and fixed telephone line subscriptions between 2000 and 2010.	[1]
		Penetration of mobile cellular telephone subscriptions has risen while fixed telephone line subscriptions have remained relatively constant. [1m]	
		OR	
		Mobile cellular telephone subscriptions were lower than fixed telephone line subscriptions before 2001 but it has overtaken the latter and increased at increasing rate since 2001.[1m]	
	(ii)	Explain two possible reasons besides income for the observations identified above.	[4]
		Dd reasons: Increased labour mobility so need to be contactable while on the move.	
		Ss reasons: increased technology & connectivity and more intense competition among suppliers leading to cheaper prices for cellular phone devices/services.	
		*2 marks for each well explained reason.	

(c)	Using price elasticity of demand, explain why the 'price war is confined to the growing prepaid segment' in the local telecommunication industry rather than the postpaid market segment. Price elasticity of demand measures the responsiveness of quantity	[4]
	Demanded to a change in the price of the good, cetens panbus. Demand in prepaid segment is generally price elastic as prepaid subscribers are usually the young or lower-income consumers. They do not have high earning power and expenditure on mobile phone usage takes up a higher proportion of their income. This segment of the market has a high churn rate or low brand loyalty, i.e. subscribers have no qualms switching between operators based primarily on pricing and availability. Any price decrease will lead to more than proportionate increase in quantity demanded as the telecommunication operator is able to snatch customers away from rivals as they are not tied down by any plans.	
	However, the demand in the postpaid market segment is generally price inelastic as the consumers here are tied to long-term contracts where they are given discounts for same network calls and subsidies for handsets. Thus, any price cuts by rivals will not raise their quantity demanded by more than proportionate as the consumers who have signed up with rival telecommunication companies cannot switch to the cheaper operator.	
	*Explain why demand for prepaid segment is price elastic and why they will engage in price war. [2m]	
	*Explain why demand for postpaid segment is price inelastic and why they will not engage in price war. [2m]	
(d)	Explain one source of market failure present in the cellphone industry and evaluate a possible measure that the Singapore government can adopt to reduce this market failure.	[8]
	 Source of market failure: Negative externality (Production) Define negative externality: External costs inflicted on third parties that is not borne by the consumers or producers and not compensated for. Identify the third parties: People who do not use cellphone/People living near cell phone towers and other broadcasting antennas. Identify the external costs: From extract 3, "radiation from handsets and from the tower-based antennas carrying the signals to development of brain tumors, genetic damage, and other exposure-related conditions like sleep disorders and headaches. Due to the presence of external costs, it causes a divergence between MSC and MPC. (Explain with the aid of a diagram.) The socially optimum level of production is less than what the producers are producing. Hence, there is an over allocation of resources to the production of cell phone towers. 	

	*Stud failui med dang awai	Possible measure (1): Singapore government to regulocation and number of cell phone towers an broadcasting antennas. Evaluation of the measure: (+) This will ensure that there will be less human expradio frequency radiation. (-) Small land size of Singapore makes it difficult telecommunication operators to relocate their cell towers and other broadcasting antennas. Thus, all measures such as improvement in technology sh considered as well. Possible measure (2): Improvement in technology. Si government should invest in conducting resear development to seek ways to reduce harmful radiation from the cell phone towers and broadcast antennas. Evaluation of the measure: (+) Less harmful radiation emitted without having phone towers and broadcast antennas to be relocated. (-) Opportunity cost incurred as funds used for r development can be used for other purposes seducation and health.	ulate the d other osure to for the l phone ternative ould be ngapore ch and emitting the cell research such as f market industry bout the are fully	
	L2	failure. Explanation of the source of market failure and the	3-4	
		measure to reduce the market failure lacks sufficient depth.		
	L3	Well developed explanation of the source of market failure and the measure to reduce the market failure	5-6	
	E	A developed evaluation of the measure used to reduce the market failure	1-2	
(e)	"The elect to st	Indian government is proposing restrictions on the ir cronics and telecommunications equipment, arguing that imulate domestic manufacturing and local job creation."	mport of it wants	[8]
	 To w	hat extent do you support this view?		
	Thes	sis: Support the view		
	•	By restricting the import of electronics and telecommur equipment, domestic firms that produce such goods less competition from abroad and increasing demand	nications will face from the	

		 locals. Hence, domestic producers will seek to raise production to meet the rising demand. This will then lead to rising demand for factors of production such as labour and thus, there will be more jobs available for the locals (Derived Demand). Employment will rise.
	A	nti-thesis: Does not support the view
		• As stated in extract 3, "telecommunications industry, struggles to regain its momentum" and "low penetration of high-end mobile handsets which can send and receive data at high speeds is preventing the development of a 3G ecosystem". Thus, this means that the demand for electronics and telecommunications equipment is not high in the first place. With low demand for these goods, it will not stimulate domestic manufacturing and local job creation to a large extent even if restrictions is placed on the import of these goods.
		 Placing restrictions on imports → A method of protectionism
		May face retaliation from other countries. This will result in less demand for India's exports \rightarrow fall in AD \rightarrow RNI will fall \rightarrow less demand for goods and services \rightarrow rising unemployment as less labour is needed to produce the goods and services (labour being a derived demand) [Explain with the aid of AD/AS diagram]
		 This may also affect other industries in India if protectionist measures are imposed on them. → Higher cost of production for domestic firms (due to higher prices of imported factors of production) → Loss of jobs (lay off workers to reduce cost of production) → Higher prices of imported goods or less goods and services available for the consumers (affect SOL).
	P	ossible evaluation:
	P ot gr	lacing restrictions on import may only be a short-term solution as ther countries may soon retaliate and this will affect the economic rowth of India adversely.
	TI te to w eo ar	hus, instead of placing restrictions on the import of electronics and elecommunications equipment, the Indian government should seek increase the penetration of high-end mobile handsets so that there ill be a rising local demand for electronics and telecommunications quipment. This will then aid in stimulating domestic manufacturing nd local job creation.
	S re qu	ubsidies can also be given to domestic firms for them to engage in esearch and development so that they are able to produce better uality and more price competitive products as compared to imports.
1		

	L1	Mostly irrelevant answers.	1-2
	L2	Explanation is lop-sided or lacks sufficient depth.	3-4
	L3	A balanced and well developed answer on whether the Indian government should propose restrictions on the import of electronics and telecommunications equipment	5-6
	Е	Able to provide a stand with justification.	1-2