

CV002/ Engineers and Society
April/May 2016

Section A: Question 1

- a) ii
- b) ii (Penang and Melaka)
- c) i (Singapore only became Republic of Singapore in 1965)
- d) iv (Etiquette)
- e) i (WSHA)
- f) ii (WSHA is non-prescriptive in nature)
- g) iii
- h) ii
- i) ii
- j) ii

Section B Question 3

3a) Lim Bo Seng

- Lim Bo Seng who was born in China, was a loyal Chinese patriot who took part in fund-raising to help China in war against Japan

Contribution during the war:

- Provided British government with labourers for war effort and dynamited the causeway when Japanese troops advance towards Singapore.
- Went to India to be trained to fight in jungle and recruited resistance fighters for Force 136
- LBS sent first batch of Force 136 to Malaya to set up intelligence network in urban areas
- Smuggled secret messages in empty tubes of toothpaste, salted fish and even in the Force 136's members' own diaries.

How did he get captured:

- Lai Teck leaked out valuable information that allowed the Kempeitai to pick up coded messages from Force 136
- Lai Teck betrayed LBS, causing him to be captured and tortured by the Japanese as he refused to reveal names of his people
- LBS fell ill and died due to lack of food and unhealthy living condition

3b) 3 new key principles of WSHA

1. Reduce Risk at source by requiring all stakeholders to minimise risks which they create
 - Occupiers, employers, suppliers and persons at work will have responsibility to identify & prevent or mitigate risks at source
 - Change from managing risk to identifying & eliminate before they are created
2. Industry will be required to take greater ownership of safety outcomes
 - From Prescription to Goal setting for safety standards. Employers to develop actionable plans to achieve OSH desired outcome.
 - Change from compliance with "Letter of the law" to proactive planning to achieve a safe workplace
3. Prevent accidents through higher penalties for poor safety management
 - Greater financial incentives, disincentives and penalties
 - Change from accidents are costly to poor safety management is costlier

3c) 4 Key issues ASEAN facing

1) Terrorism

- SEA (Southeast Asia) region is a recruiting ground for ISIS and JI
- Singapore (homeland security) works with neighbours (Malaysia and Indonesia) to exchange info and intelligence on IS and JI
- SPF works with neighbouring counterparts to strengthen border control and exchange terrorist suspects
- Singapore's security and intelligence agencies share best practices on counter-terrorist ideology

2) Trans-boundary Haze

- Especially severe in 2015, affecting Singapore, Malaysia, Thailand and Philippines
- Shares the weather and meteorological data and hot-spots of forest fires with neighbours
- Deepens cooperation and shares info on errant companies to account for their irresponsible practices of land and forest burnings
- Singapore advocates early operationalization of ASEAN Sub Regional Haze Monitoring System

3) South China Sea (SCS) Dispute

- China and some ASEAN members have laid claims on the SCS territory
- As a Non-Claimant State, Singapore urges all parties to exercise maximum restraint, refrain from provocative actions or use of force, commit to accident prevention measures and non-militarization of land features in SCS
- Singapore is a transparent and objective coordinator for ASEAN-China Dialogue Relations
- Singapore works towards achieving a Code of Conduct for SCS for all claimant states and ultimately a win-win outcome for this dispute

4) AEC (ASEAN Economic Community) Integration

- AEC was established at end of 2015
- Singapore is facilitating to achieve a single market production base, with free movement of goods, services and skilled labour.
- Singapore also working with other members to ratify the ASEAN Open Skies agreement and concluding a high quality Regional Economic Comprehensive Partnership
- As coordinator of ASEAN-China Dialogue Relations, Singapore is helping to deepen the economic ties between AEC and China, the world's second largest economy.

3 d) Main purpose and 5 key areas

Purpose:

- To make Singapore a vibrant and resilient economy with sustainable growth that creates value and opportunities for all in
- to address 5 Areas of Singapore Economic Growth future growth which are industries and markets, corporate capabilities and innovation, jobs and skills, urban development and infrastructure, and connectivity

5 key areas:

A) Future growth industries and markets

- Identify and design growth strategies for priority clusters in Singapore
- Enable companies to seize opportunities in the global marketplace.

B) Corporate capabilities and innovation

- Recommend strategies to enable companies and industry clusters to develop innovative capacities,
- Use technology as well as new business models and partnerships to create value.

C) Jobs and skills

- Assess the impact of demographics and technology on the labour force,
- Recommend strategies to create and re-design jobs, and to equip Singaporeans with the skillsets needed for the future

D) Urban development and infrastructure

- Recommend strategies to enhance our infrastructure and develop sustainable urban spaces
- To create an outstanding living environment for our people and reinforce economic advantage

E) Connectivity

- Study modern connectivity and flows in the future global economy
- Recommend how Singapore can continue to be a hub that brings value to Asia and the world.

Section B Question 4

4a) 4 Possible threats posted by ISIS

1) Threat of terrorist attack- not "if", but "when"

- Anticipate and prepare for attacks
- Strengthen our security forces, intelligence capabilities, and border controls
- Everyone is responsible for collective security of Singapore

2) Threat of radicalization of a part of Muslim population

- Through social media, many people are brainwashed
- Everyone including Muslim community and government and society must do their part to check this trend
- Government with help of families and religious bodies to rehabilitate the offenders and re-integrate them into society

3) Threat of Muslim Population growing distant from society

- False teaching about Islam advocating separation from mainstream and other faiths
- Monitoring and self-regulating of foreign preachers by religious bodies
- Authorities will not tolerate foreign teachings that go against multi-cultural and multi-ethnic harmony

4) Islamophobia among non-Muslim community

- Through social media, people are brainwashed easily
- Some reports of intolerance towards Muslims by non-Muslims
- A serious problem if this perception becomes widespread
- Non-Muslims should reach out and encourage Muslims to confront extremism by IS or JI perpetrators

* Everyone is responsible for national security and social harmony

4b) 4 Positive Impacts of Globalisation on Singapore

A) Boosting Economic Growth

1. Globalisation has helped Singapore attain actual economic growth through **increased international trade**.
2. Singapore has **relied heavily on exports** for economic growth.
3. **Net exports** make up **the largest** component of Singapore's **GDP**.
4. Increasing **actual growth** also helps Singapore achieve **full employment**, or alternatively low unemployment.

B) Attracting FDI (Foreign Direct Investment)

1. Foreign direct investment (**FDI**) have helped Singapore achieve **potential economic growth**.
2. Potential growth is the **increase** in the economy's potential **capability to produce output**.
3. Transfer of physical capital, human capital, and technology from MNCs helped increase Singapore economy's productive capacity.

C) Increased Labour Flow

1. Singapore has also benefited from increased labour flows across **international borders**.
2. **Importing foreign labour** leads to an **increase in Singapore's labour** which raises the **economy's productive capacity**.
3. This is a relatively efficient and **cost-effective** way of **increasing potential growth**.

D) Low Inflation

1. Globalisation has helped Singapore keep inflation low.
 2. By **importing raw materials** from other countries at **low prices**, it helps Sg to **lower costs of production** which results in **lower prices** for final products.
 3. Importing necessities and other finished products helps keep the general price level down.
- *Globalisation increases the Singapore economy's productive capacity which lowers prices.

4c) HDB (shortage of housing):

- Singapore Improvement Trust (SIT) replaced by HDB priority to build many low-cost housing units
- First priority during formation was to build as many low-cost housing units as possible,
- Home ownership for people scheme introduced to help people buy flats instead of rent
- Efforts to convince people living in squatters to move into flats were not successful, only successful after Bukit Ho Swee Fire
- HDB efficiency and earnestness won the people over
 - * 85% of Singaporeans live in HDB flats
- HDB were luxurious as they were spacious and equipped with basic services such as electricity, flush toilets and piped water
- By 1976 50 Percent of the population in HDB, improvement from 8.8percent living in SIT
- Singapore's first town (Queenstown – initiated by SIT developed by HDB)
- Second new town (Toa Payoh developed entirely by HDB)

4d) Nicol Highway station

1) Cause of the Collapse

A) Under-design of the diaphragm wall using Method A

- Mechanical properties of drained soil were used for Finite element analysis of ground conditions
- Data for Undrained soils should be used

B) Under-design of waler connection in strutting system

- About 10% underestimation of strut loads at level 9
- 50% underestimate of wall bending moments
- 50% underestimate of wall deflections

* Resulted in failure of 9th level strut-waler connection

2) Impacts

- Gas, water, electricity cables snapped causing power outage
- Police cordoned off bridge and roads leading to Nicoll Highway affecting thousands of commuters
- Cost of damage arising from the disaster was estimated to be in millions
- Delay in project stopped work for eight months before the Nicoll Highway is opened again
- Excavation works at all MRT Circle Line sites under the charge of the main contractor were temporarily suspended

3) Fundamentals principles of engineering code and ethics

A) Perform services in area of competence

- When designing diaphragm wall, wrong use of mechanical properties of soil were used
- When design waler connection in structing system, force, moment and deflections were underestimated
- Should the engineer be competent, it will not result in miscalculation for numerous aspect of the structural design

B) Hold paramount the safety, health and welfare of public

- Both Paul Broome (professional engineer for temporary works) and Ng Seng Yoong did not complied with his duties as a Qualified Person
- BCU did not received 26 reports of instrument readings that Ng should have been submitted over the past six months.
- Alert Level breached at many points: More than 2,000 instruments on site that served as red flags for safety breaches
- Ng did not hold paramount the safety, health and welfare of public as he did not submit the instrumental readings be submitted and conduct check on the safety instruments which serves as a safety checkpoint for the site.

Good Luck and All the Best! ☺

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