Firstly, the same as MT2002, Benson and Jasmine is the classic pair for lecturing. You cannot expect score like A or A+, the average will be B and B+. There does existing one or two student can score A but it really depends. The questions are usually not shown in the lecture and it does help to attach some real life example. I got an A- during my term but no student score A volunteer to do this PYP. Before the start of answer, due to I am in Norway during the time of compiling this answer, there might not cover all I wrote in exam because I do not bring over my notes. Sorry for that but I will try my best to give out standard answer below. I hope my answer helps. Best wishes for your exam!

Q1:

(a) The revenue generated by port services (cargo handling, storage and distribution, bunkering etc) can have a magnified effect on the economy.
The initial injection of spending (e.g. cargo handling) by ships calling at the port for direct needs generate 'direct' multiplier effects.
Therefore, in this case, direct multiplier effect on output for Port X is
82800+9000=91800
(b) Direct Multiplier on income is 82800+9000-(70200+8000)=13600
(c) Direct Multiplier on income for port X is 13600/91800=0.148

Q2

(a) Major criteria in ocean carrier's perspective in selection of ports including:
   – Cargo-generating potential (i.e. load centre effect): Carrier in size must decide port of call depends on the port's cargo generation ability. The logic behind is that ship must get enough cargo to cover their operating cost. For big vessels they need to call ports with larger cargo generation ability and for small vessels they can ball ports with smaller cargo generation ability. Example as Maersk EEE calls Singapore which is hub port rather than feeder port such as Penang.
   – Port charges : Carrier must consider port charges when they call a port. Port charges decide what they can place their freight at. However, if other consideration exceeding the cost of extra port charge, they might choose to berth this port. The example of Singapore port is an example, service quality of the port exceeding the extra port charge for berthing in Singapore.
   – Level of efficiency: Efficiency of the port also matters when ships call a port due to all ship wants to operate under full usage in sea voyage. If a port working extra slow or need to play around with government ship company might not go for that port. Port of Singapore and some other big port efficiency is higher, which create convenience for ship operators.
   – Nautical access: The access is one of the key factors that affect the call, if a ship cannot call the port, it cannot sail to there. Example as port of Xiamen, the berth in port located in city has draft limited of 13 meters and air draft of 58 meters. Which means EEE ships under full load will not be granted to enter.
   – Berth allocation policy (international cargo, deepsea, feeder, barge): The effect of berth allocation policy is considered minor in these factors. However, it still need to be considered as the crane size affect loading and unloading. Position in port for vessel to make a turn also matters when draft is limited, shallower turning position will make vessel easier grounded. Example arise in port of Xiamen, turning in

Haicang berth give vessel at least 3 meter of clearance but turning in Dongdu birth only allow 0.5 meter clearance during low tide.
- Strategic fit with shipping company's and shippers' logistics network strategies: The factor is important when shipper wants to deliver goods through carrier's inland transportation system so that they can get their goods as soon as possible at lower transportation cost. Example as Virginia inland port, only few ports such as Virginia port connected to the inland port so if cargo wants to go to inland port, carrier must choose to call ports like Virginia port.
- Bargaining power vis-à-vis ports or port group: It is a factor that helps carrier cut cost and work more efficient as resources will first deploy to them. Furthermore, dedicated berth or JV for ports will help carrier have more advantages. Example as dedicated berth for APL in POLA and POLB. The ports will accommodate their own vessel at a better rate and work more efficient on their own vessel.

(b) Singapore can enhance their competitiveness by enhancing:
- Cargo-generating potential (i.e. load centre effect): Singapore are able give more carrier rebate or give discount to cargo owner to let them ship their cargo in Singapore. Enhancing Sinapore's image as a hub port.
- Port charges : Singapore can considered to enhance the efficiency and cutting cost for vessel berthing in Singapore. In this way, more carrier will comes to berth in Singapore.
- Level of efficiency: Efficiency can be increase by deploying the Auto Guide vehicles and other efficient machineries.
- Nautical access: Dredging is needed for Singapore if bigger vessel berth in Singapore in the future. However, because the territorial sea limit of Singapore, it cannot accommodate more vessel by widen the approaching channel.
- Berth allocation policy (international cargo, deepsea, feeder, barge): Have better arrangement for cargo and vessel will helps to attract more carriers. The measure can be put together the cargo needed for an vessel and put those cargo nearer to the vessel.
- Strategic fit with shipping company's and shippers' logistics network strategies: In land port in Malaysia or fast passing border can be discussed so that Singapore can extended its cargo delivery ability.
- Bargaining power vis-à-vis ports or port group: Cooperate with shipping companies for establishing the dedicated berth for them if they paid a fair price.
- Green image and port reputation: Attracting more carrier and shipper by greening the port such as deploying solar panel for power generation.

Q3

(a) The current port ownership of Singapore is landlord port. The characteristic of landlord port is:
- Port authority/ ministry of transport acts as regulatory body and landlord that owns and maintains port infrastructure that will be leased to private port operator
- Private port operator provides and maintains own superstructure and employs labor for cargo handling activities
- Mixed character which aims to strike a balance between public and private interests
- Dominant port ownership model in busy medium-sized and large-sized ports, e.g. Singapore, Hong Kong, Rotterdam, Los Angeles/ Long Beach, etc.

- Ownership of superstructure and equipment

Prior to landlord port, there existing two other type of port ownership, the first type which is the original type is public service port with characteristic of:

- Fully controlled by port authority/ ministry of transport
  - Own, maintain and operate all assets, including port infrastructure and superstructure
  - Directly employs labor for cargo handling activities
- Leadership is composed of public officials, recruited by state or federal government
- Mainly focus on the realization of public interests
- Mostly found in developing countries
- Public, private or mixed provision of service

And tool port:

- Ownership of infrastructure
- Partly controlled by port authority/ ministry of transport, i.e. owns, maintains and operates most assets, including port infrastructure and superstructure and directly employs labor for cargo handling activities, except
  - Cargo handling on board vessel
  - Apron/ quay
- Port authority leases superstructure to private cargo handling company who signs contract directly with cargo owner
- Its impeding success depends on the allocation of services and liabilities between the port authority and cargo handling company
- A good means of transition from tool port to landlord port

Although public service port has strength of unity of command, disadvantage of public service port are:

- Lack of internal competition leading to inefficiency
- Operations not user or market oriented
- Underinvestment due to dependence on gov't budget
- Lack of innovation

Therefore, involving to tool allow port to avoiding duplication of facilities, but disadvantage of tool port still involve:

- Conflict of interest due to split operation
- Limited future expansion as private operator doesn't own major equipment
- Risk of underinvestment
- Lack of innovation

Transform from tool port to landlord port provide advantage of:

- Single entity to operate and likely to make long-term investment
- Market oriented which is the main goal of a company

Example can be found as Tool port and it gain more earning ability when it transfer to landlord port

- Port of Shuwaikh at Kuwait
  - Mostly owned by Kuwait Ports Authority except the quayside operations are handled by private stevedore, Kuwait and Gulf Link Transport Co. (KGL)
  - One of the busiest ports in the Middle East with 21 berths with max. water depth of ~10m

(b) Pricing Objectives
- To promote the most efficient use of facilities
- To recover sufficient revenue to meet financial objectives
- To retain the benefits resulting from investment within the country

Existing port pricing structure is to trying to satisfy conflicting objective of the existing port:
- Government: efficient management of assets
- Port authority: Maximizing throughput, value added and employment
- Port users: prices should reflect the costs of the services with transparency of charges

Port Pricing of Singapore is:

- Basic elements are port dues and specific port tariffs
- Port dues – charges for the use of the general port services and facilities
- Port tariffs – charges for specific and clearly identified services

Port pricing of Singapore as landlord port should be:

- The decision base on various items, e.g. costs, competition, market demand variables, payment terms, etc.
- Levied on the vessels or containers/ cargoes
- Differ with respect to the value of cargoes, e.g. price discrimination
- Used to prevent port congestion
- Respond to external changes
- Simple and competitive with ports nearby as shipowners are price sensitive

But actual price charged by port may not be the same as found in the tariff

- Subject to contract negotiation with port users
- Usually lower to attract shipping line to maintain its port calls or start new port calls through the use of discounts and volume rebates
- Exports may be lower than imports to promote economic development of the region or employment rate

Q4

(a) Free Trade Zone is:
- A specific area where trade is based upon the unrestricted international exchange of goods
- Goods imported from abroad are not subjected to any domestic duties until they leave the free trade zone
- Goods can be processed, repacked, sorted, displayed, traded, etc.

- Attract more cargo owner and companies to ship their cargo and tranship or selling in the countries.
- Example including: Keppel Distripark is a free trade zone in Singapore
  - Allows exemption from the Goods and Service Tax (GST)
  - 45 warehouse modules of covered storage totalling 113,000m2
  - Services available include cargo consolidation, de-consolidation, storage, cargo surveying, packing and repacking, co-loading among NVOCCs

(b) Inland Port is:
- "A site located away from traditional land, air and coastal borders with the vision to facilitate and process international trade through strategic investment in multi-modal transportation assets and by promoting value added services as goods move through the supply chain" (Center for Transportation Research, University of Texas)
- "A dry port is an inland intermodal terminal directly connected to seaport by rail where customers can leave/ pick up their units as if directly to a seaport" (Roso et al. 2009)
- Is an intermodal terminal situated inland
- Usually with rail connection to a seaport with scheduled and reliable services
- Offer services that are available at freight terminals and at seaports, e.g. storage of containers, container maintenance, customs clearance, inspection, consolidation, forwarding, etc.
- Act as an intermodal cargoes transfer facility with value added services, e.g. interface between rail and truck for the transportation of containers to and from the seaport
- Allow traditional loading and unloading operations at seaport to be moved inland
- Provide a variety of value added services
- Example of the typical inland port is Virginia inland port, US:
  - The first and one of the most successful inland ports in US opened in 1989
  - Intermodal container transfer facility of Port of Virginia
    - Just west of Washington D.C. and 364km northwest of Port of Virginia
    - Port of Virginia include 3 state-owned terminals: Norfolk International Terminals, Newport News Marine Terminal, Portsmouth Marine Terminal
  - 65 Ha of land area with 39 major company surrounded, train scheduled 5 days per week and handled 31000 containers in 2006.
- Advantages of the inland port including:
  - Move the time consuming loading and unloading of cargoes inland, away from the congested seaport to improve port productivity
  - Speed up the flow of cargoes between vessels and land transportation networks, e.g. a high-capacity rail link system to the inland port
  - Close proximity to different stakeholders in the supply chain, e.g. shippers and consignees
  - Free up land area at the seaport
  - Reduce air emission

(c) High performance indicators are higher value of key indicators/ indexes to measure and control the operations performances of a terminal:

- Operational level
  - Port rate
    - The total no. of containers handled on a vessel during its port stay
    - Total no. of containers handled exclude restow, hatch cover movements, uncontainerized cargoes (UC)
    - Port Rate (Gross) = No. of containers handled on vessel/port stay
    - Unit: move per hour (mph)
  - QC rate
    - The total no. of containers handled on a vessel with a total operating time operated by a no. of QCs
    - ∑ no. of containers handled on vessel / ∑ QC operating time
    - Unit: move per hour (mph)
  - RTG rate
    - The rate to reflect the productivity of RTG
    - ∑ RTG movements / ∑ RTG operating time
    - Unit: move per hour (mph)
  - Prime mover turnaround time
    - The average time required for an external prime mover to complete a round trip for container collection or container delivery upon entering the container terminal
    - ∑ (Completion date time – document hand-in date time) / No. of external prime movers
    - Unit: minute per prime mover
- Terminal handling capacity level
  - Quayside
    - Maximum capacity of a terminal to handle vessels at quayside
    - QC utilization=peak weekload (move)/maximum QC fleet capacity (move per week)
    - Berth utilization=peak week berth demand (meter-hour)/weekly berth capacity(meter hour)
    - Unrealistic to achieve 100% berth utilization due to unlikely of having total length of vessel which is equal to the quay length and shorter the length between vessel risk is higher
  - Landside
    - The capacity at stacking yard to store all the containers being handled by quayside and gate traffic
    - Stacking demand =annual throughput(TEU)xDwell time(Day)/365 days
    - Usually, the stacking demand for different container types are determined separately as the dwell times are different
    - Total stacking demand of the stacking yard is the sum of the demands for all individual container types
    - Theoretically, halved the dwell time will double the stacking capacity
  - Equipment
    - More concerns on landside container handling equipment
      - Support quayside and stacking yard operations
      - Support restow moves required in digging out the designated containers

- - o Should design to have sufficient equipment to support operations during peak hour of the peak day
  - Gatehouse
    - o Should design to have sufficient traffic lanes at both the in-gatehouse and out-gatehouse when external prime movers enter and leave the terminal
    - o The determination of the no. of traffic lanes is based on the design criteria that it can meet the peak hour demand

BEST WISHES FOR YOUR EXAM!

Answer key provided by Lin Hanye