EXAM GUIDELINES FOR LOGISTICS SYSTEMS (TRL3708)

Dear Student,

Please note that the upcoming exams will be marking the end of our second semester, and I hope you have had an interesting and informative time. Please find this document which serves as a guideline on what you will be assessed on and how you should respond to such assessment. **Please note that this is not a replacement for your prescribed book and/or study guide, but just guidelines on how to respond to the exam questions. Also note that these questions are examples, and not possible exam questions.**

<u>**Exam Composition**</u>

The examination paper consists of a <u>**two (2) hours**</u> written examination counting seventy <u>**(70) marks**</u>. The paper consists of <u>**Section A**</u> with short questions and <u>**Section B**</u> with longer written questions.

The <u>**two (2) hour**</u> fill in examination paper will consist of the following format:

SECTION A			
Answer <u>ALL</u> the questions in this section			
Question	**Type**	**Marks**	**Total Marks**
Question 1	Compulsory **short questions**	20	20
SECTION B			
Answer any <u>two (2)</u> of the three (3) questions in this section			
Question	**Type**	**Marks**	**Total Marks**
Question 2	Written Questions	25	50
Question 3	Written Questions	25	
Question 4	Written Questions	25	

TOTAL   **70 Marks**

These guidelines are based on the study guide, in correlation with the prescribed book (both the 2010 and 2013 edition).

<u>**Examination Guidelines**</u>

The examination paper consists of questions from **ALL STUDY UNITS**. In order to pass the exam, it is advisable to study **all study materials** and **not only your assignments.**

CONTENTS

Topic 1: Comprehensive supply chain information systems

Study Unit 1: The functions and components of information systems

Study Unit 2: Logistics

Study Unit 3: Procurement and Manufacturing

Study Unit 4: Information Technology

Topic 2: Integration theory in network design

Study 5: Logistical operating systems

Study 6: Warehouse requirements and network

Study 7: The trade-off between service and cost

Topic 3: The network design process

Study Unit 8: Logistics network planning and design methodology

Topic 4: Network planning and design techniques

Study Unit 9: Analysis techniques: Location decisions

Study Unit 10: Analysis techniques: Inventory decisions

Study Unit 11: Analysis techniques: Transport decisions

Study Unit 1: The functions and components of information systems (Bowersox et al. 2010:95-98; 2013:7- 8)

This unit discusses the importance of information technology in supply chain management. Supply chain technology systems initiate activities and track information regarding processes, facilitate information sharing both within the firm and between supply chain partners, and assist in management decision making. Below are the key points of this unit.

i. **Information system functionality**: logistics focuses on product storage and flow through the supply chain. In the past information flow and accuracy were viewed as being critical to customers, but now the focus has moved to customers and the logistics system design and operations.

Students can expect short (one and two paragraphs) questions from this unit.

Sample Questions

1. Give reasons for the importance of timely and accurate information in a logistics systems design and operations.

   - First, customers perceive information regarding order status, product availability, delivery tracking, and invoices as necessary dimensions of customer accommodation.
   - Second, with the goal of reducing total supply chain assets, managers realise that information can be used to reduce inventory and human resource requirements.
   - Third, information increases flexibility with regard to how, when, and where resources may be utilised to achieve competitive advantage.
   - Fourth, enhanced information transfer and exchange utilising the Internet is facilitating collaboration and redefining supply chain relationships.

Study Unit 2: Communication Systems (Bowersox et al. 2010:119-128).

The 2013 edition does not have enough information on the subject, and therefore additional notes have been uploaded on myUnisa.

i. **Communication Technology:** Information-sharing technology is critical to facilitate logistics and supply chain planning and operations. These include bar code and scanning, global data synchronisation, the Internet, extensible markup language, satellite technology, and image processing.
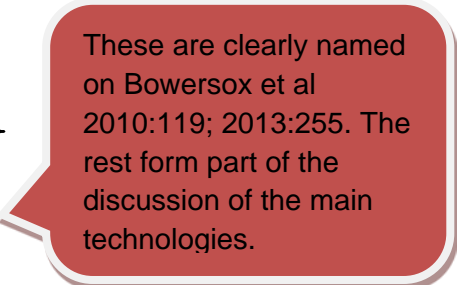
Students can expect short (one and two paragraphs) and essay questions from this unit.

Sample Questions

1. Name two types of technologies that can be used in supply chain communication. (2)

   Name any two. These are the main technologies: There seem to be some confusion on these. Students tend to quote the subheadings. Additional notes on these have been uploaded on myUnisa.

   - Bar coding and scanning;
   - Global data synchronisation;
   - The Internet;
   - Extensible Markup Language;
   - Satellite Technology;
   - Image Processing

   These are clearly named on Bowersox et al 2010:119; 2013:255. The rest form part of the discussion of the main technologies.

From these technologies, students can also expect long questions.

This unit focuses on the Supply Chain Information Systems (SCIS), which are the thread linking logistics activities into an integrated process. These initiate, monitor, assist in decision making, and reports on activities required for the completion of logistics operations and planning.

i. **Supply Chain Information System Modules**: A comprehensive SCIS initiates, monitors, assist in decision making, and reports on activities required for complexion of logistics operations and planning. These include the Enterprise Resource Planning (ERP), communication systems, executive systems, and planning systems.

ii. **Enterprise Operations:** these include customer accommodations, logistics, manufacturing, purchasing, and inventory deployment modules.

iii. **Enterprise Planning and Monitoring:** Enterprise and monitoring modules facilitate the collaboration and exchange of plans and performance data both across the firm functions and between supply chain members.

iv. **Software as a service:** Traditionally supply chain software was bought by the firm using it or on behalf of the individual firm by a firm managing their information resources. Recently, some firms are effectively shifting toward software rental in what is being termed as software **as a service**.

Students can expect short (one and two paragraphs) and essay questions from this unit.

Sample Questions

2. Discuss Enterprise Resource Planning's function in logistics. (10)

The ERP systems are the backbone of most firms' logistics information system. (√) This backbone maintains current and historical data and processes to initiate and monitor performance. (√) ERP systems facilitate integrated operations and reporting to initiate, monitor, and track critical activities such as order fulfilment and replenishment. (√) They incorporate an integrated corporate wide database,

sometimes referred to as data warehouse, along with appropriate transactions to facilitate logistics and supply chain planning and operations. (√) Supply chain transactions facilitated by ERP include order entry and management, inventory assignment, and shipping, beyond these supply chain application, ERP include financial, accounting and HR capability. (√) Data mining, knowledge management, and other enterprise integration applications operates using ERP backbone to develop and organise insight regarding customers, products and operations. (√)

The core of an ERP system is the central database or information warehouse where all information is maintained to facilitate access to common and consistent data by all modules. (√) Surrounding the database are the functional modules that initiate and coordinate business activities. (√) Central database is the relational information repository for the entire ERP system. (√) The central database consists of eight major data files; customer file, product-price file, supplier file, order file, bill-of-materials file, purchase order file, inventory file and history file. (√)

3. Discuss major files that are critical for logistics operations in the central database of a typical ERP system. (10)

1. **Customer file** contains information describing the firm's customers, including their names, addresses, billing information, ship-to location, company contact, price list, terms of sale, and special instruction. (√) **2. Product-price file** contains the information describing the products and services offered by the firm. (√) **3. Supplier file** contains lists of the firm's suppliers for materials and services. (√) **4. Order file** contains the information regarding all open orders in some stage of the processing or fulfilment by the firm. (√) **5. The Bill-of Material file** describes how raw material are combined for finished for finished products, (√) for example a simple bill-of-material for an automobile would indicate that one car requires one body, one chassis, four seats, one engine, one transaxle and four tires. (√) **6. Purchase Order file** is similar to the order file except that it contains the records of the purchase orders that have been placed on suppliers**. (√) 7.Inventory file** records the physical inventory or quantity of products that he firm has available or may be available in the future according to the current production schedules. (√) **8. History file** documents the firm's order and purchase order history to facilitate management reporting, budget and decision analysis, and forecasting. (√) The file contains a summary of the customers' orders that have been filled and the purchase orders that have been received. (√)

This unit focuses on the integration of operations within the supply chain; this includes Advanced Planning and scheduling (APS) and supply chain visibility. This is one of the components of the Supply Chain Information Systems (SCIS). It uses the information in the ERP database and other applications to help management make decisions about the following: network planning (number and location of warehouses or distribution centres), production scheduling, inventory planning and transport planning.

Students can expect short (two paragraphs) and essay questions from this unit.

Sample Questions

1. Briefly discuss supply chain visibility (3)

   Visibility implies not only being able to rack supply chain inventory and resources (√) but also that information regarding available resources can be effectively evaluated and managed. (√) Uncertainty in product availability, results in limited visibility on inventory in transit and expected arrival times. (√)

2. Fully discuss Advance Planning System (APS) as one of the planning systems in the logistics. (16)

   Advance Planning System is a network including plants, warehouses, and customers as well as a transportation flows. (√) This network reflects the resource status and allocation at a point in time. (√) The planning and execution of effective logistics and supply chain strategies, supply chain planning systems incorporate both spatial and temporal considerations. (√) The ideal option is to select the combination resulting in the lowest combined cost of manufacturing and storage while meeting customer requirements. (√) Using linear optimization techniques, APS identifies the most cost-effective trade-offs considering all relevant costs. (√)

   There are many approaches to designing supply chain planning applications like APS, but the major ones are demand management, resource management, resource optimisation, and resource allocation. These models relate to each other and to ERP. Here are the models discussed in details:

Demand management develops the requirement projections for the planning period. (√) It generates the sales forecast based on sales history, scheduled activities and customer information. (√) Demand management is applicable both internally and across the firm's functional components and externally with supply chain partners to develop a common forecast for each period. (√)

Resource management coordinates and records supply chain system resources and constrains. (√) This module includes the databases for storing the product and customer definitions, resource definitions, system constraints, and planning objectives. (√) The module also includes the process of validating and maintaining the information. (√)

Requirements optimisation uses mathematical programming and heuristics to analyse the output of the two modules in order to determine the best way of meeting the customers' requirements while at the same time utilising resources effectively. (√)The mathematical programming is a combination of a linear programming and mixed-integer programming. (√) Resource optimisation also determines when requirements cannot be met and which resources are the most constraining on supply chain performance. (√)

Resource allocation refines the resource assignments and communicates them to the ERP system in order to initiate appropriate transactions. (√) It also provides product information about ATP and CTP. (√)

You can add more to this answer including the benefits, depending on the allocated marks and/or question at hand.

This unit discusses logistics in-depth, with its involvement in managing order processing, inventory, transportation, and the combination of warehousing, materials handling, and packaging. Also, looking at the transformation of the supply chain from holding large amounts of safety stocks in order to meet customer demands, to the 21st century supply chain strategies .Below are the focal points of this unit.

i. **Logistical operating arrangements:** has three (3) structures: Echelon (structure where the flow of products proceeds through a common arrangement of firms and facilities as it moves from the point of origin to the final destination, Direct (system designed to ship products direct to customer's destination from one or a limited number of centrally located inventories and combined (system where the benefits of echelon and direct are combined.

ii. **Flexible structures:** these are pre-planned strategies to prevent logistical failures that could affect the completion of a customer's order. There are four (4) different situations where these plans can be applied.

iii. **Responsiveness:** information connectivity created the potential for developing responsive business models.

Students can read through and expect short (one paragraph) and essay questions (three to six paragraphs)

Sample Questions:

1. The tendency in business is to move away from the traditional anticipatory business model to a more response-based model. Discuss the benefits of using the responsive and anticipatory business model. (10)

   Responsiveness
   It is useful to contrast traditional or anticipatory business practice to the emerging time-based responsive (or pull) business model. (√) It is a method of controlling the flow of production through the factory based on a customer's demand. (√) A **pull system** is where processed are based on customer demand. (√) The concept is that each process is manufacturing each component in line with another department to

build a final part to the exact expectation of delivery from the customer. (√) Because production processes are designed to produce only what is deliverable, businesses become lean, as a result of not holding excessive stock levels of raw, part-finished, and finished materials. (√)

Anticipatory Business Model
Since the industrial revolution, the dominant business model has required anticipation of what customers will demand in the future. (√)

Responsive business model
Seek to eliminate or reduce forecast reliance by jointing planning and rapid exchange of information between supply chain partners. (√) Sharing information improves both speed and accuracy of the supply chain logistics. (√) the sharing of information leads to the reduction of overall inventory. (√) Furthermore, customers can be provided with the products they want fast. (√)

2. Briefly discuss postponement (10)

Postponement strategies reduce the anticipatory risk of supply chain performance. (√)Anticipatory arrangements require most inventories to be produced to final product state and deployed on the basis of forecasts or planned requirements. (√) Working arrangement, which allow postponement of final manufacturing, customization, or distribution of a product until receipt of a customer, reduce the incidence of wrong manufacturing or incorrect inventory deployment. (√)

Two types of postponements are used in operations; manufacturing (of form postponement and geographic (or logistics postponement). (√)

Manufacturing postponement involves withholding the product's final shape until the exact customer order specifications are fully known and the customer is committed to the purchase of the product. (√)Fewer resources are wasted when goods are made on order. (√)Manufacturing postponement requires fast order processing and flexible logistical operational systems to increase responsiveness to customer requirements. (√)**Form postponement** manufactures a standard or base product in sufficient quantities to realise economy of scale while delaying the final features, such as colour or accessories, until customer commitment is received. (√)

Logistical or geographic postponement: Differentiated products are kept in stock at a central point for fast response to customer orders. (√) The deployment of
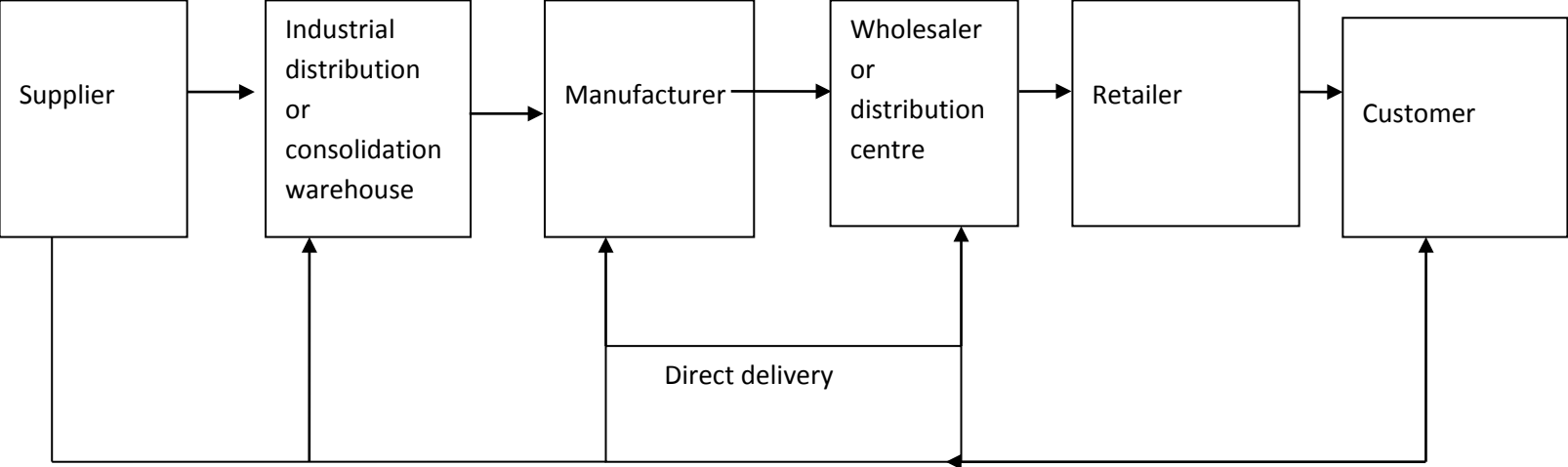
inventory to a location closer to the market is postponed until customer orders are received. (√ Central inventory storage reduces the inventory levels needed to maintain a high degree of availability in all markets. (√)

3. Explain one of the four situations under which a flexible logistics operating system is justified? (3) **Students can choose any of the following situations:**

- First is when the **delivery times and delivery costs** from two or more warehouses are equal (√), the order can be serviced from the facility having the best inventory position or available transportation capacity to achieve timely delivery. (√) This form of flexible logistics offers the way to fully utilise system capacity by balancing workload between facilities while protecting customer service commitment. (√)
- A second alternative justifying flexible distribution is **when the size of a customer's order creates an opportunity to improve logistical efficiency** if serviced through an alternative channel arrangement. (√)For example, in the case of a small consignment, an independent distributor could be used, (√) whilst direct delivery in the case of a large order would most probably be more economical. (√)
- A third alternative may result in a **selective inventory stocking strategy**. (√) The cost and risk associated with stocking inventory require careful analysis to determine which items to place in the warehouse. With placement parts, a common strategy mentioned earlier is to stock selected items in specific warehouses with the total line being stocked only at a central facility. (√) Master facilities are often used to describe inventory strategies that designate larger facilities for back up support of smaller restricted facilities. (√)
- The fourth alternative results from **agreements between firms** to move selected shipments outside the established echelon system or direct logistics arrangements. (√)Two special arrangements gaining popularity are flow through **cross-docks and service supplier arrangements**. Cross -docks involving multiple suppliers arriving at a designated time at the handling facility and typically used in situations where storage and material handling can be avoided (√) and service supplier arrangements to consolidate product delivery. (√) Specialists are used to avoid storage and handling of slow moving products through the mainstreams of the echelon structure. (√).

4. Give a schematic presentation of a direct logistical structure (3) Please note that in such questions, you have to give the full sketch, otherwise the process is incomplete and the sketch is incorrect. **The drawing must talk to the reader.**

Figure 1: Combined Echelon and Direct Delivery ($\int\int\int$).

Supplier → Industrial distribution or consolidation warehouse → Manufacturer → Wholesaler or distribution centre → Retailer → Customer

Direct delivery

Study Unit 6: Warehouse requirements and network (Bowersox et al. 2010:86-88,305-319; 2013:106-109,288-301)

This unit looks at the framework to assist managers in achieving such integration. The below subheadings are the focal points of this unit.

i. **Enterprise Facility Network:** network reengineering is the most challenging task in logistics. In the past product and material movement was done by water, since it was the only cheapest mode. This mode led to long lead time of about nine (9) months. Today, transportation system is highly developed with rail, air highway, and pipeline services. These systems each bring different benefits to the table, which could help firm create competitive superior warehouse networks to service customers.

ii. **Warehouse Requirements:** Warehouses are established in a logistical system to lower total cost or to improve customer service. Warehouses create value for the processes they support.

iii. **Total Cost Integration:** Economic forces such as transportation and inventory should determine a firm's initial network of warehouse facilities.

Students can expect short (one and two paragraphs) and essay questions from this unit.

Sample Questions

1. Present the relationship between inventory cost and transport cost in a form of a graph. (3) Bowersox et al 2010:317; 2013:300.

2. Discuss the different strategies used in production planning. (9) There are five (5) strategies: Make-to-order (MTO), make-to-plan (MTP), Assemble-to-order (ATO), Make-to-stock (MTS) and Engineer-to-order (ETO). The ETO strategy is discussed in the 2013 edition of the prescribed book. I noticed most students struggled with this question on assignment 2. For clarity on the concepts, you can use the internet to get meanings. You can structure your answer to quantify the marks allocated, but for this example I have included more points than the marks.

MTO

The make-to-order manufacturing strategies seek to manufacture to customer specifications. (√). The MTO may not be as limited as the traditional job shop; exact quantities and configurations are produced in an MTO environment and shipped direct to customers. (√). Logistical capacity may be required for temporary storage and to achieve outbound transportation consolidation, but most products produced in an MTO environment is shipped direct to the customer. (√).

MTP

This strategy is also referred to as a make-to-stock (MTS). The make-to-order strategies are characterised by industries exploiting economy of scale from long production runs. (√). Significant finished goods' inventory is typically manufactured in anticipation of future customer requirements. (√).The logistical requirements to support the MTP warehousing capacity are to store finished products and to facilitate product assortment to meet specific customer requirements. (√).

ATO

The assemble-to-order strategy is when base products and components are partially manufactured in anticipation of future customer orders; however the products are not fully assembled or customised until the customer's order is received. (√). This final configuration or assembly reflects the principle of manufacturing or postponement. (√) By postponing the final assembly operations, the manufactures avoid carrying large amounts and varieties of finished goods. (√) The increasing amount of ATO product finalization is being performed in supply chain logistics warehouse. (√) Full implementation of an ATO strategy requires that warehouse operations be integrated into the value creating process to perform customizing and assembly operations. (√) The attractiveness of an ATO manufacturing strategy is that it has the potential to combine the facets of economy of scale provided by line flow processes with degree of flexibility characteristics of job shop or batch processes. (√) Unfortunately, customers have to wait for the assembly portion of the manufacturing cycle. (√)

ETO

In the ETO strategy, products are unique and extensively customized for the specific needs of individual customers. (√) For example, a custom-built house, a cruise ship, specialised industrial equipment, and even a custom-built racing bicycle. (√) Nothing happens for ETO items until a customer order is received. ETO products require an entire new design, and therefore materials required for production are not carried in

inventory. (√) ETO products utilise a job-shop production process. (√) In some instances, a batch process may be used, depending on the quantity that is specified by the customer order. There is a very long order-to-deliver time in ETO. (√)

3. Discuss the types of inventories committed to supply chain nodes.(10)

Base Stock (∫)

Is inventory held at a node and is typically one-half of the leverage shipment size received. (∫)

Safety Stock (∫)

Exists to protect against variance in demand or operational lead time. (∫) It is at and between supply chain nodes that wok related to logistics is performed. (∫). Inventory is stocked and flows through nodes, necessitating a variety of different types of materials handling and when necessary storage. (∫)

Transit Stock (∫)

Is available to promise, but cannot be physically accessed. (∫).It represents the amount in transit between facilities or on order but not received. (∫) Handling in transit storage takes place within transportation. (∫).

Study Unit 7: The trade-off between service and cost (Bowersox et al. 2010:319-325; 2013:301-307)

This unit focuses on the trade-off between cost and service that led to the positioning of logistics as an integral part of overall corporate strategy.

i. **Formulating Logistical Strategy:** it is necessary to evaluate the relationships between alternative customer service levels and associated cost. The general approaches in generating the strategy include, determining a least-total-cost system design, measuring service availability and capability associated with the least-total-cost-system design, conducting sensitivity analysis related to incremental service and cost directly within revenue generation, and finalizing the plan.

Students can expect short (one and two paragraphs) and essay questions from this unit.

Sample Questions

1. Discuss the difference between the threshold service and the cost minimisation. (10)

> There's more to say on the threshold service level, but only a few points were quoted on this guide.

Threshold
Threshold service level is the level of customer service that is associated with a least-cost logistical design resulting from safety stock policy and the location proximity of warehouses to customers. (√)To establish a threshold service level, it is necessary to initiate network reengineering with policies regarding to desired inventory availability and capability. (√)Delivery times are estimated on the basis of distance. (√)The elapsed time from the time the customer places an order to the time the order is delivered tends to be longer in this system than would be with system that are focused on service performance. (√) For example, furniture shops do their deliveries based on the distance involved from the warehouse and the number of customers in that area. (√)Customers closer to the warehouse will get their deliveries sooner than those who are far, who would have to wait for other orders so the supplier gets a truckload savings. At the end of the day, the customer's order is fulfilled but it took a while. (√)

Cost Minimisation

Is a strategy of least total cost that seeks a logistical network with the lowest fixed and variable costs. (√) This system design is driven purely by cost- to –cost trade-offs. (√) For example high costs for labour and essential services occur in large metropolitan areas, but because of demand concentration, total logistic cost resulting from transportation and inventory consolidation benefits is often minimised in these areas. (√) i.e. a bus from Pretoria to Durban is cheaper than a bus from Pretoria to Nelspruit, reason being the increased demand in the Durban-Pretoria route. (√)

2. What do you understand by sensitivity analysis? (10)

The threshold service resulting from the least-total cost logistical design provides a basis for service sensitivity analysis. (√) The basic service capabilities of a network can be increased or decreased by variation in number of warehouses, (√) change in one or more performance cycles o increase speed or consistency of operations, and/or change in safety stock policy. (√)

Location Modification (√)

The warehouse structure of the logistical system establishes the service that can be realized without changing the performance cycle or safety stock policy. (√)

Performance Cycle Modification (√)

Speed and consistency of the service can be varied to a specific market or customer by a modification of some aspect of the performance cycle. (√) The decision to increase service by adopting a faster performance cycle arrangement leads to increased variable costs, (√) whilst service improvements increases fixed costs if warehouses are increased and this leads to a less flexible system overall. (√)

Safety Stock Modification (√)

A direct way to change service is to increase to decrease safety stock held at one or more warehouses. (√) To improve customer service availability, safety stock as to increase at each warehouse. (√)

3. The supply chain network includes the combination of suppliers, manufacturing plant, warehouses, consolidation points, service providers and retailers to bring the product from the raw material stage to the end consumer. What are the questions to include when making a decision of selecting the warehouse location? (5)

1. How many and what kind of warehouses should a form establish? (√)
2. What services should they provide? (√)
3. What inventories should they stock? (√)
4. Which customer should they service? (√)
5. Where should they be located? (√)

Study Unit 8: Logistics network planning and design methodology (Bowersox et al. 2010:327-343; 2013:311-327)

This unit presents a generalised methodology that includes an overview of techniques used for logistics planning. The supply chain environment is constantly evolving, because the constant changes in markets, competitors, suppliers, technology and so many other economic factors. Below are the focal points of this unit.

i. **Planning Methodology:** At this stage, the firm needs to know how many warehouses the logistics system use and where should they be located, what are the inventory/service trade-offs for each warehouse, what type of transportation equipment should be used and how should vehicles be routed and is investment in a new materials handling technology justified?

Students can expect short (one paragraph) and essay questions from this unit.

Sample Questions

1. Briefly discuss the process of planning a logistics network, with reference to the three (3) phases. (9) Students can also expect long questions from this process and therefore should know it thoroughly.

The planning process has three (3) phases, problem definition and planning, data collection and analysis and recommendation and implementation. You can phrase your answer your way, as long as it reflects the critical phases and the means to achieve those.

Phase 1: Problem definition and planning (√)
This stage provides the foundation for the overall analysis. (√) A thorough planning and problem identification is vital, looking at the feasibility assessment, and project planning. (√)

Phase 2: Data Collection and Analysis (√)
This phase follows immediately after h problem definition and plan. (√) It requires assumption definition, data collection, and analysis alternatives. (√)

Phase 3: Recommendation and Implementation (√)

This stage puts to action the plans and design made in phase 2. (√) Recommendations are reviewed and the best alternative with less cost, saving benefits and/or less risk is implemented. . (√)

Study Unit 9: Analysis Techniques: Location decisions (Bowersox et al. 2010:343-350; 2013:327-334)

This unit looks at the general process for planning and designing a logistics network, with more attention on the principles of the techniques. Students should focus on the below subheading:

i. **Supply Chain Analysis Methods and Techniques:** High-performance supply chain management requires regular comprehensive analysis of supply chain strategies and operations.

Students can expect short (one paragraph) and essay questions from this unit.

Sample Questions

1. What are the typical management questions on selecting the number and location of plants, warehouses, and other supply chain nodes? (8)

   1. Where should the manufacturing plants be located and which products should they produce?
   2. How many warehouses should the firm use, and where should they be located?
   3. What customers or market areas should be serviced from each warehouse?
   4. Which product lines should be produced or stocked at each plant or warehouse?
   5. What is the role of master or regional distribution centres relative to field or local warehouses?

Study Unit 10: Analysis Techniques: inventory decisions (Bowersox et al. 2010: 162-178, 352; 2013:162-171,334-336)

This unit discusses the techniques for inventory analysis, looking at the optimal inventory management parameters (ordering quantity, reorder point and safety stock) that are needed to maintain the desired customer service level with minimum inventory investment. Students should pay attention to the inventory techniques.

Students can expect short (one paragraph) and essay questions from this unit.

Sample Questions

1. Name the questions to be considered when doing an inventory analysis? (5)

   1. How much product should be produced during the next production cycle? ($\sqrt{}$)
   2. Which warehouses should maintain inventories of each item? ($\sqrt{}$)
   3. Should slow-moving items be centralised? ($\sqrt{}$)
   4. What is the optimum size of replenishment orders (the order quantity decision)? ($\sqrt{}$)
   5. What is the necessary reorder point for replenishment orders (the safety stock decision)? ($\sqrt{}$)

2. Discuss the two types of methods to evaluate and select from inventory management options. (10)

   1. *Analytic Inventory Techniques*($\sqrt{}$)
      Analytic inventory methods utilise functional relationships to determine ideal inventory stocking parameters based on the desired service level. ($\sqrt{}$) The technique uses service objectives, demand characteristics, performance cycle characteristics, and the logistics system characteristics as input to calculate optimum inventory parameters. ($\sqrt{}$) From an inventory perspective, service objectives are defined in terms of case or order fill rates. ($\sqrt{}$) Demand characteristics describe the periodic average and standard deviation of customer demand. ($\sqrt{}$)

2. *Simulation Inventory Techniques(√)*

Simulation creates a mathematical and probabilistic model of the logistics operating environment. (√) Simulation parameters such as the order quantities and reorder points to be tested become the simulation inputs. (√) The major outputs are the service level and inventory performance characteristics of the testing environment. (√) The major benefit of simulation techniques is the ability to model a wide range of supply chain environments without requiring simplifying assumptions. Simulation creates a mathematical and probabilistic model of the logistics operating environment. (√) Simulation parameters such as the order quantities and reorder points to be tested become the simulation inputs. (√) The major outputs are the service level and inventory performance characteristics of the testing environment. (√)

Study Unit 11: Analysis Techniques: transport decisions (Bowersox et al. 2010: 353-355; 2013:336-338)

This unit focuses on the decision support systems that can be used for transportation analysis, with attention on the following:

- the difference between strategic and tactical transportation decisions (for which transportation analysis is relevant)
- typical decisions where transport analyses are useful
- the characteristics, advantages and constraints of each of the four categories of the transportation techniques (the heuristic approach, the exact approach, the interactive approach and a combination of the three)
- the data requirements that are necessary for transportation analysis

Students can expect short (one paragraph) and essay questions from this unit.

Sample Questions

1. What are the five (5) transport questions that should be asked when making decisions on choosing a transport system? (5)

   1. How should deliveries be grouped to form routes? (√)
   2. What is the best delivery sequence for servicing customers? (√)
   3. Which routes should be assigned to which vehicle types? (√)

4. What is the best type of vehicle for servicing different customer type? (√)
5. What delivery sequence should be used to accommodate time restrictions imposed by customers? (√)

2. Explain the transport analysis techniques applied in logistic (10). You can be asked to discuss any of the **four**.

Exact/optimal Approach

Uses mathematical programming to identify the best route. (√) Optimisation solution has been complex for even the fastest computer; (√) but recent mathematical programming advances have enhanced their capabilities. (√) The main difficulties of these approaches are the large number of constraints and variables needed to represent the basic routing and scheduling problem (√), and the impact on the size on computation time and computer storage space. (√)

Interactive Approach

Utilise a combination of simulation, cost calculator or graphics capability to support an interactive decision process. (√) The decision makers identify the alternatives for evaluation. (√)The decision support system then determines and plots the routes. (√)Calculates the performance characteristics of each alternative and refines the strategy until no additional improvement is likely. (√) The obvious drawback is the dependence of the skill and ability of the decision maker, especially when the problem and complexity increases. (√)

3. Name and explain the types of data required when analysing transport system. (6)

Network (√)

Defines all possible routes and is the backbone of any transportation routing system. (√) Usually, a network is defined by using street maps of the delivery area. (√) Each intersection is a node and the streets become links. (√)

Demand Data. (√)

Defines the customer pickup and delivery requirements. (√)For long term analysis, demand is specified in terms of average pickups or deliveries per customer. (√) Tactical analysis allows the routes to be precisely designed for delivery requirements with no allowance for uncertainty. (√)

Operating Characteristics (√)

Defines the number of vehicles, vehicle limitations, driver constraints, and operating costs. (√) Vehicle limitations include capacity and weight restrictions as well as unloading constraints such as dock requirements. (√) Driver constraints include driving time and unloading restrictions. (√)

Once again, please note that the sample questions are just highlighting the points of focus but does not mean you must focus on these.

All the best with your preparations for the exam!

Best Regards,

Ms TKT Ngcamphalala (Lecturer: Logistics Systems)