UNIVERSITY OF BOLTON

INSTITUTE OF MANAGMENT

MSC LOGISTICS AND SUPPLY CHAIN MANAGEMENT

SEMESTER 02 EXAMINATIONS 2023/2024

LOGISTICS MANAGEMENT

MODULE NO: SCM7102

Date: Thursday 16 May 2024 **Time: 2.00 – 5.00**

INSTRUCTIONS TO CANDIDATES:

Part A is worth 60 marks and contains five questions. Students have to answer ANY THREE questions.

Part B is worth 40 marks and contains four questions based on a case study. All questions within Part B are compulsory.

An Appendices is provided at the end of the examination paper.

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PART A

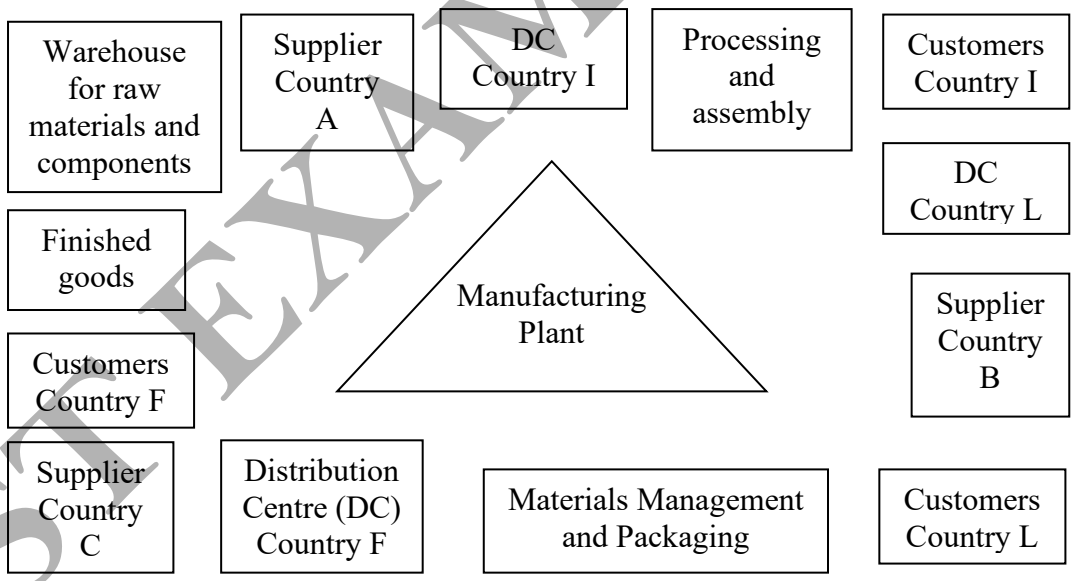
01. Define Integrated Logistics Management. Draw and critically analyse the Integrated Logistics Management framework. Explain three key benefits of integrated logistics management with examples. [20 marks]

02. A) What is the role of transportation management in supply chain? Explain with example. [10marks]

B) Identify and discuss about the key participants in Transportation Management. [10marks]

03. What are different types of transportation modes? Critically analyse each of the transportation modes considering its advantages and disadvantages in terms of six key supply chain performance metrices. (Use relevant data available in appendices) [20marks]

04. A) What is Global Logistics? Develop the framework of a global logistics system from the details below and explain. [10marks]



B) Identify and critically analyse at least six unique challenges of managing global logistics with examples. [10marks]

05. A well-designed transportation network allows a supply chain to achieve the desired degree of responsiveness at a low cost. Discuss various design of a transportation network including their strength and weakness in the context of a buyer with multiple locations sourcing from several suppliers. [20marks]

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PART B – (Case study)

06. Answer all the questions based on the case study below:

A) Analyse the case study and identify seven intermodal configurations possible for transporting the grain from Warsaw to Bolton Farmers? [5marks]

B) Based on the configurations, evaluate and identify the least expensive intermodal configuration is the least on a monthly basis? [10marks]

C) Based on the configurations, evaluate and identify the intermodal configuration that has the lowest GHG emissions (carbon footprint) on a monthly basis? [10marks]

D) Based on the configurations, critically analyse and suggest the most sustainable intermodal configuration would you suggest to be the most sustainable? Base your decision making on costs and the three environmental issues of greenhouse gas, nitrification, and acidification [15marks]

Case study

Consider yourself as vice president of supply chain at Bolton Farmers, a large mixed-feed company in the Netherlands, Europe, was reading a new scientific report from CED (an independent research and advisory company specialising in environmental impacts) that analysed the environmental effects of the importing of raw materials. Bolton Farmers is a modem international company producing feed and fodder for pigs, cows, poultry, and so on, importing grain from all over Europe. As Bolton Farmers considers sustainable entrepreneurship to be very important this document made you wonder about the environmental and economic consequences of the import of grain as feedstock for pigs. Bolton Farmers has a high market share in specific feedstock for sustainable port, called Euro Grain. Euro Grain was developed in Netherlands, but supply volume forms this country is not sufficient. Some other countries within Europe are also capable of producing grain that satisfies the Euro Grain criteria, among them Poland. You believe that your company could significantly improve both distribution costs and environmental impact from transportation by investigating the possibility of using various modes of transportation.

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Case Study continued

Modes of Transportation
The supply chain uses a combination of following modes of transportation: Truck, inland ship, sea ship and rail. As grain is not very perishable, speed is not really an issue. Price vary with destination and depend heavily on the capacity of transportation mode. Varieties of intermodal combinations are possible, using a truck, water and rail combinations with containers.

Distribution Alternatives for Warsaw
You asked your staff to propose different distribution alternatives for Poland. Your staff came up with a below report considering the environmental issues and further on the costs, needs and possibilities for various transportation modes:

The demand of Bolton Farmers for Euro Grain is about 2000 tons of grain per month. It is identified that from the farm near Warsaw, grain can be transported by rail to the train station in Wroclaw (320km) or the train station in Rotterdam (1160km). By road, it is possible to reach the sea harbour Gdansk (330 km), the train station/inland harbour of Wroclaw (345 km), or even drive to Farmers directly (1197 km). From the sea harbour Gdansk, a sea ship can travel to the sea harbour/rail station of Rotterdam (1064 km). An inland ship can travel from the inland harbour of Wroclaw to the inland harbour of Oss (950 km). The inland harbour of Oss can also be reached by inland ship from the port of Rotterdam (84 km). Finally, as Bolton Farmers can only be reached by truck, it takes 26 km to drive from the inland harbour of Oss to Farmers, and 100 km from the sea harbour/rail station in Rotterdam.

The distribution costs are £1 per km for a truck with a capacity of 40 tons. A sea ship from the port of Gdansk to the port of Rotterdam costs £3.5/ton per trip with a capacity of 3,000 tons. While an inland ship from the harbour of Wroclaw to the harbour of Oss costs £13.75/ton per trip with a capacity of 1,000 tons, an inland ship from Rotterdam to Oss costs £3.75/ ton per trip with a capacity of 1,000 tons. The rail tariffs for a capacity of 1000 tons from Warsaw to Rotterdam: £25.4/ton.

The environmental impact of transportation can be represented by the following airborne emission categories: CO_2 (carbon dioxide) equivalents to represent greenhouse gas (GHG) emissions, NO_X (nitric oxide) equivalents to represent nitrification, and SO_2 (sulphur dioxide) equivalents to represent acidification.

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Case Study continued

Table 1 below gives the emission-equivalents per modality (gram per ton km). You are now wondered which intermodal configuration would have the best sustainable performance for this supply chain. Please note 1000g is equivalent to 1kilogram (kg)

Table 1. Emission factors for modalities

Modality	**CO_2-eq** (g/Tkm)	**NO_X-eq** (g/Tkm)	**SO_2-eq** (g/Tkm)
Truck	50.4	0.4200	0.0016
Inland ship	11.1	0.3500	0.22
Sea ship	9.6	0.3000	0.19
Trains	28.34	0.4720	0.036

END OF QUESTIONS
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Appendices

Table A. Breakdown of modal share of Total US Transportation cost, 2019 (Source: Adapted from 2020 CSCMP's Annual state of logistics Report)

Transportation	Cost (in billions, rounded)	% of total transportation cost (rounded)
Air	75.2	7.1
Truck/Motor carriers	680.4	64.2
Rail	83.9	7.9
Water	47.9	4.5
Pipeline	57.4	5.4
Other (carload, intermodal)	114.4	10.8
Total	1059.1	100

Table B. Modes of transportation in terms of key supply chain performance metrices (Note: 5- best, 1- worst)

Transportation	Cost	Speed	Reliability	Capability	Flexibility	Capacity
Air	1	5	2	2	3	1
Truck	2	4	4	3	5	2
Rail	3	2	3	4	4	4
Water	5	1	1	5	2	3
Pipeline	4	3	5	1	1	5

Table C. Transportation facts (Source: Data from freight shipments within the US by Mode, Bureau of transportations statistics, Retrieved April 19 2017)

Transportation	Freight Value ($ billions) in 2011	Freight Tons (millions) in 2011	Freight Ton-Miles (millions) in 2011	Value added to GDP ($ billions) in 2009
Air (includes tuck & air)	394	6	11	61.9
Truck	12181	11924	2337	113.1
Rail	588	2053	1518	30.8
Water	201	645	343	14.3
Pipeline	889	1912	1018	12.0
Multimodal	1985	583	489	--

END OF APPENDICES