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Beyond A Graduate

Faculty of Management and Social Sciences
Department of Logistics & Transport
BSc Hons in Logistics and Transportation
Course CODE: COM551

Year 3 Semester I

SEMESTER END EXAMINATION

Customs and Commodity Inspections Operations – LTCO3204

- This paper consists of SEVEN questions on FIVE (05) pages.
- Answer FOUR Questions including Question 01.
- Only non-programmable calculators are allowed.
- You may use appropriate graphs, diagrams, equation/s to prove or justify the answers.
- If you have any doubt as to the interpretation of the wording of a question, make your own decision, but clearly state it on the script.
- Write Legibly.
- Required documents are attached.

Date: 2022.10.01 Pass mark: 50% Time: 02 Hours

Question 01

Power Drink Lanka (Pvt) Ltd is a limited liability company registered under the Companies Act of Sri Lanka. "Pump-up" is a popular energy drink manufactured by Power Drink Lanka (Pvt) Ltd according to a secret recipe comprising several herbs and 1.5% of alcohol in the volume. This popular energy drink was sold in 300ml glass bottles until the company's Marketing Director proposed to market the same in 200ml cans. Since there was no facility for canning the energy drink in Sri Lanka Power Drink Lanka (Pvt) Ltd contracted a company namely Can Can (Bhd) Ltd in Malaysia for this purpose. According to the contract signed between the two companies Power Drink Lanka (Pvt) Ltd must supply Pump-up concentrate, alcohol, and empty cans to Can Can (Bhd) Ltd free of charge. The canning process included;

1. Preparation of beverage by mixing the Pump-up concentrate, alcohol, and water in the following proportion and can the same into the empty cans.
   (a) Pump-up concentrate - 10 units
   (b) Alcohol - 03 units
   (c) Water - 187 units

2. Packing the cans in the following manner for shipping and marketing purposes.
   (a) 6 cans in a pack
   (b) 10 packs in a carton
   (c) 20 cartons in a pallet

The price agreed by the two parties for the above process is USD 0.75 ExWorks (EXW) per can.

To manufacture empty cans Power Drink Lanka (Pvt) Ltd retained the services of a company in Singapore namely Alu Can Co. Ltd. According to the agreement entered, Power Drink Lanka (Pvt) Ltd had to provide the artwork to print the empty cans to Alu Can Co. Ltd free of charge and the Alu Can Co. Ltd had to ship the empty cans directly from Singapore to Can Can (Bhd) Ltd. The price agreed by the two parties for this process was USD 0.25 DDP per can.

Power Drink Lanka (Pvt) Ltd retained the services of renowned Sri Lankan artist Mr. Sanura Silva to design the can and develop the artwork. He was paid Sri Lanka Rupees (SLR) 1 million (Rs. 1,000,000.00) for this task. Once the artwork was completed Power Drink Lanka (Pvt) Ltd sent the same to Alu Can Co. Ltd free of charge.

Power Drink Lanka (Pvt) Ltd purchased the alcohol from Best Spirits (Pty) Ltd in South Africa. According to the agreement entered, Best Spirits (Pty) Ltd had to ship the alcohol directly from South Africa to Can Can (Bhd) Ltd. The price agreed by the two parties for this process was USD 0.15 DDP per liter.

Accordingly, to start the manufacturing process Power Drink Lanka (Pvt) Ltd supplied the following items to Can Can (Bhd) Ltd free of charge.

1. A shipment of 1,500 litres of Pump-up concentrate exported from Sri Lanka for USD 120,000 on DDP term.
2. A shipment of 150,000 empty cans exported from Singapore.

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3. A shipment of 25,000 litres of alcohol from South Africa

As the first shipment Power Drink Lanka (Pvt) Ltd has imported a shipment of 01x20' container said to contain 400 cartons of Pump-up Energy Drink cans from Can Can (Bhd) Ltd.

Ms. Power Drink Lanka (Pvt) Ltd has entrusted the transportation of the said container from Malaysia to the Port of Colombo to a Freight Forwarding company namely Sea-Sky Lanka Ltd. The following charges have been paid by Power Drink Lanka (Pvt) Ltd to Sea-Sky Lanka Ltd as the total cost of transport.

1. Main Carrier Charges (Sea Freight) - USD 1285
2. Packing Cost - USD 315
3. Inland Transport - USD 725
4. Terminal Handling Charges at the origin port - USD 250
5. Currency Adjustment Factor (CAF) - USD 145
6. Bunker Adjustment Factor (BAF) - USD 135
7. Terminal Handling Charges at the destination port - USD 150
8. Container Deposit - Rs. 5750
9. Container Washing - Rs. 1150

The marine insurance has been obtained by Power Drink Lanka (Pvt) Ltd locally from Sri Lanka Insurance Company on payment of Rs. 18,436/= for the whole shipment.

In the Customs Declaration (CusDec) submitted by Power Drink Lanka (Pvt) Ltd to clear the subject shipment, the Customs Value was declared as Rs. 13,766,161.20. However, the Customs Officers rejected this value and move to calculate the correct Customs Value.

Presume that you are the Customs Officer who was entrusted with this task and calculate the Customs Value of the subject shipment in Sri Lankan Rupees.

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Question 05

Explain the structure of an HS Code up to 8 digit level and the procedure one should follow to determine the HS Code of any given commodity. (20 Marks)

Question 06

a) Explain **Section 10** and **Schedule A** (Table of Duties) of the Customs Ordinance

b) Explain **Section 12** and **Schedule B** (Table of Prohibitions and Restrictions) of the Customs Ordinance

(20 Marks)

Question 07

The payment methods in international trade have evolved based on how the risk is transferred between the buyer and the seller. Explain the six methods of payment in international trade with an emphasis on how the risk is transferred between the buyer and the seller. (20 Marks)

----------END OF THE QUESTION PAPER----------

Computation formulae for imported goods

Where

v	=	CIF value in Rupee
c	=	Cess levy under Sri Lanka Export Development Act
d	=	Customs Duty
e	=	Excise (Special Provisions) Duty (ED)
t	=	Value Added Tax (VAT)
p	=	Port and Airport Development Levy (PAL)
r_e	=	Rate of Excise (Special Provisions) Duty (ED)
r_t	=	Rate of Value Added Tax (VAT)
r_n	=	Rate of Nation Building Tax

- Customs Duty (d) = (CIF value) × (Customs duty rate)
  or
  = (quantity) × (unit rate of customs duty)
- Value Added Tax (t) = (v + 10% of v + d + c + p + e) × r_t
- Cess Levy (c) = (v + 10% of v) × (Cess levy rate)
  or
  = (quantity) × (unit rate of Cess levy)
- Port and Airport Development Levy (p) = (CIF value) × (PAL rate)
- Excise (Special Provisions) Duty (e) = (v + 15% of v+ d + c + p) × r_e
  or
  = (quantity) × (unit rate of Excise Duty)
- Special Commodity Levy = (Quantity) × (unit rate of Special Commodity Levy)

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கொள்கை, திட்டமிடல் மற்றும் ஆராய்ச்சிப் பிரிவு
Policy, Planning and Research Directorate

No: RE/38/2022

ශ්‍රී ලංකා රේගුව
இலங்கைச் சுங்கம் Sri Lanka Customs

Telephone: 2221510 (DC), 2445146 (DDC), 2445146(SC) E-mail:ddcppnr@customs.gov.lk

Customs Notification (General)
Customs Ordinance (Chapter 235)
Rates of Exchange

It is hereby notified that by virtue of powers vested in me under Section 17 of the Customs Ordinance (Chapter 235) I, **P.B.S.C. Nonis, Director General of Customs,** determine that with effect from **26.09.2022** all duties of Customs as well as other charges, penalties and forfeitures incurred under the Customs Ordinance (Chapter 235), shall be paid and received at the Rates of Exchange set out in the schedule overleaf.

The notification relating to the Rates of Exchange published in Gazette No: **2298/01** of **19.09.2022** is hereby rescinded.

P.B.S.C. Nonis
Director General of Customs

Sri Lanka Customs
Colombo 11
23.09.2022

Ref. DGC A877/PL305 The letter No. 33/04/001/0011/015 (38) Dated 23.09.2022 of Central Bank of Sri Lanka

Schedule

Rates of Exchange Effective From 26.09.2022 TO 02.10.2022

	Country	Country Code	Currency	Currency Code	Rate of Exchange (Rs.)
1	Australia	AU	Dollar	AUD	245.3333
2	Bahrain	BH	Dinar	BHD	981.1904
3	Bangladesh	BD	Taka	BDT	3.5880
4	Brazil	BR	Brazil Real	BRL	72.2846
5	Brunei	BN	Brunei Dollar	BND	260.5554
6	Canada	CA	Canadian Dollar	CAD	274.4647
7	China	CN	Renminbi	CNY	52.1518
8	China	CN	Offshore	CNH	52.1181
9	Czechoslovakia	CZ	Koruna	CZK	14.7386
10	Denmark	DK	Kroner	DKK	48.8987
11	Egypt	EG	Pound	EGP	18.9802
12	Euro Zone		Euro	EUR	363.6163
13	Ghana	GH	Cedi	GHS	36.0901
14	Hongkong	HK	Dollar	HKD	47.1273
15	Hungary	HU	Forint	HUF	0.8970
16	India	IN	Rupee	INR	4.5616
17	Indonesia	ID	Rupiah	IDR	0.0246
18	Iran	IR	Riyal	IRR	0.0088
19	Japan	JP	Yen	JPY	2.6041
20	Jordan	JO	Dinar	JOD	521.7539
21	Korea	KR	Won	KRW	0.2624
22	Kuwait	KW	Dinar	KWD	1,194.7276
23	Macau	MO	Pataca	MOP	45.7317
24	Malaysia	MY	Ringgit	MYR	80.9638
25	Maldives	MV	Rufiya	MVR	23.9278
26	Mauritius	MU	Rupee	MUR	8.3036
27	Myanmar	MM	Kyat	MMK	0.1762
28	Nepal	NP	Rupee	NPR	2.8591
29	New Zealand	NZ	Dollar	NZD	216.0353
30	Nigeria	NG	Naira	NGN	0.8599
31	Norway	NO	Kroner	NOK	35.4969
32	Oman	OM	Riyal	OMR	960.8278
33	Pakistan	PK	Rupee	PKR	1.5446
34	Papua New Guinea	PG	Kina	PGK	105.0583
35	Philippines	PH	Peso	PHP	6.3376
36	Poland	PL	Zloty	PLN	76.5048
37	Qatar	QA	Riyal	QAR	101.2421
38	Russia	RU	Rouble	RUB	6.0150
39	Saudi Arabia	SA	Riyal	SAR	98.3185
40	Seychelles	SC	Rupee	SCR	25.4688
41	Singapore	SG	Dollar	SGD	260.5646
42	South Africa	ZA	Rand	ZAR	21.0212
43	Sweden	SE	Krona	SEK	33.3789
44	Switzerland	CH	Francs	CHF	378.1869
45	Taiwan	TW	Dollar	TWD	11.6820
46	Thailand	TH	Baht	THB	9.9109
47	U.A.E.	AE	Dirham	AED	100.7115
48	United Kingdom	GB	Sterling Pound	GBP	415.7940
49	United States of America	US	Dollar	USD	369.9235
50	Zambia (Old)	ZM	Kwacha	ZMK	0.0712
51	Zambia (New)	ZM	Kwacha	ZMW	23.5290
52	Zimbabwe	ZW	Dollar	ZWD	0.9748

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Faculty of Management and Social Sciences
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Year 3 Semester I

SEMESTER END EXAMINATION

Transport Planning and Logistics Management – LTTM3208

- This paper consists of SEVEN questions on SEVEN (07) pages.
- Answer FOUR Questions including Question 01.
- Only non-programmable calculators are allowed.
- You may use appropriate graphs, diagrams, equation/s to prove or justify the answers.
- If you have any doubt as to the interpretation of the wording of a question, make your own decision, but clearly state it on the script.
- Write Legibly.

Date: 2020.09.27 Pass mark: 50% Time: 02 Hours

Question 01 - Compulsory

Transportation terminal is the key node in transport systems. Efficient terminals can enhance and adjust the operational efficiency & layout of passenger/ cargo transportation networks, provide a passenger/freight guidance system, and regulate the development of commercial forms, as well as optimize the assembly and distribution of modern logistic modes, among others.

(a) Define the term "transport terminal". (02 Marks)

(b) Name main three functions of transport terminals. (03 Marks)

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(c) Explain four elements defining the hinterland of a port terminal. (20 Marks)

Question 02

As terminals, sea ports are vast freight handling platforms. For handling freight, port infrastructures collectively have to accommodate transhipment activities both on ships and inland and thus facilitate convergence between land transport and maritime systems. Around the globe, sea ports are the points of convergence from which inland transport systems, particularly rail, were laid. Majority of global sea ports, especially those have historical importance, owe their initial emergence to their site as the great majority of harbors are taking advantage of a natural coastline or a natural site along a river.

(a) Name four elements depicting the nature of transport terminals. (05 Marks)

(b) Critically differentiate intermodalism & multimodalism. (20 Marks)

Question 03

Refer the data below which is gathered for a Transport Study in September 2022, for the study area of Western Province and three (03) study zones were identified as Municipal Council Boundaries, which are:

Study Zone I – Mount Lavinia and Dehiwala - Dehiwala

Study Zone II – Sri Jayewardenepura Kotte – Hanwella

Study Zone III – Colombo – Peliyagoda

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From the each study zone : below trip productions and trip attractions were identified.

Table 3.1 : Trip Productions and Trip attractions from each zone

Zone	Trip Production	Trip Attraction
Zone I	100	104
Zone II	108	120
Zone III	124	108

If the generalized cost function is give as

$f(cij) = 1/cij^2$

and the cost matrix is shown as:

Table 3.2 : Cost Matrix

Zone	I	II	III
I	1.00	1.20	1.80
II	1.20	1.00	1.50
III	1.80	1.50	1.00

Calculate:

(a) The adjusted Generalized Cost Matrix (02 Marks)

(b) The Balancing Factors using an appropriate tabulae format (10 Marks)

(c) Each combination of Trip Distribution (08 Marks)

(d) The final Table with expected Trip Productions and Trip attractions (05 Marks)

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Formulae to be used:

$$T_{(ij)} = \quad A(i) * O(i) * B(j) * D(j) * f(cij)$$

$$B(i) = \frac{1}{\sum A(i) * O(i) * f\ (cij)}$$

$$A(i) = \frac{1}{\sum B(j) * D(j) * f\ (cij)}$$

Question 04

(a) Briefly explain two (02) factors affecting Freight Distribution Planning and Modelling (05 Marks)

(b) What are the four types of Aggregate Demand Planning models? Briefly state those main applications. (05 Marks)

(c) Assume that the growth factor is related to variables of :

(i) Population in the study Zone (P)

(ii) Car ownership (C)

(iii) Average Monthly income per capita (IPC)

Referring to the above variables,

(I) Formulate an equation to calculate the growth factor (02 Marks)

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(II) If the car ownership is estimated to be increased by 10%, and the population is estimated to be increased by 12.50% calculate the growth factor using the above formulated equation in part (I) (04 Marks)

(III) For the below base year trip matrix, formulate the estimated trip matrix.

(09 Marks)

Tale 4.1: Base year Trip Matrix

		Destination Zones				D_j
		D1	D2	D3	D4	
Origin Zones	O1	19	23	20	22	84
	O2	18	20	21	19	78
	O3	20	21	19	18	78
	O4	22	23	24	20	89
O_i		79	87	84	79	329

Question 05

(a) Differentiate between **"charter air services"** and **"scheduled air services"**.

(05 Marks)

(b) Discuss in detail, the conditions that ensure the complementarity of modes.

(05 Marks)

(c) What are the three dimensions that modal competition is based on? Explain.

(05 Marks)

(d) Map, illustrate and explain the functioning of intermodal transport supply chain.

(10 Marks)

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Question 06

(a) "It's often said that containerization has revolutionized the transportation in terms of many aspects". Explain (10 Marks)

(b) Discuss in detail the advantages and disadvantages of containerization in your own words with suitable examples. (10 Marks)

(c) Define what's a modal shift in your own words. (05 Marks)

Question 07

(a) Define below terms. Use appropriate figures where necessary. (02 * 05 Marks)

(i) Weighted Graph
(ii) Vertex and Edge
(iii) Multiplicity
(iv) A Walk
(v) A Closed Path

(b) Using the figure 7.1 illustrated below of a topological network (a weighted, two-way graph) of public busses in Sri Lanka from Pettah to Borella, Answer the following questions.

S = 1 = Starting Node

E = 5 = Ending Node

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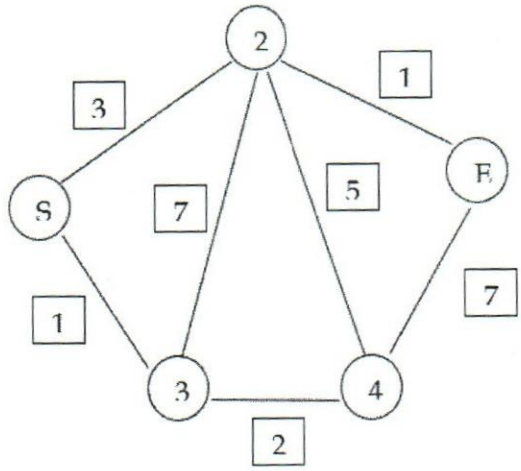

Figure 7.1 : Topological Public Bus Network from Pettah to Borella

(a) What is the k(G) ? (01 Mark)

(b) Identify and write a path with a loop (01 Mark)

(c) Explain the terminology of Incident, Adjacent and isolated edges/vertices. Give one (01) example foreach Incident, Adjacent and isolated edges/vertices (05 Marks)

(d) Find the shortest path for each node using Dijkstra Algorithm, Greedy method (08 Marks)

----------END OF THE QUESTION PAPER----------

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Year 3 Semester I

SEMESTER END EXAMINATION

Production and Operations Management – LTPM3207

- This paper consists of SEVEN questions on ELEVEN (11) pages.
- Answer FOUR Questions including Question 01.
- Only non-programmable calculators are allowed.
- You may use appropriate graphs, diagrams, equation/s to prove or justify the answers.
- If you have any doubt as to the interpretation of the wording of a question, make your own decision, but clearly state it on the script.
- Write Legibly.
- Formulae sheet attached.

Date: 2022.09.25 | Pass mark: 50% | Time: 02 Hours

Question 01 (Compulsory)

SELECT THE MOST APPROPRIATE ANSWER OUT OF THE GIVEN CHOICES.

1. Operations Management is
   (a) The management of transforming that create goods and/or provide services
   (b) The management of transforming that achieve the goals of the organization
   (c) The management of systems or processes that create goods and/or provide services
   (d) The management of systems or processes that achieve the goals of the organization

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2. System Operations functions are
   (a) Decisions concerning capacity, inventory, scheduling, project management and quality assurance
   (b) Decisions concerning personnel, inventory, scheduling, project management and quality assurance
   (c) Decisions concerning personnel, location, scheduling, project management and quality assurance
   (d) Decisions concerning personnel, inventory, arrangement of departments, project management and quality assurance

3. Characteristic of a Service operation,
   (a) Low consumer participation
   (b) Facility site selection dictated by the transportation facilities available
   (c) Labor intensive
   (d) Tangible

4. Manufacturing operations
   (a) transform some inputs or raw materials into some outputs with systems
   (b) transform some inputs or raw materials into some outputs with effective and efficient systems
   (c) transform some inputs or raw materials into some outputs effectively and efficiently
   (d) transform some tangible input or raw materials into some tangible output

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5. Forecasting is
   (a) A process of predicting a future event
   (b) A process of guessing a future event
   (c) A process of identifying a future event
   (d) A process of ready for a future event

6. Short range forecast is for
   (a) Purchasing, job scheduling, workforce levels, job assignments, production levels
   (b) Sales and production planning, budgeting
   (c) New product planning, facility location, research and development
   (d) workforce levels, facility location

7. Most accurate forecasting is
   (a) Short Term forecasting
   (b) Medium Term Forecasting
   (c) Both Short Term and Medium-Term Forecasting
   (d) Long Term Forecasting

8. Four stages of Product Life Cycle
   (a) Introducing, Entering, Maturity, Decline
   (b) Introduction, Growth, Maturity, Decline
   (c) Introducing, Entering, Stable, Decline

(d) Introduction, Growth, Competition, Decline

9. Trend in Product and Service Design
   (a) Reduce time to capture the market
   (b) Market survey
   (c) Reduce time to introduce new product or service
   (d) Identify marketing features

10. Reasons for product and service design
   (a) Be competitive
   (b) Development of new product
   (c) Be comparative
   (d) Change the existing product

11. Process selection decision is based on
   (a) Forecasting, Capacity Planning, Technological Change
   (b) Forecasting, Product and Service Design, Technological Change
   (c) Product and Service Design, Capacity Planning, Technological Change
   (d) Forecasting, Capacity Planning, Product and Service Design

12. Process Types are
   (a) Job Shops, Batch, Repetitive, Continuous
   (b) Make to Stock, Make to Assemble, Make to Order
   (c) Job Shops, Intermediate, Repetitive, Continuous

(d) Make to Stock, Make to Assemble, Make to Order

13. When you modify the capacity

(a) Facilities can be added

(b) People can be added

(c) Jobs can be scheduled

(d) Machines can be allocated

14. Importance of Capacity Decision

(a) Impacts ability to make future requirements

(b) Involves short term commitment

(c) Affects operating cost

(d) Increase competitiveness

15. Design capacity is

(a) the maximum theoretical output of a system

(b) the minimum theoretical output of a system

(c) the capacity a firm expects to achieve given current operating constraints

(d) the capacity a firm needs to achieve given current operating constraints

(01 Mark*15 = 15 Marks)

16. There are several policies which are considered in Aggregate Planning. They are

(a) Workforce, Subcontracting, Hiring/Layoff

(b) Subcontracting, Overtime, Inventory

(c) Facilities, Backorders, Workforce

(d) Hiring/Layoff, Overtime, Workforce

17. Aggregate planning is a

(a) Short Range Planning

(b) Intermediate Range Planning

(c) Both Short Range and Intermediate Range Planning

(d) Long Range Planning

18. One of the Aggregate Planning outputs is

(a) Total cost of a plan

(b) Total budget

(c) Total capacity

(d) Labor flexibility

19. Product Standardization will not help you to

(a) Reduce the parts in your inventory

(b) Reduce the training cost

(c) Fill the orders from inventory

(d) Do small production runs

20. Sources of ideas for product and service design

(a) Employees, Marketing, Management Information System

(b) Employees, Customers, Competitors

(c) Marketing, Management Information System, Customers

(d) Competitors, Suppliers, Management information System

(02 Marks*5 = 10 Marks)

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Question 02

(a) Briefly explain the Business Operations Overlap in the industry. (07 Marks)

(b) Identify three characteristics of Service Operation and briefly explain one. (08 Marks)

(c) Identify three Manufacturing Operations and briefly explain each. (10 Marks)

Question 03

(a) New car sales for a dealer in a Company, for the past year are shown in the following table, along with monthly seasonal relatives, which are supplied to the dealer by the regional distributor.

Table 3:1 – Car sales

Month	Unit sold	Seasonal relative
Jan	640	0.80
Feb	648	0.80
Mar	630	0.70
Apr	761	0.94
May	735	0.89
Jun	850	1.00
Jul	765	0.90
Aug	805	1.15
Sep	840	1.20
Oct	828	1.20
Nov	840	1.25
Dec	800	1.25

i. Does there seem to be trend? (03 Marks)

ii. Deseasonalize car sales. (06 Marks)

iii. Forecast sales for the first three months of the next year. (10 Marks)

(b) A bank manager wants to estimate quarterly relatives for fixed deposit openings, based on the data shown.

Table 2:2 – Fixed Deposits

	Quarter			
Year	1	2	3	4
1	200	250	210	340
2	210	252	212	360
3	215	260	220	358
4	225	272	233	372
5	232	284	240	381

Determine quarter relatives. (06 Marks)

Question 04

(a) Identify the product and service activities. (07 Marks)

(b) Briefly explain legal, environment and ethical issues of product and service design. (08 Marks)

(c) Briefly explain three reasons for product and service design. (10 Marks)

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Question 05

(a) In a job shop, effective capacity is only 50% of design capacity, and actual output is 80% of effective output. What design capacity would be needed to achieve an actual output of eight jobs per week? (05 Marks)

(b) A producer of felt-tip pens has received a forecast of demand of 30,000 pens for the coming month from its marketing department. Fixed costs of $25,000 per month are allocated to the felt-tip operation, and variable costs are 37 cents per pen.

(i) Find the brek-even quantity if pens sell for $1 each. (04 Marks)

(ii) At what price must pens be sold to obtain a monthly profit of $15,000, assuming that estimated demand materialises? (05 Marks)

(c) A small firm intends to increase the capacity of a bottleneck operation by adding a new machine. Two alternatives, A and B, have been identified, and the associated costs and revenues have been estimated. Annual fixed costs would be $40,000 for A and $30,000 for B; variable costs per unit would be $10 for A and $11 for B; and revenue per unit would be $15.

(i) Determine each alternative's break-even point in units. (03 Marks)

(ii) At what volume of output would the two alternatives yield the same profit? (04 Marks)

(iii) If expected annual demand is 12,000 units, which alternative would yield the higher profit? (04 Marks)

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Question 06

For the set of tasks given below, do the following:

(a) Develop the precedence diagram. (03 Marks)

(b) Determine the minimum and maximum cycle times in seconds for a desired output of 500 units in a 7-hour day. Why might a manager use a cycle time of 50 seconds? (03 Marks)

(c) Determine the minimum number of workstations for output of 500 units per day. (04 Marks)

(d) Balance the line using the largest popsitional weight heuristic. Break ties with the most following tasks heuristic. Use a cycle time of 50 seconds. (10 Marks)

(e) Calclate the percentage idle time for the line. (05 Marks)

Table 7:1 - Tasks

Task	Task Time (Seconds)	Immediate Predecessors
A	45	-
B	11	A
C	9	B
D	50	-
E	26	D
F	11	E
G	12	C
H	10	C
I	9	F, G, H
J	10	I

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Question 07

SummerFun, Inc., produces a variety of recreation and leisure products. The production manager has developed an aggregate forecast:

Month	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Forecast	50	44	55	60	50	40	51	350

Use the following information to develop aggregate plans.

Regular Production cost - Rs. 80 per unit
Overtime cost - Rs. 120 per Unit
Regular capacity - 40 units per month
Overtime capacity - 8 units per month
Subcontracting cost - Rs. 140 per Unit
Holding cost - Rs. 10 per unit per month
Subcontracting capacity - 12 units per month
Back -order cost - Rs. 20 per Unit
Beginning Inventory - 0 units

Develop the aggregate plan using a combination of backlogs, subcontracting, and inventory to handle variations in demand. (25 Marks)

----------END OF THE QUESTION PAPER----------

Formula Sheet

Simple Moving Average

$$F_{t+1} = \frac{D_t + D_{t-1} + \ldots + D_{t-n+1}}{n}$$

D_t : actual demand in period t

n : number of periods in the average

1. **Weighted Moving Average**

$$T_{t+1} = W_1 D_1 + W_2 D_{t-1} + \ldots + W_n D_{t-n+1}$$

2. **Exponential Smoothing**

$$F_t = F_{t-1} + \alpha(A_{t-1} - F_{t-1})$$

F_t = new forecast

F_{t-1} = previous forecast

α = smoothing (or weighting) constant ($0 \leq \alpha \geq 1$)

4. **Trend Projections**

$y = a + bx$

y = computed value of the variable to be predicted

a = y-axis intercept

b = slope of the regression line

x = the independent variable

$$b = \frac{\Sigma xy - n\bar{x}\bar{y}}{\Sigma x^2 - n\bar{x}^2} \qquad a = \bar{y} - b\bar{x}$$

5. **Exponential Smoothing with Trend Adjustment**

$$F_t = \alpha (A_{t-1}) + (1-\alpha)(F_{t-1} + T_{t-1})$$

$$T_t = \beta (F_t - F_{t-1}) + (1-\beta) T_{t-1}$$

$$FIT_t = F_t + T_t$$

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Year 3 Semester I
SEMESTER END EXAMINATION
International Economics – LTIE3201

- This paper consists of SEVEN questions on SIX (06) pages.
- Answer FOUR Questions including Question 01.
- Only non-programmable calculators are allowed.
- You may use appropriate graphs, diagrams, equation/s to prove or justify the answers.
- If you have any doubt as to the interpretation of the wording of a question, make your own decision, but clearly state it on the script.
- Write Legibly.

Date: 2022.09.19 Pass mark: 50% Time: 02 Hours

Question 01: (Compulsory)

Select the most suitable answer.

According to the Central Bank Report of Sri Lanka 2021,

1) The share of Industrial exports in total exports,
   (a) 22%
   (b) 12%
   (c) 78%
   (d) 44%

2) The major Industrial exports of Sri Lanka is,
   (a) Textile and Garment
   (b) Leather, travel goods and footwear,
   (c) Rubber products
   (d) Gems, diamonds and jewelry

3) The major imports under the intermediate good of Sri Lanka is,
   (a) Chemical products
   (b) Fuel
   (c) Textiles and Textile Articles

(d) Plastic and Articles

4) Major Export Destination of Sri Lanka is,
   (a) UK
   (b) India
   (c) Middle East
   (d) USA

5) Highest imports by Origin Sri Lanka is,
   (a) India
   (b) China
   (c) Singapore
   (d) EU

6) Number of trading partners consider for calculation of NEER and REER
   (a) 8
   (b) 24
   (c) 48
   (d) 12

7) Major lender to Sri Lanka ,
   (a) Government of Japan
   (b) International Development Association
   (c) Asian Development Bank
   (d) Export-Import Bank of China

8) Trade balance of Sri Lanka as a percentage of GDP in 2021 is,
   (a) -4.0
   (b) -7.8
   (c) -3.9
   (d) -9.6

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9) Which one is incorrect about current account of Sri Lanka in 2021 is,
   (a) Service account has a surplus
   (b) Primary income account balance is deficit
   (c) Workers' remittance is more contributed to secondary income accounts.
   (d) It has a trade deficit.

10) Other than GSP ,next largest share of exports recorded under preferential trade Agreements of Sri Lanka is,

   (a) Asia-Pacific Trade Agreement (APTA) Implemented in 1975
   (b) Indo-Sri Lanka Free Trade Agreement (ISFTA) Implemented in 2000
   (c) Global System of Trade Preferences (GSTP) Implemented in 1989
   (d) South Asian Free Trade Area (SAFTA) Implemented in 2006

(20 Marks)

11) To measures the export competitiveness of a country REER is better than the NEER.

True [ ] False [ ]

12) Purchasing power of one unit of import in term of exports is called as term of trade.

True [ ] False [ ]

13) Workers' remittance is recorded in the primary income account of BOP.

True [ ] False [ ]

14) The lowering the exchange rate by the Central bank is known as revaluation.

True [ ] False [ ]

15) International term of trade is the slope of line passing through the point where the offer curves cross.

True [ ] False [ ]

(05 Marks)

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Question 02

(a) Explain that theory of Absolute Advantage and the Theory of Comparative Advantage in international trade using following figures, assume that each nation has 630 labour hours. Explain using Production Possibility Curves.

Country	Labour hours needed to produce one unit of	
	Truck	Car
A	105	21
B	30	18

(13 Marks)

(b) Explain the relative price of product (04 Marks)
(c) How does the exchange rate between nation determine? (03 Marks)
(d) Illustrate the gain from trade (05 Marks)

Question 03

You are given following Information,

	U.S	U.K
Capital stock (millions)	45	20
Labour Stock (millions)	15	10

	Product A	Product B
No. of Capital hours required	1	5
No.of labour hours required	5	10

(a) Explain the term factor abundance and factor intensity using above information (06 Marks)

(b) Explain that how does countries determine comparative advantage (04 Marks)

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(c) Illustrate H-O model and H-O-S model with respect to given information (15 Marks)

Question 04

(a) After the tariff in small country case, production effect and revenue effect are the positive while the consumption effect and trade effect are negative. Do you agree? Explain. (12 Marks)

(b) "Tariff has created economic inefficiencies" Explain (05 Marks)

(c) What are the non-tariff trade restrictions on international trade? explain (08 Marks)

Question 05

(a) What do mean by Economic Integration and types of economic integrations in the world with examples (12 Marks)

(b) Explain that trade diverting custom union with a diagram (10 Marks)

(c) What are the dynamic benefits of Custom union (03 Marks)

Question 06

(a) What do you mean by Exchange rate? Which factors determent demand and supply for respective currency? (12 Marks)

(b) Briefly explain the sub accounts of current account of Balance of payment (08 Marks)

(c) Explain the relationship between Exchange rate and Balance of payment (05 Marks)

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Question 07

Write down short note on any four (4) of the following

(a) Nominal Effective Exchange Rate Vs Real Effective Exchange Rate
(b) National accounting and Balance of Payment
(c) Nominal Rate of Protectionism Vs Effective Rate of Protectionism
(d) Fixed Exchange Rate Regime Vs Floating Exchange Rate Regime
(e) J- curve effect and Marshall-Lerner condition

(25 Marks)

----------END OF THE QUESTION PAPER----------

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Course CODE: COM551

Year 3 Semester I

SEMESTER END EXAMINATION

Airline Business Management – LTAM3202

- This paper consists of SEVEN questions on THREE (03) pages.
- Answer FOUR Questions including Question 01.
- Only non-programmable calculators are allowed.
- You may use appropriate graphs, diagrams, equation/s to prove or justify the answers.
- If you have any doubt as to the interpretation of the wording of a question, make your own decision, but clearly state it on the script.
- Write Legibly.

Date: 2022.09.14 Pass mark: 50% Time: 02 Hours

Question 01: Compulsory

(a) For continued airworthiness, standards are set for performing maintenance tasks. Briefly explain why aircraft maintenance is important. (05 Marks)

(b) Differentiate between Preventive maintenance and Corrective maintenance. (10 Marks)

(c) 'Objective of crew pairing is to find a set of pairing that covers all flights and minimizes the total cost.' Discuss the above statement with examples. (10 Marks)

Question 02

(a) Graphically explain the economic evaluation process used for fleet planning. (10 Marks)

(b) Top-Down approach or Bottom-Up approach can be used for fleet planning evaluations. Explain which model is more applicable with reasons. (06 Marks)

(c) The spread of the coronavirus has caused airlines to reconsider the airline planning processes. Explain how the outbreak of COVID -19 has impacted the airline fleet planning process. (09 Marks)

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Question 03

(a) Write down 3 (three) airline profit maximizing strategies indicating the intended benefit and the strategy pitfall of each. (09 Marks)

(b) Explain with examples factors that affects supply and demand of airline services of SriLankan airlines, the flag carrier of Sri Lanka. (16 Marks)

Question 04

(a) Airlines publish a variety of fares between each city pair. Every published fare has a published set of fare rules. Explain such fare rules that must be met for a passenger to qualify for a fare. (15 Marks)

(b) Objective of airline revenue management is to extract the maximum revenue that a passenger is willing to pay. Explain revenue management fences. (10 Marks)

Question 05

(a) Briefly explain the final product of the flight schedule development process with examples. (05 Marks)

(b) Explain the 4(four) steps of the flight schedule planning process. (08 Marks)

(c) Flight schedule represents the foundation or basis of the airline product. There are conflicting objects the schedule planner attempts to balance during the development of a flight schedule. Explain such conflicts between revenue maximization and cost minimization with suitable examples. (12 Marks)

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Question 06

(a) Advances in technology is revolutionizing airline business management. Explain how technological factors has impacted airline marketing in the present day. (10 Marks)

(b) Market segmentation in the airline industry helps to better understand passenger needs and tells how you can best meet those needs with your product or service. Assume you are an airline marketer and explain the wants and needs of the modern-day business traveler and leisure traveler. (15 Marks)

Question 07

(a) Human Resource Manager from ABM company states that it is more beneficial to arrange their overseas travel by going through a travel agent. Agree or disagree. Explain your answer. (10 Marks)

(b) Human factors is a multidisciplinary field devoted to optimizing human performance and reducing human error. Explain factors that affects human performance in aviation with examples. (15 Marks)

----------END OF THE QUESTION PAPER----------

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Year 3 Semester I
SEMESTER END EXAMINATION
Port Planning – LTPP3203

- This paper consists of SEVEN questions on THREE (03) pages.
- Answer FOUR Questions including Question 01.
- Only non-programmable calculators are allowed.
- You may use appropriate graphs, diagrams, equation/s to prove or justify the answers.
- If you have any doubt as to the interpretation of the wording of a question, make your own decision, but clearly state it on the script.
- Write Legibly.

Date: 2022.09.12 Pass mark: 50% Time: 02 Hours

Question 1 (Compulsory)

What are the Challengers to be considered by Ports when expanding or building a new port under following areas?

a) Providing Navigational Services? (9 Marks)
b) Providing Cargo Handling Terminals Facilites? (9 Marks)
c) Value Added Logistic Facilities? (7 Marks)

Question 2

a) Describe the main reasons to expand the Colombo Harbour built by British now known as Colombo South Harbour?

(5 Marks)

b) Select TWO of the cargo handling terminals and draw and describe a full terminal layout that can handle three ships at any given time & name main terminal facilities?
   1) Liquid Bulk Handling Terminal
   2) Dry Bulk Handling Terminal
   3) Cruise Terminal
   4) RO – RO Automobile Handling Terminal

(10*2 Marks)

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Question 3

a) Name Continer Yard Storage/Stacking Equipments? (9 Marks)
b) Name different sizes of Ship to Shore Gantry Cranes (STS)? (4 Marks)
c) What is a spreader & name four types of spreaders? (4 Marks)
d) Name Quay Tranfer Equipments? (8 Marks)

Question 4

a) What are the competivie container ports for the Port of Colombo? (5 Marks)
b) List Globoal Container Termnal Operators? (5 Marks)
c) What is BOT / PPP? (5 Marks)
d) Give three examples from Sri Lanka on BOT / PPP? (5 Marks)
e) What are the key features of the Colombo Port Expansion Project / Colombo South Harbour)? (5 Marks)

Question 5

Your expertise is required to finalize a master plan for the Port of Hambantota.

a) What are the current facilties & the Port of Hambantota? (8 Marks)
b) What are the current business at the Port of Hambantota? (5 Marks)
c) Draw a master plan & zone out areas for differenct types of cargo handling termnals and industrial areas? (12 Marks)

Question 6

Commercial ports in Sri Lanka are owned by Sri Lanka Ports Authority (SLPA). New port building & port expansion projects should be aligned with the Government Vision to make Sri Lanka a Maritime & Logistic Hub.

a) Describe SLPA Vision & Mission (10 Marks)
b) What are the port development projects planned in Sri Lanka & describe port projects? (15 Marks)

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Question 7

Automated Container Terminals

a) What are the advantages and disadvantages of Container Terminal Automation? (4 Marks)

b) Give examples for Fully and Semi Automated Container Terminals in the world? (4 Marks)

c) List out Automated Quay Tranfer Equipments? (4 Marks)

d) List out Automated Storage Equipments? (4 Marks)

e) Name Automated Gate Facilites? (4 Marks)

f) What level of automation is planned for ECT & WCT (CWIT) sperately? (5 Marks)

----------END OF THE QUESTION PAPER----------

(4)

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Year 3 Semester I

REPEAT EXAMINATION

Environmental and Social Impacts of Transport and Logistics – LTEL3205

- This paper consists of SEVEN questions on THREE (03) pages.
- Answer FOUR Questions including Question 01.
- Only non-programmable calculators are allowed.
- You may use appropriate graphs, diagrams, equation/s to prove or justify the answers.
- If you have any doubt as to the interpretation of the wording of a question, make your own decision, but clearly state it on the script.
- Write Legibly.

Date: 2022.08.31 Pass mark: 50% Time: 02 Hours

Question 01 (Compulsory)

a) Discuss in your own words, how freight transportation contributes to various problems such as congestion in urban context of Sri Lanka. (15 marks)

b) Explain in detail the mitigation strategies that can be followed in the urban context to minimize the urban freight challenges. (10 marks)

Question 02

a) Elaborate how "Transportation conveys substantial socioeconomic benefits, but at the same time, transportation is impacting environmental systems". (08 marks)

b) Explain how mobility comes at a partial cost to the user and a full cost to the society and environment? (07 marks)

c) Explain in your own words how urbanization has led to motorization indirectly in the developing world?

(10 marks)

Question 03

a) Even though there're various forms of environmental pollutions, noise pollution has turned to be an adverse source of environmental externality of transportation. Do you agree or disagree? Elaborate your answer with examples.

(07 marks)

b) Differentiate between the pros and cons of centralized and diffused networks in terms of the emission level created by each network.

(05 marks)

c) Elaborate in your own words, how global warming is indirectly affected by transportation.

(05 marks)

d) Explain how the ships pollute the marine waters in your own words. (08 marks)

Question 04

a) What are the major ways that energy sources are utilized in transportation?

(07 marks)

b) Even though energy brings about significant benefits to human life, there are so many issues related to energy. Mention and explain 5 such issues of energy.

(10 marks)

c) Select two types of alternative energy sources and through a SWOT analysis elaborate the pros and cons that they possess. (08 marks)

Question 05

a) Explain the annexes of MARPOL Convention in detail. (10 marks)

b) What are the two basic types of measures that achieve the goal of improving transport system efficiency? Explain in detail (05 marks)

c) Elaborate in detail, transport demand management strategies that can be used to solve road transportation problems of Sri Lanka. (10 marks)

Question 06

a) What are the major types of scoping techniques used in EIA? (05 marks)
b) Identify the scoping impact of a proposed highway from Kandy to Dambulla (10 marks)
c) Discuss the importance of conducting an EIA prior to a road construction project. (10 marks)

Question 07

Write shorts notes on the below topics. (05 * 5 Marks= 25 Marks)

a) Marine oil pollution
b) Externalities of noise pollution
c) Paradox of mobility
d) Distribution Sprawl
e) City Logistics.

----------END OF THE QUESTION PAPER----------

(5)

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BSc Hons in Logistics and Transportation
Course CODE: COM551

Year 3 Semester I

REPEAT EXAMINATION

Transport Planning and Logistics Management – LTTM3208

- This paper consists of SEVEN questions on SIX (06) pages.
- Answer FOUR Questions including Question 01.
- Only non-programmable calculators are allowed.
- You may use appropriate graphs, diagrams, equation/s to prove or justify the answers.
- If you have any doubt as to the interpretation of the wording of a question, make your own decision, but clearly state it on the script.
- Write Legibly.

Date: 2022.08.30 Pass mark: 50% Time: 02 Hours

Question 01: (Compulsory)

(a) State briefly the role of planning transportation in logistics management.

(03 Marks)

(b) Briefly explain the implication on economic rationality behind choices of freight movement.

(06 Marks)

(c) Define the following terminologies commonly used in transportation network.

I. Link
II. Node
III. Flow
IV. Path
V. Cycle
VI. Tree

(06 Marks)

(d) Briefly explain the usage of Dijkstra's algorithm in transportation network.

(04 Marks)

(e) Briefly explain the conservation law on transportation network taking into consideration the flows of network. (Hint – both centroid and intermediate nodes have to be considered)

(02 Marks)

(f) Briefly discuss the term 'generalized cost' in terms of freight transportation that is highly useful for planning trip distribution and mode choice.

(04 Marks)

Question 02

(a) State each example for the following transportation networks

I. Linear network

II. Grid network

(04 Marks)

(b) Explain two (02) advantages of hub and spoke network.

(06 Marks)

(c) Describe three (03) indexes that can be used to measure the efficiency of the transport network.

(06 Marks)

(d) Differentiate topology versus typology using two (02) each examples.

(05 Marks)

(e) Discuss two advantages of having an efficient freight transport systems through railways in Sri Lanka.

(04 Marks)

Question 03

(a) Assume that the number of truck trips at a given location on an average weekday was 10,000 in 2005 and 15,000 in 2010. Estimate the number of truck trips for the year 2024. (Hint - Use simple growth factor method based on historic traffic trends)

(04 Marks)

(b) Find the total flow through the network shown in Q3-b when the node 1 is the source and node 4 is the sink. Flows between nodes are shown in the figure.

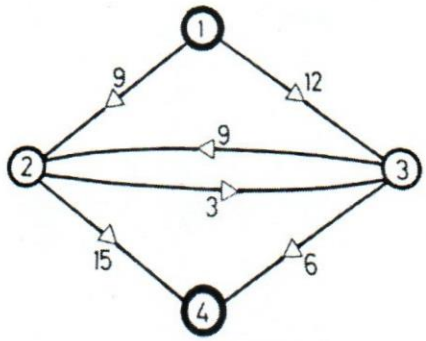

Figure Q3-b: Transportation network flow conservation law to be applied

(03 Marks)

(c) Determine the Minimum Spanning Tree (MST) for the transportation network shown in figure Q3-c.

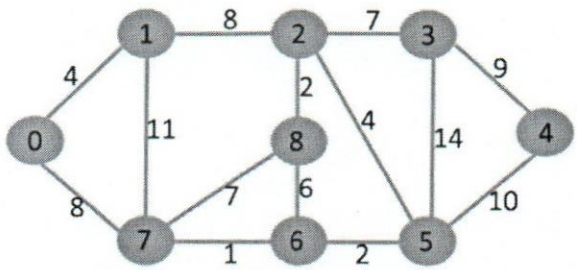

Figure Q3-c: Transportation network to which MST to be found

(18 Marks)

Question 04

(a) State two functionalities of transportation in terms of freight movement.

(02 Marks)

(b) Find the shortest route from the origin O to the destination T for the network shown in figure Q4-b using Dijkstra's Algorithm. The travel cost between nodes are stipulated in the figure.

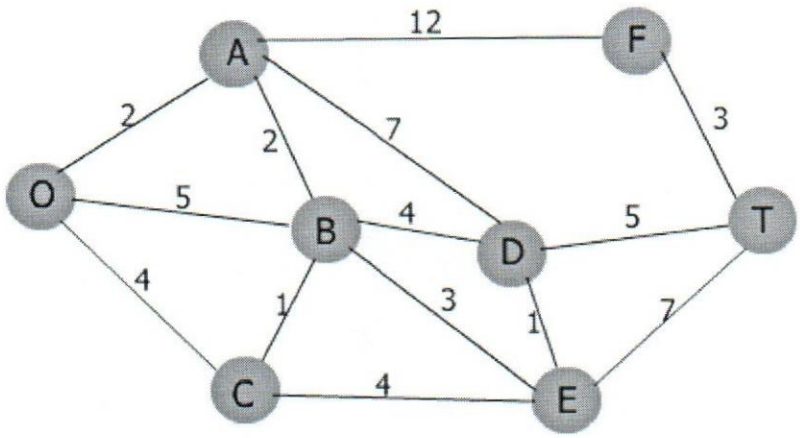

Figure Q4-b: Network to which shortest paths to be found out using Dijkstra Algorithm

(17 Marks)

(c) Identify three contributions that containerization has made to the change of era in international trade.

(06 Marks)

Question 05

(a) Fill the table Q5-a shown below using the modal characteristics of transportation modes.

Table Q5-a: Table to be filled

Mode	Advantage (01)	Disadvantage (01)
Rail		
Highway		
Water		
Pipeline		
Air		

(05 Marks)

(b) Determine the maximum flow between node s and node t of the transportation network shown in figure Q5-b. Capacities of individual branches are shown on the figure.

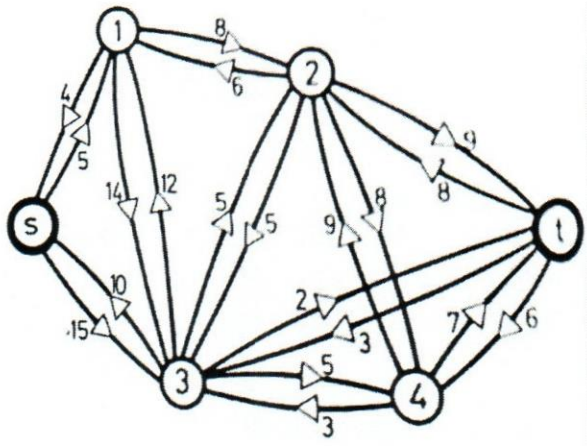

Figure Q5-b: The transportation network for which maximum flow to be found between node s and node t

(14 Marks)

(c) State three factors that might have contributed to the decline of freight movement by Sri Lanka Railway's during the last three decades.

(06 Marks)

Question 06

(a) Identify two factors that contribute for the economic development of a country.

(02 Marks)

(b) Solve the Chinese Postman problem for a tour which starts and finishes in node a of the transportation network shown in Figure Q6-b.

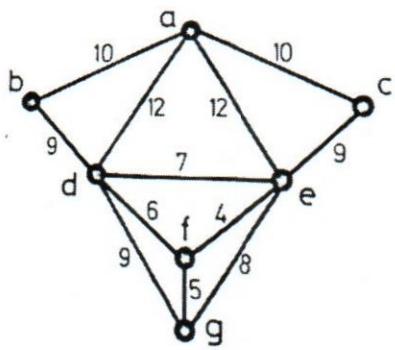

Figure Q6-b: Non oriented network for solving the Chinese Postman problem

(14 Marks)

(c) Describe three ways that freight transportation helps for the economic development.

(09 Marks)

Question 07

Write short notes for the following.

(a) Two (02) factors affecting freight movement globally
(b) Two (02) factors that affect pricing of freight movements
(c) Transportation as a means of minimizing temporal, financial and environmental

resource cost

(d) Main actors in freight movement
(e) Two difficulties in collecting freight related data.

(05 X 05 =25 Marks)

----------END OF THE QUESTION PAPER----------

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Year 3 Semester I
REPEAT EXAMINATION
Port Planning – LTPP3203

- This paper consists of SEVEN questions on TWO (02) pages.
- Answer FOUR Questions including Question 01.
- Only non-programmable calculators are allowed.
- You may use appropriate graphs, diagrams, equation/s to prove or justify the answers.
- If you have any doubt as to the interpretation of the wording of a question, make your own decision, but clearly state it on the script.
- Write Legibly.

Date: 2022.08.28 Pass mark: 50% Time: 02 Hours

Question – 1 (Compulsory)

List out challengers that a Port Planner should consider when planning future port infrastructure, superstructure and port operations?

(25 Marks)

Question –2

Following ports & future requirements can have an impact to Sri Lankan Ports in the future.
Select **one** of the following and discuss the impact to Sri Lankan Ports?

a. LNG as alternate for ship fuel
b. One Belt One Road concept and Hamabantota Port
c. Vallapadam International Transhipment Container Terminal in Kerala State
d. Vizinjam Port in Kerala State and Port of Colombo
e. Rail connectivity between China & Europe
f. Port of Hambantota management transfer to a Chinese Company for 99 years?

(25 Marks)

Question – 3

If you are appointed as a Project Design Engineer for a Pure Car Carrier - RO-RO terminal project:

(a) Draw a RO-RO terminal plan that can berth three ships

(10 Marks)

(b) List out key terminal facilities & staff requirements

(15 Marks)

Question – 4

Hambantota new port building was one of the major port project undertaken in the recent past. Describe Hambantota Port Project and the way forward (25 Marks)

Question – 5

What are the modern container handling equipment's that can be used for a mega container terminal? (25 Marks)

Question – 6

Today most of the ports & terminal facilities are built-operate using PPP and BOT basis. Discuss how Sri Lanka Ports Authority adpted this method with examples?

(25 Marks)

Question – 7

(a) What is SLPA VISION 2020?

(10 Marks)

(b) Select **one** of the cargo handling terminals and draw a full terminal layout and describe the terminal facilities.

a) Liquid Bulk Terminal
b) Dry Bulk Terminal
c) Cruise Terminal

(15 Marks)

----------END OF THE QUESTION PAPER----------

CINEC CAMPUS
Beyond A Graduate

Faculty of Management and Social Sciences
Department of Logistics & Transport
BSc Hons in Logistics and Transportation
Course CODE: COM551

Year 3 Semester I

REPEAT EXAMINATION

Operational Research – LTOR3206

- This paper consists of SEVEN questions on FIVE (05) pages.
- Answer FOUR Questions including Question 01.
- Only non-programmable calculators are allowed.
- You may use appropriate graphs, diagrams, equation/s to prove or justify the answers.
- If you have any doubt as to the interpretation of the wording of a question, make your own decision, but clearly state it on the script.
- Write Legibly.

Date: 2022.08.28 Pass mark: 50% Time: 02 Hours

Question 01

Marketing department of ABC Company has collected information on the problem of advertising for its products. This relates to the advertising media available, the number of families expected to be reached with each alternative, cost per advertisement, the maximum availability of each medium and the expected exposure of each one (measured as the relative value of one advertisement in each of the media): The information is as given below.

Advertising Media	No of families expected to cover	Cost per advertisement (USD)	Maximum Availability	Expected exposure (units)
TV (30 sec)	3000	800	8	80
Radio (20 sec)	7000	300	30	20
Sunday edition (1/4 page)	5000	400	4	50
Magazine (1 page)	2000	300	2	60

Important Information:

- The advertising budget is USD 7000.
- At least 40,000 families should be covered
- At least 2 insertions be given in Sunday edition of a daily but not more than 4 ads should be given in the TV.
- Formulate this as a LP problem.

(25 Marks)

Question 02

a manufacturer produces two product namely product 1 and product 2. these products are processed using two machines –machine A and machine B.m product 1 requires 02hrs on machine A and 06 hrs on machine B. Product 2 requires 5hrs on machine A and no time on machine B. there are 16 hours per day available on Machine A and 30hrs on machine B. profit contribution are USD 2 and USD 10 from product 1 and 2 respectively.

Using graphical method determine the optimum daily production of product 1 and product 2. (25 Marks)

Question 03

A firm produces three products A, B and C each of which passes through three departments: Fabrication, Finishing and packaging. Each unit of product A requires 3,4, and 2; a unit of product B requires 5, 4 and 4; while each unit of product C requires 2,4 and 5 hrs respectively in the three departments. Daily capacity of three departments are as follows.

- Fabrication Department - 60hrs
- Finishing Department – 72hrs
- Packaging Department – 100hrs

The unit contribution of product A, B and C are Rs.5/=, Rs. 10/= and Rs. 8/=.

(a) Formulate this as an LP model (05 Marks)
(b) Find the optimum solution using Simplex method. (20 Marks)

Question 04

Use 2 phase method and solve the following Linear Programming Problem by clearly stating the phase I objective function. (25 Marks)

MIN = 5X1 + 8X2

Subject to:

3X1 + 10X2 = 60

10X1 + 6X2 ≤ 110

4X1 + 7X2 ≥ 40

X1, X2 ≥ 0

Question 05

MAX z = 3X + 6X2 + 4X2

Subject to

X1 + 2X2 + X3 ≤ 10

3X1 + 3X2 + 2X3 ≤ 10

X1, X2, X3 ≥ 0

(a) Construct the dual problem, for this primal problem. (05 Marks)
(b) Solve the primal and dual problems using any appropriate method. (10*2 Marks)

Question 06

Consider a transportation problem where items should be transported from 03 warehouses to 4 sales outlets.

		Sales Outlets				Supply
		S1	S2	S3	S4	
Warehouses	W1	3	1	7	4	300
	W2	2	6	5	9	400
	W3	80	3	3	2	500
Demand		250	350	400	200	

(a) Using North West Corner method find the initial transportation schedule.

(05 Marks)

(b) Find the optimal transportation schedules using any appropriate method.

(20 Marks)

Question 07

The materials manager if s firm wishes to determine the expected mean demand for a particular item in stock during the reorder lead time. The information is needed to determine how far in advance to reorder, before the stock level is reduced to zero. However both lead time in days and the demand per day for the item are random variables, described by the following distribution.

Lead Time	Probability
1	0.45
2	0.30
3	0.25

Demand per day	Probability
1	0.15

2	0.25
3	0.40
4	0.20

Using the below random numbers simulate the problem and estimate the demand during lead time.

Random Numbers for Leadtime:

84 46 77 61 08 39 74 00 99 24

Random Numbers for Demand:

35 55 21 64 05 35 92 28 65 27 09 52 66

51 07 47 70 83 76 07 79

(25 Marks)

----------END OF THE QUESTION PAPER----------

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Faculty of Management and Social Sciences
Department of Logistics & Transport
BSc Hons in Logistics and Transportation
Course CODE: COM551

Year 3 Semester I
REPEAT EXAMINATION
Production and Operations Management – LTPM3207

- This paper consists of SEVEN questions on ELEVEN (11) pages.
- Answer FOUR Questions including Question 01.
- Only non-programmable calculators are allowed.
- You may use appropriate graphs, diagrams, equation/s to prove or justify the answers.
- If you have any doubt as to the interpretation of the wording of a question, make your own decision, but clearly state it on the script.
- Write Legibly.

Date: 2022.08.27 Pass mark: 50% Time: 02 Hours

Question 01

1. System Design functions are;
   (a) Capacity planning, Location arrangement of departments, Product and Service design
   (b) Personnel, Inventory scheduling, Project management and Quality assurance
   (a) Capacity planning, Location arrangement of departments, Personnel
   (b) Personnel, Inventory scheduling, Project management and Capacity planning

2. The difference between the cost of inputs and the value or price of outputs should be
   (a) Transformation process
   (b) Value Added
   (c) Control
   (d) Feedback
3. Characteristics of a manufacturing organization is
   (a) Output is intangible

(b) Customer contact is low

(c) Uniformity of inputs are low

(d) Labor content is high

4. Select the wrong statement regarding the forecasting

   (a) Medium/long range forecasts deal with more comprehensive issues

   (b) Short-term forecasting usually employs different methodologies than longerterm forecasting

   (c) Short-term forecasts tend to be more accurate than longer-term forecasts

   (d) Maturity requires longer forecasts than introduction and growth of a product

5. Reasons for product and service design

   (a) Maintain business growth

   (b) Maintain product quality

   (c) Be competitive

   (d) Maintain the development

6. Sources of ideas for product and service design

   (a) Employees, Marketing, Management Information System

   (b) Employees, Customers, Competitors

   (c) Marketing, Management Information System, Customers

   (d) Competitors, Suppliers, Management information System

7. Two research types are;
   (a) Basic Research, Implementing Research
   (b) Applied Research, Commercial Research
   (c) Basic Research, Applied Research
   (d) Basic Research, Commercial Research

8. Product Standardization will not help you to
   (a) Reduce the parts in your inventory
   (b) Reduce the training cost
   (c) Fill the orders from inventory
   (d) Do small production runs

9. Process selection outputs are used for
   (a) Forecasting
   (b) Capacity Planning
   (c) Technological change
   (d) Product and Service Design

10. When you modify the capacity
   (a) Facilities can be added
   (b) People can be added
   (c) Jobs can be scheduled
   (d) Machines can be allocated

11. There are several policies which are considered in Aggregate Planning. They are
   (a) Workforce, Subcontracting, Hiring/Layoff

(b) Subcontracting, Overtime, Inventory

(c) Facilities, Backorders, Workforce

(d) Hiring/Layoff, Overtime, Workforce

12. One of the Aggregate Planning outputs is

(a) Total cost of a plan

(b) Total budget

(c) Total capacity

(d) Labor flexibility

(12 * 2 Marks = 24 Marks)

13. A group of machines designed to handle intermittent processing requirements and produce a variety of similar products is

(a) Cellular Production

(b) Flexible Manufacturing System

(c) Process Oriented Manufacturing

(d) Product Oriented Manufacturing (01 Mark)

Question 02

(a) Define the term "Operations Management". (03 Marks)

(b) Briefly explain the Business Operations overlap. (07 Marks)

(c) Briefly explain the transformation process of an organization. (07 Marks)

(d) Briefly explain the "Value-Added" in Operations Management. (08 Marks)

Question 03

(a) Logistics firm operations of last 7 weeks are shown in the table below. Predict the operations of 8th and 9th weeks by using appropriate forecasting technique.

(10 Marks)

Table 3:1 – Operations

Week	Operations
1	405
2	410
3	420
4	415
5	412
6	120
7	124

(b) A well-known transport agency wants to predict quarterly demand for periods 15 and 16. Use below information to predict the demand. The series consists of both trend and seasonality.

(15 Marks)

Table 3:2 – Demand

Year	Quarter	Actual Demand
1	1	132
2	2	140
3	3	146
4	4	153
5	1	160
6	2	168
7	3	176
8	4	185

Question 04

(a) A building contractor's records during the last five weeks indicate the number of job requests:

Table 4:1-Job Requests

Week	1	2	3	4	5
Requests	20	22	18	21	22

Predict the number of requests for week 6 using exponential smoothing with α = 0.3. Use 20 for week 2 forecast. (05 Marks)

(b) Air travel on Mountain Airlines for the past 18 weeks was as below

Table 4:2 – Passengers

Week	Passengers	Week	Passengers
1	405	10	440
2	410	11	446
3	420	12	451
4	415	13	455
5	412	14	464
6	120	15	466
7	124	16	474
8	433	17	476
9	438	18	482

Use the trend projection technique to develop a forecast for the next three weeks.

(10 Marks)

(c) Using the following information, the Branch Manager of a Tourist Centre wants to predict the first quarter of next year demand for the purpose of writing a report to Top Management.

Table 4:3 – Seasonal Relatives

Month	Seasonal Relative	Month	Seasonal Relative
Jan	1.2	Jul	0.8
Feb	1.3	Aug	0.6
Mar	1.3	Sep	0.7
Apr	1.1	Oct	1.0
May	0.8	Nov	1.1
Jun	0.7	Dec	1.4

The monthly forecast equation being used is:

$F_t = 402 + 3t$

Where

t_0 = January of last year

F_t = Number of arrivals

Determine the number of arrivals of the first three months of next year. (10 Marks)

Question 05

(a) Identify two types of researches in Operations Management. (05 Marks)

(b) Identify five reasons for product and service design. (06 Marks)

(c) Briefly explain two trends in product and service design. (07 Marks)

(d) Briefly explain two sources of ideas for product and service design. (07 Marks)

Question 06

(a) A large manufacturer of erasers is planning to add a new line of erasers, and you have been asked to balance the process, given the following task times and precedence relationships. Assume that cycle time is to be the minimum possible.

Table 6:1 - Task Time

Task	Lenghth (Minutes)	Immediate Follower
a	0.2	b
b	0.4	d
c	0.3	d
d	1.3	g
e	0.1	f
f	0.8	g
g	0.3	h
h	1.2	end

(i) Draw the precedence diagram. (03 Marks)

(ii) Assign tasks to stations in order of greatest number of following tasks. (09 Marks)

(iii) Determine the percentage of idle time. (03 Marks)

(iv) Compute the rate of output that could be expected for this line assuming a 420-minute working day. (05 Marks)

(v) What is the shortest cycle time that will permit use of only two workstations? Is this cycle time feasible? (05 Marks)

Question 07

(a) SummerFun, Inc., produces a variety of recreation and leisure products. The production manager has developed an aggregate forecast:

Month	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Forecast	50	44	55	60	50	40	51	350

(b)

Use the following information to develop aggregate plans.

Regular Production cost	Rs. 80 per Unit
Overtime Production cost	Rs. 120 per Unit
Regular capacity	40 units per month
Overtime capacity	8 units per month
Subcontracting cost	Rs. 140 per Unit
Subcontracting capacity	12 units per month
Holding cost	Rs. 10 per unit per month
Back -order cost	Rs. 20 per Unit
Beginning Inventory	0 units

Develop an aggregate plan using regular production. Supplement using inventory, overtime and subcontracting as needed. No backlogs allowed. (25 Marks)

----------END OF THE QUESTION PAPER----------

Faculty of Management and Social Sciences
Department of Logistics & Transport
BSc Hons in Logistics and Transportation
Course CODE: COM551

Formula Sheet

Simple Moving Average

$$F_{t+1} = \frac{D_t + D_{t-1} + \ldots + D_{t-n+1}}{n}$$

D_t : actual demand in period t

n : number of periods in the average

1. **Weighted Moving Average**

$$T_{t+1} = W_1D_1 + W_2D_{t-1} + \ldots + W_nD_{t-n+1}$$

2. **Exponential Smoothing**

$$F_t = F_{t-1} + \alpha(A_{t-1} - F_{t-1})$$

F_t = new forecast

F_{t-1} = previous forecast

α = smoothing (or weighting) constant ($0 \leq \alpha \geq 1$)

4. **Trend Projections**

$y = a + bx$

y = computed value of the variable to be predicted

a = y-axis intercept

b = slope of the regression line

x = the independent variable

$$b = \frac{\Sigma xy - n\bar{x}\bar{y}}{\Sigma x^2 - n\bar{x}^2} \qquad a = \bar{y} - b\bar{x}$$

5. **Exponential Smoothing with Trend Adjustment**

$$F_t = \alpha (A_{t-1}) + (1- \alpha) (F_{t-1} + T_{t-1})$$

$$T_t = \beta (F_t - F_{t-1}) + (1-\beta) T_{t-1}$$

$$FIT_t = F_t + T_t$$

library

(5)

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Faculty of Management and Social Sciences
Department of Logistics & Transport
BSc Hons in Logistics and Transportation
Course CODE: COM551

Year 3 Semester I
REPAT EXAMINATION
International Economics – LTIE3201

- This paper consists of SEVEN questions on TWO (02) pages.
- Answer FOUR Questions including Question 01.
- Only non-programmable calculators are allowed.
- You may use appropriate graphs, diagrams, equation/s to prove or justify the answers.
- If you have any doubt as to the interpretation of the wording of a question, make your own decision, but clearly state it on the script.
- Write Legibly.

Date: 2022.08.27 Pass mark: 50% Time: 02 Hours

Question 01: (Compulsory)

Explain that background of the international trade of Sri Lanka with rest of the world using recent economic publications. (25Marks)

Question 02

Why does countries do international trade? Explain it using two of theories. (25Marks)

Question 03

There are two countries namely A and B and can produce two commodities of product X and Y. Country A can produce product X in lower opportunity cost than country B while country B can produce product Y in lower opportunity cost than country B. Consider the Ricardian model and derive the Offer curves for the both nations.

(25 Marks)

Question 04

Using appropriate diagram explain cost and benefits of tariff which imposed by small nation (25 Marks)

Question 05

(a) Different types of economic integration with appropriate examples (20 Marks)

(b) What are the conditions required to increase welfare of nation after economic union. (05 Marks)

Question 06

(a) Explain the relationship between National Accounting and Balance of payment. (15 Marks)

(b) Explain the relationship between price of dollar and Balance of payment (10 Marks)

Question 07

Write down short notes

(a) National Accounting and Inflation
(b) Factor price equalization theory
(c) Trade creating custom union
(d) Forward Contracts
(e) Currency appreciation (5x5 Marks)

----------END OF THE QUESTION PAPER----------