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NAME:	**ECHO JOSEPH**
PROGRAM:	**MASTER OF BUSINESS ADMINISTRATION, MBA in LOGISTICS AND SUPPLY CHAIN MANAGEMENT**
REG. NO.:	**MBALSCM/TLU-00116EJ**
ACADEMIC SESSION:	**2025/2026 SESSION**
YEAR/SEMESTER:	**FIRST/SECOND**
DATE:	**OCTOBER 22, 2026**
INSTRUCTION:	**ANSWER ALL THE QUESTIONS**

SECOND SEMESTER RESEARCH WORKS FOR MASTER OF BUSINESS ADMINISTRATION [MBA] DEGREE PROGRAM IN LOGISTICS AND SUPPLY CHAIN MANAGEMENT

RESEARCH OBJECTIVES

The research works on the under-listed courses are designed to enable the student achieve the following objectives:

1 To expose the student to the rudiments of effective research backed up with empirical case studies to discuss and to have proper understanding of the courses as researched upon.

2 To enable the student be able to carry out independent self-studies at the post graduate levels.

3 To enable the student apply the knowledge acquired from the various courses researched on at real life scenario like at the work places and to participate on contemporary business related discussions as occasion may demand.

4 To apply the knowledge acquired from the various course to a real life situation towards solving problems at work places.

5 With the knowledge, graduates of these courses can effectively render consultancy services based on their various professional and academic certifications.

6 It is further to enable the student to begin to think of undertaking further study with additional in-depth research works up to doctoral level.

7 It will further enable the students at the completion of their programs be able to compete alongside their counterparts in such similar areas of study globally based on current trends and demands.

NECESSARY INSTRUCTIONS
ON HOW TO ANSWER THE RESEARCH QUESTIONS

This program is a Master of Business Administration (MBA) degree program. Therefore students are advised to follow the following steps in answering the questions:

1 The research student is expected to attempt all the questions

2 There are four courses and each of the course carry four questions each with their sub questions

3 Each of the questions with the sub questions should be presented in a chapter form. Since there are four questions for each of the courses, it implies that each course should be presented in four chapters.

4 State the chapter first, then the questions as written in the research document, before answering.

5 At the end of answering all the four questions for each of the courses, there should be references at the end.

6 The typing should be in 14 point (size), with 1.5 line spacing and well justified

7 Students are to use the recommended text books as stated in the study time table to answer the questions unless otherwise directed contrary by the academic supervisor.

8 All research works must be submitted within four months.

9 Should the student not meeting up to the four months period for submission of all works, he/she should apply for extension not more than two weeks.

10 All submissions should be sent to the academic supervisor's direct email mbagwuignatius11@gmail.om for assessment.

STUDENT NAME: **ECHO JOSEPH**

PROGRAMME: **MASTER OF BUSINESS ADMINISTRATION [MBA]**

FACULTY: **BUSINESS AND MANAGEMENT SCIENCES**

DEPARTMENT: **LOGISTICS AND SUPPLY CHAIN MANAGEMENT**

COURSE: **TRANSPORT MODELLING, ANALYTICS & TECHNIQUES**

COURSE CODE: **LSCM 633**

UNIT: **4**

TEXT BOOKS: **MODELLING IN TRANSPORT PHENOMENA; A CONCEPTUAL APPROACH**

AUTHOR: **ISMAIL TOSUN**

WEEKS	**TOPIC**	**PAGES**

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1 Introduction 1
1 BASIC CONCEPTS
1.1.1 Characteristics of the Basic Concepts
1.2 DEFINITIONS
1.2.1 Steady-State
1.2.2 Uniform
1.2.3 Equilibrium
1.2.4 Flux
1.3 MATHEMATICAL FORMULATION OF THE BASIC CONCEPTS
1.3.1 Inlet and Outlet Terms
1.3.2 Rate of Generation Term
1.3.3 Rate of Accumulation Term
1.4 SIMPLIFICATION OF THE RATE EQUATION
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1.4.2 Steady-State Transport With Generation

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THE RESEARCH QUESTIONS

[A] COURSES: TRANSPORTATION MODELLING; ANALYTICS AND TECHNIQUES [LSCM 633]

1ai Discuss the basic concepts in relation to transportation modelling, analytics and techniques and the characteristics of the basic concepts [pages 1- 2]

ii Define the following concepts [page 5]

- Steady state
- Uniform
- Equilibrium
- Flux

iii Base on mathematical formulations of the basic concepts [page 5]
Explain with mathematical formulations:

- Inlet and outlet terms
- Rate of generation term
- Rate accumulation terms

bi Reference to simplification of the rate equation, [page 8] mathematically explain:

- Steady- state transport without generation
- Steady-state transport with generation

ii Explain the concept behind molecular and convective transport [page 15]

iii In line with transport modelling, analytics and techniques, you are required to present empirical write-ups on: [pages15, 18, 20,29,32]

- Newton's Law of Viscosity
- Fourier's Law of Heat Conduction
- Fick's First Law of Diffusion
- Rate of Mass Entering and/or Leaving the System
- Rate of Energy Entering and/or Leaving the System

ci Explain interphase transport and transfer coefficients [page 41]

ii In heat transfer coefficient, explain convection heat transfer coefficient and radiation heat transfer coefficient [page 44, 45, 49]

iii What is transport analogies with reference to transportation modelling, analytics and techniques.

2ai Drawing inference from Reference Temperature and Concentration [page 66]; present empirical explanations of:

- Bulk temperature and concentration
- Film temperature and concentration
- Friction factor correlations []age 75]

ii Reference to flow in circular pipes [page 94], explain the following:

- Heat transfer correlations [page 100]
- Mass transfer correlations [page 107]
- Flow in non-circular ducts [page 110]

iii Based on rate of generation in momentum, write on energy and mass transfer [page 133]

bi Explain the law of combining proportions [page 140]

ii Explain rate of reaction [page 144]

iii Momentum generation as a result of pressure force [page 134]

ci Explain momentum generation as a result of gravitational force [page 134]

ii Explain momentum generation as a result of pressure force [134]

iii Explain what modified pressure is [page 135]

3ai Reference to transportation modelling, analytics and techniques, write on conservation of mass [page 152]

ii Write on conservation of energy [page 156]

iii Explain steady-state macroscopic balances [page 149]

bi Write on approximation that are used in unsteady processes [page 182]

ii Conservation of total mass [page 186]

iii Conservation of energy [page 198]

ci Explain the concept of momentum in transport [page 238]

ii Write on mass transport with convection [page 301]

iii Write on conduction in a fin [276]

4ai Base on momentum transport, explain:

- Flow between parallel plates [page 326]
- Flow in a circular tune [page 334]
- Conduction in rectangular coordinates [page 342]

ii Explain the analysis of a plug flow reactor [page 406]

iii Explain diffusion into a falling liquid films [398]

bi In unsteady-state microscopic balances without generation explain the concept of 'solution for short times' [page 435]

ii Explain the term, 'energy transport' [page 436]

iii Explain mass transfer into a rectangular slab [page 458]

c Write on extraction solution [page 475] and absorption with reaction [page 485]

NOTE:

1. The academic second semester work, starts October 22, 2026 and ends February 22, 2027.
2. You are to pay Examination Fee of ₦20,000.00 for each course. (Compulsory Payment)
3. Each course should contain a minimum of 20 pages.
4. The front page should be properly addressed. A sample will be sent to you on your request.
5. All the research works must be approved by the supervisor.

Thanks and wishing you success in your academic research.

Prof. Mbagwu Ignatius N. PhD, PhD, ***FCAI, FCPA, FMA, FFC*****,** ***FIDP*****,** ***FSBPA***
Supervisor
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