VERSION 3.0

EFFECTIVE DATE
June 1, 2025

EXAM CONTENT MANUAL

CLTD

CERTIFIED IN LOGISTICS, TRANSPORTATION AND DISTRIBUTION

APICS

ASCM ASSOCIATION FOR SUPPLY CHAIN MANAGEMENT

APICS Certified in Logistics, Transportation and Distribution (CLTD®)

Exam Content Manual

Version 3.0

ASCM staff has taken care to ensure that the contents of this exam content manual are accurate and up to date at the time of publication. However, any corrections can be found on the ASCM website at ascm.org/ecmerrata.

The references in this manual have been selected solely based on their educational value to the APICS CLTD certification program and the content of the material. APICS does not endorse any services or other materials that may be offered or recommended by the authors or publishers of books and publications listed in this manual. Internet links for various bibliographic references can be found on the ASCM website at ascm.org/CLTD.

1 E. Erie Street
Suite 525-4021
Chicago, IL 60611 USA
Phone: 1-800-444-2742 or +1-773-867-1777

The Association for Supply Chain Management (ASCM) is the global pacesetter of organizational transformation, talent development and supply chain innovation. As the largest association for supply chain, ASCM members and worldwide alliances fuel innovation and inspire accountability for resilient, dynamic, and sustainable operations. ASCM is built on a foundation of world-class APICS education, certification, and career resources, which encompass award-winning workforce development, relevant content, groundbreaking industry standards and a diverse community of professionals who are driven to create a better world through supply chain.

Acknowledgments

ASCM would like to extend our gratitude to the following subject matter experts for their voluntary contributions, time commitment, expertise, and passion to the continued development of the CLTD program.

Certification Committee Chair

- William Leedale, CPIM-F, CIRM, CSCP, CLTD

CLTD Exam Subcommittee Members

- Gary Smith, CPIM-F, CSCP-F, CLTD-F (Chair)
- Matt Drake, CPIM-F, CSCP, CLTD
- Felix Haslimeier, CPIM, CSCP, CLTD, CTSC, SCOR-P
- Joshua Hosier, CLTD
- Carlton Huffman, CSCP, CLTD, CTP
- Amy Ojena, CSCP, CLTD
- Gerald Verno, CLTD, SCOR-P
- Jim Winger, CPIM-F, CSCP, CLTD, CTSC, SCOR-P, CTL

CLTD JTA Task Force Members

- Cody Chason, CLTD
- Ashley Dempsey
- Wendy Farajpour, CLTD
- John Hines
- Jeanelle James
- Charles Penrow III, CSCP
- Joana Rocha, SCOR-P
- Adam Schneider, CLTD
- Miguel Villar, CPIM, CLTD

We would also like to thank the ASCM Corporate Members for their support in the advancement and education of supply chain and operations management.

ASCM relies on the support of volunteers to maintain the quality and prestige of the APICS certification programs.

Table of Contents

Letter to Candidates

Dear Candidate:

On behalf of ASCM and the members of the Certified in Logistics, Transportation and Distribution (CLTD) Exam Subcommittee, I would like to thank you for your expressed interest in the APICS certification program in the field of logistics, transportation, and distribution.

The CLTD certification is designed to provide a body of knowledge, technology insight, and standards for those professionals in the logistics, transportation, and distribution industries. The APICS CLTD program sets the global standard for logistics best practices and assists employers in developing the personnel needed to meet today's ever-increasing customer demand for logistics service. The worldwide pandemic stressed the importance of logistics, transportation, and distribution. These organizational functions were transformed from support activities to core competencies that have a direct impact on customer service, satisfaction, revenue, growth, and profit. Supply chain professionals' skills have recently been put to the challenge like never before.

The APICS CLTD program takes an end-to-end supply chain view of logistics operations, extending from inbound materials management, outbound distribution, and reverse logistics to encompass all the integrative process steps that define supply chain logistics. The APICS CLTD certification program provides you with the knowledge to effectively manage the integration of these activities to maximize your company's value chain. By earning the APICS CLTD designation, candidates will have demonstrated an integrated knowledge of logistics best practices.

This APICS CLTD Exam Content Manual (ECM) provides an overview of the program, an outline of the body of knowledge, key terminology, and recommended references. The content outline is divided into the following nine diagnostic areas with the relative emphasis of each area indicated by the percentage:

- Understand Logistics Fundamentals and Strategy (10%)
- Conduct Capacity Planning and Demand Management (10%)
- Conduct Order Management (10%)
- Facilitate Inventory Management (11%)
- Conduct Warehouse Distribution / Fulfillment Center Management (12%)
- Conduct Transportation Management (15%)
- Facilitate Global Logistics (13%)
- Facilitate Logistics Network Design (10%)
- Understand Sustainability and Reverse Logistics (9%)

A sample of eight questions is provided at the end of this manual to illustrate the type of questions you will encounter on the exam. We recommend using the APICS CLTD ECM as one of your references as you prepare for the CLTD exam.

We wish you every success in the pursuit of your CLTD designation.

Gary Smith, CPIM-F, CSCP-F, CLTD-F
CLTD Subcommittee Chair

Introduction

This exam content manual (ECM) provides guidance for individuals preparing for the CLTD certification examination. The objective of this manual is to outline the APICS CLTD body of knowledge.

The CLTD body of knowledge section of this manual begins with a statement on the scope of the subject matter, followed by a descriptive outline of the content. Key terminology and a bibliography of suggested references are also provided. The exam overview concludes with sample questions similar to those that appear on the examination along with the correct answers for the sample questions and brief explanations as to why they are correct.

The recommended procedure for mastering the subject matter is to:

- review the content outline, which defines the scope of the material, and
- study each topic area using the suggested references.

At the end of each major section of the content outline is a list of the references that apply to the topics in that section. The first number indicates the sequence number for the reference in the Bibliography section, and the numbers in parentheses indicate the relevant chapter(s) within that reference.

Candidates should understand the definitions of the key terminology and the application of the outlined tools, processes, and techniques.

Sufficient references are provided for each topic area. Reading periodicals - including SCM Now Impact, the ASCM Insights blog, and ASCM research reports - as well as listening to podcasts, such as ASCM's The Rebound, will help you keep up to date about industry trends.

About the APICS CLTD Examination

The APICS CLTD exam consists of 150 questions, of which 20 are pre-test questions that do not contribute to the total score but are used for statistical purposes only. Pre-test questions are continuously introduced and evaluated statistically, as part of an industry best practice for certification program exam development. Candidates will not be notified which questions are scored and which are not. Thus, candidates should answer all exam questions. There is a 3 ½ hour time limit for the exam.

For more information regarding testing and registration policies and procedures, please visit ascm.org/CLTD and the APICS Exam Handbook and Testing Policies.

Question Format

The questions on the CLTD exam are intended to test a candidate's understanding of the CLTD body of knowledge. The questions require the candidate to select the best of four choices or complete a calculation based on the information given. They may also ask the candidate to illustrate their understanding of a concept, process, or procedure. These questions may require the examinee to make finer or more in-depth distinctions than the exercises or items presented in a course. It is helpful to understand the various formats of questions on the examination. Practice questions can be found in the Sample Questions section of this ECM.

Taking the Test

The test is designed to evaluate a candidate's knowledge of the subject matter. Therefore, the key to success is a thorough understanding of the subject matter. All questions are based on the current CLTD body of knowledge as represented by the ECM.

When you begin the exam, read the directions carefully. Be sure you understand the directions before you begin to answer any questions. Read each question carefully and

thoroughly. If a question includes a table or graph, be sure to study it before answering the question. Avoid assuming that information is not provided, assuming that you know what is being asked without reading the question completely, or "second-guessing" the question. Every effort has been made to avoid misleading wording and to provide sufficient information for each question.

Choose the best answer from the choices given. Care has also been taken to avoid misleading choices. Do not look for hidden tricks or exceptions to the norm. For each multiple-choice question, one and only one of the answer choices represents the correct answer.

Once you begin the test, approach the questions in order, but do not spend too much time on those that are unfamiliar or seem difficult to you. Go on to the other questions and return later to the ones that are difficult for you. If you have some knowledge about a particular question, you may be able to eliminate one or more choices as incorrect. Your score on the test will be based on the number of questions you answer correctly with no penalty for incorrect answers; therefore, it is to your advantage to guess rather than not answer a question. Avoid changing an answer unless you are absolutely certain that you marked the wrong answer.

Interpreting Test Scores

Scoring is based on your correct responses. There is no penalty for incorrect answers. The omission of an answer will be counted the same as an incorrect answer.

The CLTD exam scaled score range is 200 – 350.

200–299: Fail

300–350: Pass

The minimum passing score is 300. Candidates will receive a final exam score along with diagnostic information by topic area on their performance. All APICS exams use this scale for communicating scores to candidates. Using a scale is a testing industry best practice and allows scores to be represented consistently across different forms or versions of the same exam. This accounts for variances in difficulty across different exam forms and ensures fairness and accurate reporting to candidates. For more information on Scaled Scoring, please see the following document.

Studying for the APICS CLTD Exam

APICS offers several resources to help individuals prepare for the APICS CLTD exam.

APICS CLTD References

CLTD Content Outline. The CLTD content outline provided in this ECM should be considered a primary resource for exam preparation. It provides an overview of the major topics included in the exam, as well as a list of the concepts relevant to that topic.

Bibliography. The APICS CLTD Exam Subcommittee identified a number of references for the APICS CLTD exam. These references are used by both the exam subcommittee and the CLTD Courseware Subcommittee in the development of exam questions and preparation materials. These are listed in the Bibliography section of this manual. All of the references contain excellent material that will assist in understanding the body of knowledge and preparing for the test. For additional information on the APICS CLTD references, visit the CLTD Exam References page.

A candidate may discover that the material covered in the chapters of one reference duplicates material covered in another reference. Both sources are included as references to allow candidates some discretion in selecting test preparation materials that they find most accessible and understandable.

In deciding if a single reference is sufficient, candidates should assess their own level of knowledge against both the descriptive exam specifications and the detailed topic list in the content outline. If there are any areas of weakness, the candidate should consult other references as part of the test preparation process.

ASCM Supply Chain Dictionary. The *ASCM Supply Chain Dictionary* is an essential reference to the exam content manual and APICS exams. Within the profession, terminology varies among industries, companies, and the academic community. The exam uses standard terminology as defined in the *ASCM Supply Chain Dictionary*. Recognizing the terms and understanding their definitions are essential.

Terminology

In studying for the APICS CLTD certification exam, candidates may discover multiple terms used to denote the same technique. An example of this is "*customer service ratio"* and "*fill rate."* ASCM and the certification exam subcommittees have worked to provide consistency with preferred terminology. However, synonyms are often used by authors in the various references used to compile the body of knowledge. Candidates are encouraged to be familiar with all terms and concepts listed within the Content Outline and Key Terminology sections of this manual, using the *ASCM Supply Chain Dictionary* as the primary guide for definitions.

Additional Resources for APICS CLTD Candidates

In addition to the cited references, it may be helpful for you to pursue chapter-sponsored courses, college courses, ASCM workshops, self-study courses, or courses offered by the ASCM network of international partners as a means of learning the body of knowledge tested in the certification program. A wide variety of courses and materials are available. As with any investment, you should research various learning options before choosing one.

APICS CLTD Learning System

The APICS CLTD Learning System is a comprehensive professional development and certification preparation program. This self-directed program combines printed material and online interactive tools. This system is also offered in instructor-led formats.

The APICS CLTD Learning System does not "teach the tests." The APICS Learning Systems provide a thorough review of the subject matter, but they should not be used without the most current CLTD Exam Content Manual (ECM) as a means to direct candidates' studies. There will likely be some content in the APICS CLTD Learning System not covered by the exam; conversely, there will likely be some content in the exam not covered by the learning system. No CLTD exam questions are derived from the learning system. Thus, it is essential for candidates to use the current ECM in their studies.

APICS CLTD Instructor-Led Review Courses and Educational Programs

The instructor-led courses and programs combine the ASCM CLTD Learning System's print and online components with the leadership of a qualified instructor; peer collaboration; networking; and a structured, set schedule to keep participants on track. Learn more about ASCM's recognized instructors at ascm.org/recognized-instructor-list or find local ASCM partners that provide ASCM CLTD courses at ascm.org/learning-opportunities.

ASCM also offers a variety of educational programs. For a complete list of learning opportunities and resources, please visit ascm.org.

Job Task Analysis

The subject matter in the CLTD exam content outline is created and validated by means of a job task analysis (JTA) study. JTAs are used in the credentialing industry to create and validate certification programs and their content by ensuring that the respective bodies of knowledge are applicable and up to date with current industry standards and trends.

In following testing industry standards and best practices, ASCM regularly conducts a JTA for each of its certifications. For the CLTD program, this process involves bringing together a task force of industry-specific professionals that represent a diverse skill set in logistics, transportation, distribution and operations. These professionals, under the guidance of a third-party psychometrician, worked to identify the knowledge, skills, and tasks deemed important in the practice of logistics and distribution. These inputs are then used to create a survey that is distributed to supply chain professionals globally to validate the content identified by the task force. The results of this industry-wide survey are then analyzed by the task force, resulting in a recommendation to the CLTD Exam Subcommittee for content updates.

The JTA process is vital to all high-stakes certifications as it validates the existing body of knowledge and identifies new topic areas and content that are at the cutting edge of the industry. This last JTA update for the CLTD program took place in 2023. This update was based on the results of a survey that was responded to by over 1,700 industry professionals, representing a diverse mix of job functions, industries, organization sizes, work experience, and countries of residence.

Exam Content versus Courseware

Certification has a very different purpose than education. Certifications determine whether a candidate meets a minimum set of requirements in relation to a body of knowledge. Certification exams test an individual's knowledge and ability to apply that knowledge to specific situations. Exam questions require the candidate to select the best of the four choices or complete a calculation based on the information given. They may also ask the candidate to illustrate their understanding of a concept, process, or procedure. While some exam questions may simply ask the candidate to demonstrate their recollection of knowledge from the content outline, they will more often require the candidate to apply the body of knowledge by evaluating and/or analyzing a scenario and determining the best solution. These questions will require the candidate to make finer distinctions than the exercises or items presented in a review course.

ASCM uses a rigorous process for creating its certification exams and courseware. Exams and courseware study materials are developed separately to maintain the integrity of the exam process.

APICS exam subcommittees define the contents of the exam content manual (ECM), which determines the areas that will be tested in APICS certification exams. Every exam question is linked to the ECM content outline. The APICS exam subcommittees also validate the references that will be used for exam development. Additionally, the exam subcommittees work with ASCM staff on the creation and maintenance of exam forms.

A separate courseware subcommittee – in conjunction with a courseware task force, ASCM staff, and a third-party vendor – creates the learning systems using the ECM and recommended references.

Courseware developers and/or instructors may believe that additional material needs to be taught or included to ensure understanding of the body of knowledge. They also may decide that a concept or term is adequately covered by the definitions in the *ASCM Supply Chain Dictionary* or content outlines and not cover it in the course. These differences sometimes lead candidates to perceive a disconnect between the courseware and the exam when, in fact, they are both covering the same body of knowledge.

Question and answer sets for APICS exams are written by exam subcommittee members and other volunteers who are subject matter experts and who have earned APICS certifications. The exam subcommittees must identify the specific entry in the ECM that is being tested and one or more of the references listed in the ECM that support the correct answer. All exam questions and answers are reviewed and typically revised by APICS exam subcommittee members. Exam subcommittees, ASCM Test Development staff, and a third-party exam development contractor all review the potential test questions for correctness of form, spelling, and grammar.

A potential test question will be reviewed multiple times before it appears on an exam. Potential test questions initially appear on exams in what is referred to as pre-test status in order to collect statistics on the questions. It is not until a question is deemed to be statistically valid that it will appear as a scored question on an exam and count towards a test-taker's exam score and result.

Because each test form has a limited number of questions, it samples representative areas of the body of knowledge as defined by the ECM. While each test form is different, all areas tested are contained within the body of knowledge as defined by the ECM.

APICS CLTD Certification Maintenance: Continuing Professional Development

To promote professional growth and lifelong learning, ASCM requires certification maintenance every five years with the first five-year cycle beginning on the date the certification is earned.

CLTD certified individuals are required to collect 75 certification maintenance points (or 100 points for CLTD Fellows) in these five-year intervals to keep their certification active for an additional five years. If they do not submit their maintenance points via the APICS certification maintenance application by the maintenance due date, their certification will be placed into suspended status. The individual will then have 90 days to submit their maintenance application. If an individual does not maintain their CLTD certification, they will lose their certification and will be required to retake and pass the exam again.

The Importance of Certification Maintenance

Maintaining your APICS CLTD certification demonstrates your commitment to achieving the highest level of professional development and standards of excellence.

The APICS CLTD certification maintenance program upholds both the objectives of the APICS CLTD program and the ASCM vision to promote lifelong learning. This flexible program recognizes that individuals are at various levels in their careers, come from many industries, have different educational needs and career goals, and have varying access to continuing education. Thus, requirements for maintaining certification can be met through multiple sources and a variety of professional development activities. These sources and activities are intended to help prepare for the challenges ahead and maintain a professional edge by:

- preserving the currency of hard-earned certification credentials,
- expanding your knowledge of the latest industry practices,
- exploring new technology solutions,
- reinforcing skills,
- improving job performance,
- demonstrating commitment to excellence, and
- increasing competitive advantage.

To ensure that CLTD-certified individuals remain up to date on industry trends and are committed to continued professional growth, certification maintenance is required for your certification to remain active.

For complete details on how to maintain your APICS CLTD designation, please visit ascm.org/maintenance.

APICS Certified in Logistics, Transportation and Distribution Fellow (CLTD-F)

The distinguishing characteristic of a Certified in Logistics, Transportation and Distribution Fellow (CLTD-F) is the willingness to share acquired knowledge with others through presenting, teaching, publishing, and participating in ASCM volunteer activities. This knowledge sharing must take place above and beyond a candidate's normal job duties and be directly related to the APICS body of knowledge.

An active CLTD certification is required to be eligible for CLTD-F status. To obtain the APICS CLTD-F designation, an application form must be completed and submitted online with the required number of points via the APICS Fellow application. Points are awarded based on the following criteria: APICS certifications earned (with additional points for fellow-level exam scoring of 320 or greater on an APICS certification exam), presentations, published works, classroom instruction, and non-paid ASCM volunteer activities.

To apply for or learn more about the CLTD-F certification, please visit ascm.org/fellow.

ASCM Code of Ethics

When you begin the exam registration process, you will be asked to pledge to abide by the ASCM Code of Ethics. Once certified, you pledge to continue your education to increase your contribution to the supply chain management profession. After achieving the APICS CLTD designation, you pledge also to share your knowledge with others by participating in ASCM research and educational activities at local, district, national, and international levels.

The ASCM Code of Ethics is as follows:

- Maintain exemplary standards of professional conduct;
- Do not misrepresent your qualifications, experience, or education to ASCM or others you serve in a professional capacity;
- Respect and do not violate the United States Copyright of all ASCM materials, including but not limited to courseware; magazine articles and other ASCM publications; APICS conference presentations; and CPIM, CSCP, CLTD, and CTSC, examination resources. In this same spirit, you must not violate the copyright of other organizations and individuals in your professional capacity;
- Do not engage in or sanction any exploitation of one's membership, company, or profession;
- Encourage and cooperate in the interchange of knowledge and techniques for the mutual benefit of the profession;
- In your professional capacity, respect the fundamental rights and dignity of all individuals. You must demonstrate sensitivity to cultural, individual, and role differences, including those due to age, gender, race, ethnicity, national origin, religion, sexual orientation, disability, language, and socio-economic status;
- In your professional capacity, do not engage in behavior that is harassing or demeaning to others based on factors, including but not limited to age, gender, race, ethnicity, national origin, religion, sexual orientation, disability, language, or socio-economic status;
- Adhere to this Code of Conduct and its application to your professional work. Lack of awareness or misunderstanding of an ethical standard is not itself a defense to a charge of unethical conduct;
- Contact the Ethics Committee when uncertain whether a particular situation or course of action violates the Code of Conduct; and
- Do not become the subject of public disrepute, contempt, or scandal that affects your image or goodwill.

Failure to abide by the ASCM Code of Ethics may result in sanctions up to and including decertification.

Bibliography and References for CLTD

All test candidates should familiarize themselves with the following references for the CLTD exam. The recommended references pertaining to the content area are listed at the end of each section of the content outline. The references listed below can also be found online on the CLTD Exam References page. A free digital copy of the *ASCM Supply Chain Dictionary* is available through the Supply Chain Knowledge Center.

	References	Author(s)
1	ASCM Supply Chain Dictionary, 18th ed., 2024	ASCM
2	International Logistics: The Management of International Trade Operations, 6th ed., 2021	David, Pierre
3	Introduction to Materials Management, 9th ed., 2022	Chapman, Stephen N., Gatewood, Ann K., Arnold, Tony J.R., and Clive, Lloyd M.
4	Making Sustainability Work: Best Practices in Managing and Measuring Corporate Social, Environmental and Economic Impacts, 2nd ed., 2014	Epstein, Marc J., and Buhovac, Adriana Reic
5	Supply Chain Logistics Management, 6th ed., 2023	Bowersox, Donald J., Closs, David J., Cooper, Bixby M., and Bowersox, John C.
6	Supply Chain Management: A Logistics Perspective, 11th ed., 2020	Langley, John C., Novack, Robert A., Gibson, Brian, and Coyle, John J.
7	Sustainable Logistics and Supply Chain Management: Principles and Practices for Sustainable Operations and Management, 3rd ed., 2022	Grant, David B., Trautrims, Alexander, and Wong, Chee Yew
8	Transportation: A Global Supply Chain Perspective, 10th ed., 2023	Novack, Robert A., Gibson, Brian, and Suzuki, Yoshinori
9	Warehouse Management: The Definitive Guide to Improving Efficiency and Minimizing Costs in the Modern Warehouse, 4th ed., 2021	Richards, Gwynne

Note: At the end of each major section in the CLTD content outline is a list of the references that apply to the topics within that section. The first number indicates the sequence number for the references designated in each subject area within the content outline. For example, "3 (chapters 8-9)" refers to the reference, Introduction to Materials Management, 9th ed., 2022 and chapters 8-9 of that reference containing content relevant to that subject matter.

APICS Certified in Logistics, Transportation and Distribution

CLTD Exam Subcommittee

Gary Smith, CPIM-F, CSCP-F, CLTD-F (Chair)
Matt Drake, Ph.D., CPIM-F, CSCP, CLTD
Duquesne University
Felix Haslimeier, CPIM, CSCP, CLTD, CTSC, SCOR-P
FHA Consulting (UK) Ltd & steibogg gmbh
Joshua Hosier, CLTD
Esolutions Furniture
Carlton Huffman, CSCP, CLTD, CTP
Prime Source Brands
Amy Ojena, CSCP, CLTD
Syndax Pharmaceuticals
Gerald Verno, CLTD, SCOR-P
WMATA
Jim Winger, CPIM-F, CSCP, CTL, CLTD, CTSC, SCOR-P
Fox Valley Technical College

Scope of the Subject Matter

Please read the introductory material in this manual for essential information about the examination. The APICS CLTD certification examination covers concepts, tools and processes which illustrate the supply chain-wide system perspective of logistics. The CLTD certification emphasizes in detail the analysis of logistics, distribution and transportation services and their relationships with the people, material, equipment, and space present in all supply chains. Managing the logistics system requires familiarity and some proficiency in transportation, order processing, inventory and the combination of warehousing, material handling and packaging. These functions are all integrated through a network of facilities with a goal to support customer service, manufacturing and purchasing operational requirements. The subject matter is organized into nine content areas:

Understand Logistics Fundamentals and Strategy. This section provides an overview of the macro and micro logistics processes and systems which define upstream and downstream material and information flows in the supply chain. With reference to its primary goal to achieve consistent customer service at the least total cost and/or landed cost, this section addresses the synchronized and integrated approach to logistics management. This section illustrates logistics' cross-functional relationships with marketing, finance, risk management and manufacturing operation requirements, showing how logistics "fits" into the totality of business operations and continuity.

Conduct Capacity Planning and Demand Management. This section explores the strategic and operational considerations, important and continuous trade-offs related to translating demand into capacity planning by integrating forecasting, procurement and demand management in terms of their separate and combined impact on logistics requirements. It emphasizes the alignment tasks in light of limited resources that define how organizations develop forecasts by which transportation and warehouse considerations are planned and operationalized.

Conduct Order Management. This section addresses the interrelated concepts of customer relationship management (CRM), order management and customer service, highlighting the major steps required to manage and execute customers' orders with an emphasis on logistics' key role in leveraging customer service. Order management defines and sets the logistics process in motion, while customer service is the task by which logistics outputs are measured and defined.

Facilitate Inventory Management. With a detailed examination of the related concepts of inventory, this section addresses the various methods and techniques that firms use to control and manage inventory in the supply chain. This section emphasizes the benefits and roles various inventory categories play in the logistics system. It illustrates the myriad of managerial decisions and trade-offs required in planning and

maintaining optimal inventory levels including costs, customer service, controls, and policy.

Conduct Warehouse Distribution / Fulfillment Center Management. This section focuses on strategies, processes, methods, tools, and techniques for the effective and efficient management of the warehouse. Emphasis is on the components of warehouse management that reduce cost and cycle time while increasing accuracy and efficiency. These include space management, packaging, control systems, storage and retrieval, warehouse ownership, layout, automation, outsourcing strategies, and key performance indicators (KPIs).

Conduct Transportation Management. This section covers the major principles and processes of transportation management, administration, and economics. It addresses the fundamental responsibilities of transportation and traffic professionals. These responsibilities include utilizing the optimal mode of transportation to position inventory for competitive advantage throughout the supply chain and executing transportation management functions which include carrier selection and negotiations, routing optimization, documentation, auditing and claims administration, and specialized transport related services, with the goal of minimizing cost and maximizing service.

Facilitate Global Logistics. With an emphasis on the more complex analyses required to navigate today's global logistics landscape, this section addresses the rules, processes, and techniques that logistics professionals need to succeed in global supply chains. It includes an understanding of the impact of geo-political and infrastructure issues, financing options, security considerations and regulations, duties, documentation, and restrictions that define the global operating environment.

Facilitate Logistics Network Design. This section tackles the transportation and inventory economies that critically define logistics network design considerations. It includes an introduction to the modeling tools and techniques which enable supply chain spatial and temporal integration, addressing the need for today's logistics professionals to extend this responsibility to include the processes, resources, and tools for managing risks.

Understand Sustainability and Reverse Logistics. This section addresses the expanded view of reverse supply chain flows to incorporate a general overview of sustainability. It includes a focus on the key factors and activities that define reverse logistics processes and logistics social responsibility considerations with triple bottom line implications.

The successful candidate will be able to understand the leadership responsibility of logistics to design and administer systems to control the movement and positioning of material and information flows, to satisfy customer requirements at the least total cost. Based on an understanding of the processes, best practice methods and tools used by today's logistics managers, the successful candidate will be able to define the actions necessary to implement selected solutions to address specific supply chain situations and opportunities. This includes an understanding of, and the ability to manage:

- the major inputs and outputs of the logistics systems with an emphasis on their value-creating role within the supply chain.
- the interdependent components within the logistics system and between logistics and other business functions in the supply chain.
- an integrated logistics facility network design strategy that includes an understanding of tradeoffs that influence total logistics costs.
- the effect of variance in a logistics system and how collaborative processes and relationships provide mechanisms to minimize these variances while reducing operations costs, enhancing productivity and meeting customer requirements.

- the changing role of various stakeholders and trading partners which defines the increased complexity of managing logistics within the current global marketplace.

In addition, the candidate preparing for the APICS certification examination must have a fundamental understanding of the following key business concepts:

- Business acumen (qualitative skills, math, statistics)
- Ethical considerations
- Leadership

Exam Percentage by Content Area

The following table identifies the nine main content areas of the exam. The relative importance of these topics varies among industries, but the figures show the percentage designated for each section on the exam.

Main Content Area	Percentage of Exam
I. Understand Logistics Fundamentals and Strategy	10%
II. Conduct Capacity Planning and Demand Management	10%
III. Conduct Order Management	10%
IV. Facilitate Inventory Management	11%
V. Conduct Warehouse Distribution / Fulfillment Center Management	12%
VI. Conduct Transportation Management	15%
VII. Facilitate Global Logistics	13%
VIII. Facilitate Logistics Network Design	10%
IX. Understand Sustainability and Reverse Logistics	9%

Content Outline

The content outline provides an overview of the major content areas assessed on the CLTD exam. Each of the nine main content areas is denoted by a Roman numeral.

I. Understand Logistics Fundamentals and Strategy

Logistics is the core of supply chain management. Fundamental concepts include managing logistics as a cohesive system, understanding tradeoffs to present a logistics strategy that aligns with organizational strategy and finding the most effective mix of revenue producing services for the cost of providing that service. Effective relationships with partners and risk management strategies facilitate synchronization of global logistics networks. Measurement and continuous improvement are emphasized as ways to meet and exceed the pressures of globalization and the steadily increasing customer expectations for logistics.

A. Recognize Logistics Fundamentals

1. Define logistics
   a. Definition and scope of logistics
   b. Logistics principles and components
2. Determine the role of logistics in supply chain management
   a. Economic impact of logistics
   b. Effects of globalization, e-commerce, and technology
   c. Relationship between sales and operations planning (S&OP) and logistics and distribution
   d. Sustainability objectives
   e. Enabling resilience
3. Discern the value of logistics management
   a. Creating competitive advantage
   b. Effectively managing transportation, labor, and inventory costs
   c. Increasing customer service levels and stakeholder satisfaction

d. Contributing to environmental, social, and corporate governance (ESG)

B. Develop Logistics Strategy

1. Align goals and objectives of logistics strategy
   a. Alignment with corporate goals and objectives
   b. Customer focus
2. Incorporate product life cycles
3. Identify cost and service optimization factors and their interactions
4. Synchronize supply chain and organizational design
5. Recognize logistics relationships and interdependencies
6. Consider risk management
7. Apply segmentation
8. Coordinate performance management and continuous improvement (CI)

References: 1; 2 (chapters 2, 21-22); 5 (chapters 1, 3-4, 11, 13); 6 (chapters 1, 3)

Note: The first number indicates the sequence number for the reference in the bibliography section, and the numbers in parentheses indicate the relevant chapters within that reference.

II. Conduct Capacity Planning and Demand Management

Logistics capacity planning and related decisions rely on effective forecasts, which makes it important to understand the concepts behind forecasting and its application to logistics decisions. This involves understanding how logistics can help to direct and prioritize capacity plans to better match supply to demand. The effective acquisition of inventory also requires a collaboration between procurement and logistics.

A. Understand Demand Management

1. Forecast demand
   a. Forecasting methods
   b. Channels (business-to-business (B2B) and business-to-consumer (B2C))
   c. Interpreting forecasts (e.g., errors, gap analysis, and time series components)
2. Incorporate risk into demand management
3. Recognize the role of demand shaping strategies

B. Facilitate Sourcing and Procurement

1. Understand purchasing strategy and implications
   a. Make-or-buy decisions
   b. Incorporating warehouse and transportation capacity
   c. Supplier management and selection
   d. Contract requirements
2. Monitor supplier performance
   a. Key performance indicators (KPIs)
   b. Supplier evaluation

C. Translate Demand into Logistics Capacity Planning

1. Develop and execute transportation capacity planning
   a. Planning horizons
   b. Transport decisions (e.g., mode, carrier, and route selections)
   c. Inbound and outbound capacity
   d. Load planning
   e. Improving and optimizing transportation plans
2. Identify and address warehousing considerations
   a. Planning horizons
   b. Storage
   c. Equipment
   d. Labor
   e. Throughput management (constraints)

References: 1; 3 (chapters 5, 8-9); 5 (chapters 5-6, 11, 13); 6 (chapters 5, 7, 10)

III. Conduct Order Management

At the core of the logistics process is the customer order, which serves as the trigger setting logistics in motion. Order management activities include a variety of tasks aimed at planning, designing, and controlling processes which manage and execute customers' orders. At the core of these processes is customer relationship management since every decision and activity that logistics takes should be with the customer in mind. By developing a customer service management strategy and effective fulfillment channels, logistics can deliver on the seven rights of customer service which enhances long-term customer satisfaction and creates lifetime customers.

A. Enable Customer Relationship Management (CRM)

1. Understand the CRM process
2. Apply customer segmentation
3. Facilitate customer service management (CSM)
    a. Service agreements
    b. After-sale service and support

B. Perform Order Management

1. Facilitate outbound orders to customers and inbound orders from suppliers (inter- and intra-company orders)
    a. Logistics role in supplier relationship management (SRM)
    b. Vendor-managed inventory (VMI)
    c. Information and documentation requirements
    d. Lead time and order cycle time
    e. Order allocation and prioritization
    f. Packaging requirements
    g. Electronic shipment notification process (e.g., advance ship notice (ASN))
    h. Order tracking, receipt, quality inspection, and confirmation
    i. Transportation plan (e.g., mode, freight forwarders, and carrier selection)
    j. Exceptions and change management
2. Optimize order fulfillment channels
    a. Business-to-business (B2B) and business-to-consumer (B2C)
    b. E-commerce
    c. Omni-channel fulfillment

References: 1; 3 (chapters 6, 13); 5 (chapters 2, 4); 6 (chapters 4, 8, 15)

IV. Facilitate Inventory Management

Inventory management involves maintaining inventory levels in a manner that aligns with the business strategy and goals, supporting the coordination of supply and demand, while protecting inventory value. Within the logistics environment, the effective management of inventory takes on added importance because of its direct impact on service levels, working capital, and return on asset investments. Like most things within the logistics systems, decisions regarding inventories must take the tradeoffs between costs and service levels into consideration. Automatic identification and connective technologies enable organizations to meet customer demand more effectively and with lower investments in inventory.

A. Understand Inventory Management Fundamentals

1. Identify the role of inventory management
    a. Decouple supply and demand
    b. Support service levels
    c. Support total cost objectives
2. Differentiate inventory types and characteristics
    a. Types of inventory (e.g., raw materials; work in process (WIP); finished goods, maintenance, repair, and operating (MRO) supplies; refurbished goods; and pipeline (in-transit inventory))
    b. Special inventory characteristics (e.g., hazardous materials, perishable goods, inventory ownership, supplier-financed,

customer-owned, consignment, excess, and obsolete inventory)
3. Define functions of inventory (classifications)
   a. Anticipation
   b. Cycle stock / lot size
   c. Safety stock
   d. Hedge
   e. Decoupling (buffer)
4. Understand the role of technology in inventory management
   a. Barcoding/quick-response (QR) code
   b. Radio frequency identification (RFID)
   c. Robotics
   d. Smart logistics and internet of things (IoT)

B. Develop Inventory Strategy and Policy and Implement Inventory Control

1. Understand costs of inventory
   a. Ordering costs
   b. Setup costs (one-time costs versus overhead costs)
   c. Inventory carrying costs
   d. In-transit costs
2. Determine when to order inventory
   a. Reorder point (ROP)
   b. Fixed order period
3. Establish how much inventory to order
   a. Economic order quantity (EOQ)
   b. Period order quantity (POQ)
   c. Lot-for-lot (L4L)
   d. Target inventory level (e.g., min-max system)
   e. Kanban
   f. Lifetime buy
4. Conduct inventory classification (e.g., ABC classification)
5. Perform inventory auditing
   a. Physical inventory
   b. Cycle counting
   c. Inventory compliance
6. Develop and monitor performance metrics
   a. Inventory turnover
   b. Aging inventory
   c. Days of supply
   d. Inventory accuracy
   e. Service level (e.g., fill rate)
   f. Damaged and loss rate

References: 1; 3 (chapters 2, 10-11); 5 (chapters 7, 13); 6 (chapters 9, 13-14)

V. Conduct Warehouse and Distribution / Fulfillment Center Management

Warehouse management entails the movement of materials and goods into and out of storage efficiently, safely, and with minimal inventory damage. Supporting the logistics systems' goal of time and place utility, warehouses enable synchronized storage, consumption, and transportation activities within the supply chain. As business practices and technology evolve, warehouse management strategies must adapt to new distribution channels and customer/consumer expectations by creating new processes that deliver the desired results.

A. Identify Strategy, Ownership Types, and Roles

1. Understand characteristics of warehousing
   a. The economics of warehousing (e.g., square root rule)
   b. Challenges of warehousing (e.g., space, location, and resource constraints)
2. Differentiate between warehouse ownership types
   a. Private
   b. Public
   c. Contracted
3. Recognize specialized warehouse services
   a. Climate-controlled
   b. Bonded
   c. Free/foreign trade zone (FTZ)
   d. Hazmat
   e. Automated capabilities
4. Identify, determine, and apply warehousing strategies
   a. Outsourcing/third-party logistics (3PL)

b. Value-added warehousing (e.g., labeling, kitting, inspection, and repair)
c. Business-to-business (B2B) versus business-to-consumer (B2C) fulfilment
d. Cross-docking

B. Formulate Warehouse Processes and Layout

1. Understand warehouse processes and order flow
   a. Receiving, inspection, and put-away
   b. Storage and inventory management
   c. Picking and packing under shelf-life considerations
   d. Consolidation
   e. Loading
   f. Shipping
   g. Replenishment
   h. Returns
2. Evaluate facility layout decisions
   a. Size of facility
   b. Types of layouts
   c. Optimizing throughput, space, and capacity
3. Utilize warehouse systems
   a. Warehouse management system (WMS)
   b. Yard management system (YMS)
   c. Enterprise resource planning (ERP) / supply chain execution
4. Prepare and utilize documentation
   a. Pick list
   b. Packing list
   c. Invoice
   d. Quality documentation
   e. Safety documentation
5. Develop and monitor performance management metrics (e.g., key performance indicators (KPIs))
   a. Cost
   b. Throughput
   c. Quality
   d. Capacity
   e. Productivity
   f. Customer service
   g. Audits
   h. Safety

C. Incorporate Packaging, Materials Handling, and Automation

1. Understand packaging fundamentals
   a. Product characteristics and primary, secondary, and tertiary packaging (e.g., dunnage)
   b. Unitization and unit loads
      1. Returnable containers
      2. Pallets and slip-sheets
      3. Corrugated versus non-corrugated cartons
   c. Packaging optimization
2. Understand materials handling considerations
   a. Equipment
      1. Manual and mechanical
      2. Automated/robotic
      3. Sortation systems
   b. Layout
      1. Storage
      2. Picking
      3. Shipping, receiving, and inspection
      4. U Flow/Flow through
   c. Slotting strategy (e.g., random-location storage, fixed-location storage, co-location, and dynamic)
   d. Health and safety, security

References: 1; 2 (chapters 9, 15-18, 20); 3 (chapters 13-14); 5 (chapters 2, 9); 6 (chapters 10, 12-14); 9 (chapters 1-15)

VI. Conduct Transportation Management

Transportation moves goods and services across geographic lines, between where products are produced and where they are consumed, while allowing for competitive growth. At home and abroad, advances in transportation through technology and design have broadened the markets for both domestic and international competition. The wider a product's distribution and the greater its demand, the more manufacturers can leverage transportation's cost economies. Logistics professionals are responsible for moving inventory throughout the firm's supply

chain and to the firm's customers. They can use a combination of private and purchased transportation services with access to various modes of transportation, offering flexible solutions for transporting products from origin to destination.

A. Understand Transportation Management Fundamentals

1. Recognize transportation cost structure
   a. Terminals
   b. Vehicles
   c. Labor
2. Identify transportation stakeholders
   a. Shipper (consignor) of transported goods
   b. Recipient (consignee) of transported goods
   c. Carrier of transported goods
   d. Government
   e. Public
   f. Sold-to party
3. Identify transportation intermediaries
   a. Third-party logistics (3PL) and fourth-party logistics (4PL)
   b. Freight forwarders and non-vessel-operating common carriers (NVOCC)
   c. Freight brokers
   d. Customs brokers
   e. Export management companies (EMC) and export trading companies (ETC)
   f. Shipping associations
   g. Agents
   h. Export packing companies
4. Differentiate between various carrier types
   a. Common
   b. Contract/dedicated
   c. Exempt
   d. Private

B. Understand Modes of Transportation and Selection Considerations

1. Identify ground characteristics
   a. Trailer types
   b. Service types (e.g., truckload (TL) and less-than-truckload (LTL))
   c. Market structure and sales strategy
   d. Operating and service characteristics
   e. Issues and challenges
2. Identify rail characteristics
   a. Types of operations (e.g., trailer on a flatcar (TOFC), container on a flatcar (COFC), full carload, and less-than-carload (LCL))
   b. Types of equipment (e.g., boxcar, hopper car, tank car, flatcar, and gondola freight car)
   c. Market structure and sales strategy
   d. Operating and service characteristics
   e. Issues and challenges
3. Identify air characteristics
   a. Types of carriers
   b. Freight classification (e.g., dangerous goods)
   c. Container types
   d. Market structure and sales strategy
   e. Operating and service characteristics
   f. Issues and challenges
4. Identify water (ocean or waterways) characteristics
   a. Types of carriers
   b. Service type (e.g., full-container load (FCL), less-than-container load (LCL), and bulk freight)
   c. Vessel type
   d. Market structure and sales strategy
   e. Operating and service characteristics
   f. Issues and challenges
5. Identify pipeline characteristics
   a. Types of freight
   b. Market structure and sales strategy
   c. Operating and service characteristics
   d. Issues and challenges
6. Identify multi-modal and multi-stop transportation characteristics

a. Types of carriers
b. Service type (e.g. FCL, LCL, and parcel)
c. Market structure and sales strategy
d. Operating and service characteristics
e. Issues and challenges

7. Identify courier and parcel services characteristics
   a. Types of carriers
   b. Freight classification (e.g., dangerous goods)
   c. Market structure and sales strategy
   d. Operating and service characteristics
   e. Issues and challenges

C. Implement Transportation Management

1. Develop and execute transportation network design and mode selection
   a. Routing analysis and optimization
   b. Trade-offs in transportation network design
   c. Utilize data-driven business intelligence
2. Facilitate carrier negotiations and selection
   a. Selection factors
   b. Outsourcing considerations
   c. Request for information (RFI), request for proposal (RFP), and request for quotation (RFQ) processes
   d. Contracts
      1. Master contracts
      2. Purchase orders
      3. Standard templates and key sections
      4. Best practices
3. Optimize fleet management process
4. Understand rate tariffs
   a. Manual versus automatic
   b. Types of charges (e.g., hazardous, fuel, notification, and line haul)
   c. Rates per mode
   d. Determinants of tariffs
   e. Freight classification, including freight all kinds (FAK)
   f. Accessorials (e.g., detention, demurrage, dwell, inside delivery, lift gate, and undeliverable)
5. Prepare and utilize documentation
   a. Terms of sale and freight payment terms
   b. Bill of lading (B/L) (Master and House)
   c. Freight bill / invoice
   d. Proof of delivery (POD)
   e. Dangerous goods documentation
6. Utilize visibility, tracing, and tracking methods
   a. Real-time tracking
   b. Optimization and consolidation
   c. Electronic data interchange (EDI) / application Interface (API)
   d. Exception management (e.g., expediting)
7. Conduct transportation cost forecasting and budgeting
   a. Economic considerations
   b. Market considerations
   c. Security considerations
   d. Regulation requirements
8. Facilitate the freight pay and audit process
   a. Freight claims
   b. Freight settlement
   c. Internal management versus outsourcing considerations

References: 1; 2 (chapters 4-5, 11-14, 17, 20); 3 (chapters 13-14); 5 (chapters 2, 8); 6 (chapters 11-12, 15); 8 (chapters 3-11)

VII. Facilitate Global Logistics

For the global logistics professional, successful participation in international trade requires awareness and knowledge of the complexities that exist within global supply chain operations. Geo-political events and tariff policies can impact the cost and risk of international transactions. Shipments must navigate infrastructure, systems, and regulations that are unique to each country it traverses. Customs clearing and documentation requirements can delay transit significantly if the shipment does not adhere to the standards. International terms of sale

and methods of payment offer more options to the transacting parties, but they can result in unexpected costs or risks if organizations do not apply them appropriately. Coordinating these international trade elements is an essential skill set for today's logistics professionals.

A. Characterize International Environment and Global Infrastructure

1. Understand macroenvironmental factors influencing international logistics
    a. Geo-political factors
    b. Sustainability factors
    c. Economic factors
2. Understand local infrastructure considerations
    a. Transportation infrastructure (e.g., roads, ports, and airports)
    b. Utility infrastructure (e.g., power, communications, and water)
    c. International trade specialists/agents
3. Consider performance management factors (internal or external)
    a. Lead time
    b. Risk and exceptions

B. Incorporate Regulations into Global Logistics Processes

1. Understand elements of international trade
    a. Trade agreements
    b. Trading blocs
    c. Trade compliance (e.g., import/ export restrictions)
2. Acknowledge international transportation regulations
    a. Government policies and regulations
    b. International Air Transport Association (IATA)
    c. International Maritime Dangerous Goods (IMDG)
    d. Anti-bribery and corruption practices
3. Understand and adhere to transportation safety regulations
    a. Labor safety regulations
    b. Standards for equipment and vehicles
    c. Dangerous goods and hazardous materials
    d. Environmental
    e. Security

C. Facilitate Customs Clearance and Documentation

1. Differentiate between invoice types
    a. Commercial invoice
    b. Pro forma invoice
    c. Consular invoice
2. Differentiate between various import documents
    a. Certificate of origin
    b. Certificate of manufacture
    c. Certificate of inspection
    d. Certificate of free sale
    e. Import license
    f. Certificate of insurance
    g. Carnet
3. Differentiate between various export documents
    a. Shipper's export declaration (SED)
    b. Export license
4. Differentiate between various international transportation documents
    a. Bill of lading (international) (B/L)
    b. Ocean bill of lading
    c. Air waybill (AWB)
    d. Road waybill
    e. Rail waybill
    f. Packing list
    g. Manifest
    h. Dangerous goods documentation
5. Understand the components of the customs clearance process
    a. Duties and taxes
    b. Harmonized system of classification codes and Harmonized Tariff Schedule (HTS)
    c. Valuation
    d. Tariffs
    e. Customs bond
    f. Role of customs brokers in clearing customs

D. Understand Finance and Payment Options

1. Understand and apply terms of sale
   a. Contract terms and conditions
   b. Incoterms®
2. Differentiate between methods of payment
   a. Cash in advance
   b. Letter of credit (L/C)
   c. Bills of exchange
   d. Open account including payment terms (e.g., net 30 and end of month (EOM))

E. Consider Currency and Tax Implications

1. Awareness of currency translation
2. Awareness of transfer pricing
3. Awareness of free/foreign trade zones (FTZs)

References: 1; 2 (chapters 1-10, 12, 17-21); 3 (chapter 7); 5 (chapters 10, 13); 6 (chapter 2); 8 (chapters 9, 11, 13)

VIII. Facilitate Logistics Network Design

The design of the network of warehouses and transportation lanes enables an effective match of supply with the place and time of demand. This involves developing the optimal number, location, and type of warehouse facilities, which can be supported by using both manual and automated decision support tools. Risk management helps logistics professionals determine how they can minimize uncertainty and provide more reliable organizational results. Technology, such as blockchain and Internet of Things (IoT), can increase the security and traceability of products moving through the global supply chain.

A. Facilitate Network Planning

1. Evaluate transportation requirements
   a. Business strategy and objectives
   b. Determine transportation requirements
   c. Analyze trade-offs
   d. Determine inventory location and levels, order size and frequency
2. Evaluate facility requirements
   a. Type of distribution network
   b. Deployment considerations/ factors
   c. Access to resources and infrastructure
3. Determine appropriate facility type

B. Understand Distribution Network Design Process

1. Understand different network modeling approaches
   a. Optimization
   b. Simulation
   c. Heuristic
   d. Center of gravity
2. Identify key factors of location decisions
   a. Geographical considerations
   b. Resources and infrastructure
   c. Site-specific considerations
   d. Incentive considerations

C. Incorporate Risk Management Principles

1. Identify types of risk
   a. Internal versus external
   b. Human-induced versus natural
   c. Transportation
   d. Warehouse
   e. Environmental
   f. Supplier
   g. Costs
   h. Visibility
2. Evaluate and implement risk management strategies
   a. Acceptance
   b. Avoidance
   c. Mitigation
   d. Transfer
3. Develop and execute risk management process
   a. Identifying
   b. Prioritizing
   c. Choosing response(s)
   d. Monitoring and reporting/ controlling

4. Identify and utilize security measures for mitigating risk
    a. Cybersecurity measures
    b. Physical security measures
    c. Traceability
    d. Blockchain technology
5. Conduct business continuity planning

D. Utilize Performance Management Strategies

1. Analytics
2. Benchmarking
3. Financial
4. Forecasting

References: 1; 2 (chapters 2, 10); 3 (chapters 7, 10, 17); 5 (chapters 2, 11, 13); 6 (chapters 4, 10, 13); 8 (chapters 3, 7, 10)

IX. Understand Sustainability and Reverse Logistics

Sustainability and social responsibility efforts make the organization more attractive to customers, suppliers, other supply chain participants, and shareholders who value green initiatives, reduced carbon footprints, and wiser usage of the world's finite resources. Companies worldwide use reverse logistics strategies to manage their product returns in ways that actually turn the reverse flows into quantifiable value streams that not only contribute to the profitability of the organization, but also strengthen its triple bottom line (TBL) and its commitment to sustainability and social responsibility. Circular supply chains take these sustainability considerations into account when designing the forward supply chain to create a balanced forward and reverse flow of materials and products throughout the life cycle.

A. Apply Sustainability Principles

1. Consider elements of logistics social responsibility
    a. Aspects of social responsibility
    b. Triple bottom line (TBL) impacts
    c. Frameworks, standards, and guidelines
        1. United Nations (UN) Global Compact
        2. Global Reporting Initiative (GRI)
        3. ISO Standards (e.g., ISO 140001 and ISO 50001)
        4. Social Accountability Standard (SA 8000)
        5. ASCM Enterprise Standards for Sustainability
        6. ASCM Supply Chain Operations Reference Digital Standard (SCOR DS)
        7. Government regulations
2. Support sustainability in the supply chain
    a. Understand the relationship between logistics and carbon footprint
        1. Measurement
        2. Offsets
    b. Sustainability initiatives
        1. Products
        2. Packaging and material handling
        3. Warehousing and facility design and layout (e.g., LEED certified, lighting sensors, and water conservation)
        4. Transportation mode selection and alternatives, reduction of fuel consumption, and vehicle selection (e.g., biodiesel and electric vehicles)
        5. Responsible disposal
    c. Supplier selection
    d. Pricing incentives
    e. Other environmental impacts
        1. Dangerous goods
        2. Hazardous waste
    f. Monitoring and measurement

B. Incorporate Reverse Logistics

1. Identify key product factors (desirability, feasibility, viability, and ethicality)
2. Facilitate reverse logistics activities

    a. Distinguish between reasons for reverse flow (e.g., returns, recalls, overstock, damaged, defective, distressed, repair, and end of life)
    b. Determine appropriate options for received items (e.g., restock, repackage, repair, remanufacture, reuse, recycle, repurpose, recovery, scrap, and salvage)
    c. Consider reusable shipping assets
3. Develop and execute reverse logistics process
    a. Determine appropriate options for disposition
    b. Understand forward and reverse flow
    c. Understand closed-loop/circular supply chains
    d. Steps of product returns process
4. Optimize reverse logistics
    a. Reverse logistics costs
    b. Creating value through reverse logistics
    c. Avoidance strategies
    d. Technology integrations
    e. Benefits and challenges

References: 1; 2 (chapters 2, 17); 3 (chapters 7, 14); 4 (chapters 1, 2, 5, 9); 7 (chapters 1-9); 8 (chapter 13); 9 (chapters 7, 15)

Key Terminology

An understanding of the following list of key terms is recommended. This list is intended to be thorough but not exhaustive. The candidate is also expected to be familiar with the definitions of terms identified in the content outline. Definitions of these terms can be found in the *ASCM Supply Chain Dictionary, 18th edition*.

In studying for the APICS CLTD certification, candidates may discover multiple terms used to denote the same technique. Examples of this include "customer service ratio" versus "fill rate" and "expedited logistics" versus "express logistics." ASCM and the certification exam subcommittees have attempted to provide consistency across all exams with recognized and preferred terminology. However, synonyms are often used by authors in the various references used to compile the body of knowledge.

CLTD Key Terminology

anticipation inventories
artificial intelligence (AI)
augmented reality (AR)
automated guided vehicle system (AGVS)
automated storage/retrieval system (AS/RS)
autonomous delivery
backhauling
barge
batch picking
break-bulk
break-bulk warehousing
break-even analysis
break-even point
carbon emissions
cash-to-cash cycle time
charter party
collaborative planning, forecasting, and replenishment (CPFR)
Delphi method
digital twin
direct store delivery (DSD)
direct to customer (D2C)
discrete order picking
distribution center (DC)
dock-to-stock

drayage
dunnage
embargo
ethical procurement
first expiry, first out (FEFO)
first in, first out (FIFO)
free on board (FOB)
freight all kinds (FAK)
freight pay and audit
gatekeeping
green supply chain
intermodal transport
ISO 14000 Series Standards
last in, first out (LIFO)
last-mile delivery
machine learning
maintenance, repair, and overhaul (MRO)
overstock
Pareto analysis
perfect order fulfillment
pick-to-light system
pick-to-voice system
postponement
push-back rack
refrigerated car

CLTD Key Terminology

return authorization
returns management systems (RMS)
roll-on/roll-off container ship (RORO)
time series analysis
total cost of ownership (TCO)
transportation management system (TMS)
transportation requirements planning (TRP)
U.S. Customs and Border Protection (CBP)
U.S. Department of Transportation (DOT)
U.S. Food and Drug Administration (FDA)
value at risk (VAR)
waste hierarchy
wave picking
wearable
World Trade Organization (WTO)
zone picking

Sample Questions

The following eight questions are similar in format and content to the questions on the exam. These questions are intended for practice and to illustrate the way questions are structured. The degree of success you have in answering these questions is not related to your potential for success on the actual exam and should not be interpreted as such.

Read each question, select an answer, and check your response with the explanation on page 27.

1. In its simplest form, logistics:

   (A) is concerned with only the distribution of products.
   (B) is another term for transportation.
   (C) integrates inbound and outbound flows.
   (D) does not involve customer service.

2. In a warehouse management system (WMS), task interleaving often combines:

   (A) put-away and replenishment operations.
   (B) replenishment and shipping operations.
   (C) shipping and put-away operations.
   (D) receiving and put-away operations.

3. A logistics manager works within a business where requirements are near capacity. Load planning is inefficient given the increasing volume of loads. Which of the following applications would enable better decision making and efficiency in planning loads?

   (A) Warehouse management system (WMS)
   (B) Distribution requirements planning (DRP)
   (C) Enterprise resource planning (ERP)
   (D) Transportation management system (TMS)

4. Which of the following metrics is considered external and thus customer facing?

   (A) Perfect order rate
   (B) Production yield
   (C) Inventory turns
   (D) Cycle count accuracy

5. Inventory carrying costs generally include:

   (A) inventory capital, storage, service, and risk costs.
   (B) inventory capital, order, storage, and setup costs.
   (C) inventory risk, service, setup, and order costs.
   (D) inventory risk, storage, service, and fixed warehouse costs.

6. Pallet-flow racking helps to facilitate:

   (A) last in, first out (LIFO).
   (B) cycle counts.
   (C) first in, first out (FIFO).
   (D) low velocity moves.

7. Which of the following functions is associated with a supply-facing warehouse?

   (A) Marketing strategies
   (B) Consolidating shipments of finished goods
   (C) Receiving inbound materials and components
   (D) Manufacturing operations and work in process (WIP)

8. A marketing initiative increases packaging dimensions for an existing product that remains unchanged. While the larger packaging may increase sales of the product, the impact on sustainability will be that:

   (A) less packaging will be thrown out.
   (B) transportation capacity will be wasted.
   (C) shipment density will increase.
   (D) fewer shipments will be required.

Answers to Sample Questions

Note: References to the content outline appear in parentheses.

1. C (IA1a) Option C is correct because the combination of inbound and outbound flows of materials and products was a natural progression of the post deregulation development of logistics during the 1980s. Options A and B are incomplete perspectives of the system that defines logistics. Option D is incorrect because customer service is one of the key outputs of the logistics system.

2. A (VB) Option A is correct because put-away and replenishment (or picking) are typically opposite operations in warehouses. Task interleaving is a warehouse management system (WMS) based task that typically combines dissimilar tasks in order to reduce traveling and increase productivity. Options B and C are incorrect because shipping does not involve traveling in the warehouse and thus would not increase productivity through combining with other processes via task interleaving. Option D is incorrect because these two operations move product in the same direction within the warehouse.

3. D (VIC) Option D is correct because the planning capabilities of a transportation management system (TMS) assist transportation buyers and managers with key pre-shipment decisions. Critical TMS planning applications include routing and scheduling, load planning and optimization, and appointment scheduling. Option A is incorrect because a warehouse management system (WMS) is used to coordinate and optimize the activities within a warehouse or distribution center. Option B is incorrect because distribution requirements planning (DRP) is used to help determine the appropriate level of inventory in order to manage and control replenishment schedules between an organization's manufacturing facilities and its distribution centers. Option C is incorrect because enterprise resource planning (ERP) systems are multi module application platforms that help organizations integrate information and key business processes via a common software platform and centralized database system.

4. A (VB5) Option A is correct because customer service can be looked at from an internal or external key performance indicator (KPI) perspective. Options B, C, and D are incorrect because they are internal metrics whereas external metrics include perfect order and order fill rate performance. These external metrics are obvious to the customers and often directly influence customers' sales behavior since they impact customers' perception of the organization's strategies.

5. A (IVB1) Option A is correct because inventory carrying costs generally include those costs that are only incurred by inventory at rest and waiting to be used, i.e., those costs associated with manufacturing and moving inventory from one point to another within the firm's supply chain. There are four components of inventory carrying costs: capital costs, storage cost, service costs, and risk costs. The fixed costs associated with a company-owned warehouse (option D) do not vary with volume of inventory manufactured/purchased. Order costs and setup costs in options B and C refer to costs associated with placing an order with a supplier or setting up an order or order changeover in manufacturing and are not associated with the costs of holding inventory.

6. C (VB1) Option C is correct because pallet-flow racks are driven by gravity, making them perfect for fast-moving products with a first in, first out (FIFO) stock rotation. Option A, last in, first out (LIFO), would be incorrect since this is typically more feasible with a push-back racking system. Options B and D, cycle counts and low velocity moves, are not relevant options in this case.

7. C (VIIIA2) Option C is correct because supply-facing warehouses are used for incoming materials and components into the facility. Options A, B, and D are incorrect because they are all associated with demand or outgoing facing warehouses.

8. B (IXA2b) Option B is correct because increasing the package size only creates more wasted space. Fewer products in a shipment mean increased shipments using more fuel. Option A is incorrect because more packaging will be thrown out. Option C is incorrect because shipment density will decrease, not increase. Option D is also incorrect because more shipments are needed due to reduced density.

Thank you for your interest in the APICS CLTD certification program. For any questions regarding the content found in this exam content manual, please contact ASCM customer relations at 1-800-444-2742 or 1-773-867-1777 or support@ascm.org.

About APICS and ASCM

The Association for Supply Chain Management (ASCM) is the global pacesetter of organizational transformation, talent development and supply chain innovation. As the largest association for supply chain, ASCM members and worldwide alliances fuel innovation and inspire accountability for resilient, dynamic and sustainable operations. ASCM is built on a foundation of world-class APICS education, certification and career resources, which encompass award winning workforce development, relevant content, groundbreaking industry standards and a diverse community of professionals who are driven to create a better world through supply chain.

To learn more, visit **ascm.org**

APICS

ASCM ASSOCIATION FOR SUPPLY CHAIN MANAGEMENT