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EXAM CONTENT MANUAL

CPIM

CERTIFIED IN PLANNING AND INVENTORY MANAGEMENT

APICS

ASCM ASSOCIATION FOR SUPPLY CHAIN MANAGEMENT

APICS Certified in Planning and Inventory Management (CPIM®)

Exam Content Manual

Version 9.0

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 CPIM certification program and the content of the material. ASCM 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/CPIM.

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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 for the continued development of the CPIM program.

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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.

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Letter to Candidates

Dear Candidate:

Thank you for choosing the Certified in Planning and Inventory Management (CPIM) program to assist you in your career development and continuing education in supply chain management. ASCM is the global leader and premier source of the body of knowledge in operations management, including production, inventory, supply chain, purchasing, and logistics.

For over 50 years, the CPIM program has been recognized as an international standard for individual assessment in the field of supply chain management as it relates to demand and supply planning, material and capacity requirements, sales and operations planning (S&OP), quality control, continuous improvement, and more. These topics align with current business strategies and technological advancements that are being utilized to better assess the marketplace, customer behavior, and evaluation of external and internal processes.

Because organizations operate in a changing and challenging international supply chain environment, the CPIM body of knowledge continues to advance and includes recognized and emerging concepts and tools for improved organizational competitiveness and effectiveness.

To ensure the body of knowledge reflects current theory and practice, ASCM surveys the industry to validate how organizational practices are evolving, allowing it to meet the rigorous needs of today's supply chain professionals and assist candidates in their understanding of the scope of how their jobs fit into their organization's operations. It is interesting to note that the supply chain industry has had a significant amount of attention in mainstream media due to supply chain risks, and an increased "footprint" in our global marketplace. As a result, professionals have searched for a well-designed supply chain certification program that offers resilience for their career now and in the future.

Today, the CPIM program utilizes one comprehensive exam that is designed to test individuals in the various concepts, methodologies, and terminologies within the supply chain and operations functions. ASCM has worked diligently to ensure that CPIM exams are consistently reliable and maintained to the highest professional standards.

This exam content manual (ECM) offers an overview of the program, including an outline of its body of knowledge, essential terminology, and relevant references. Additionally, ten sample questions are provided at the end of this manual to illustrate the types of questions you will encounter on the exam.

APICS CPIM is an outstanding educational program that will continue to evolve, incorporating relevant and current concepts and techniques into the body of knowledge.

We wish you success in your pursuit of the CPIM certification.

Dr. Tricia M. Kerns

Tricia M. Kerns, Ed.D., CPIM, CLTD, CTSC
CPIM Exam Subcommittee Chair

Introduction

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

The CPIM 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 exam along with the correct answers 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 content area using the suggested references.

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

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 Chain Podcast*, will help you keep up to date with industry trends.

Job Task Analysis

The subject matter in the *CPIM Exam Content Manual* 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 CPIM program, this process involves bringing together a task force of industry-specific professionals that represent a diverse skill set in inventory management, demand planning, materials management, master planning, sales and operations planning (S&OP), distribution, quality and continuous improvement management, and supply chain technology. These professionals, under the guidance of a third-party psychometrician, work to identify the knowledge, skills, and tasks deemed important in the practice of planning and inventory management. 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 CPIM 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. The last JTA update for the CPIM program took place in 2024. This update was based on the results of a survey that was responded to by over 1,800 industry professionals, representing a diverse mix of job functions, industries, organization sizes, work experience, and countries of residence.

About the APICS CPIM Examination

The APICS CPIM exam consists of 150 questions, of which 20 are pretest questions that do not contribute to a candidate's total score but are used for statistical purposes only. Pretest 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/CPIM and the APICS Exam Handbook and Testing Policies.

Question Format

The questions on the CPIM exam are intended to test a candidate's understanding of the CPIM body of knowledge. The questions require the candidate to select the best option 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 candidate 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 CPIM 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 CPIM 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 content area on their performance. All APICS exams use the scale above 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 CPIM Exam

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

APICS CPIM References

CPIM Content Outline. The CPIM 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 CPIM Exam Subcommittee identified a number of references for the APICS CPIM exam. These references are used by both the exam subcommittee and the CPIM Learning System subject matter experts 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 CPIM references, visit the CPIM 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 CPIM certification exam, candidates may discover multiple terms used to denote the same technique. Examples of this include “sales and operations planning (S&OP)” versus “production planning” and “master production schedule (MPS)” versus “master schedule.” 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 CPIM Candidates

In addition to the cited references, it may be helpful for you to pursue ASCM Chapter-sponsored courses, college courses, 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. The content below covers several such resources that are available to help in the pursuit of the CPIM certification.

APICS CPIM Learning System

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

The APICS CPIM 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 *APICS Exam Content Manual (ECM)* as a means to direct the candidates' studies. There will likely be some content in *the APICS CPIM Learning System* not covered by the exam; conversely, there will likely be some content in the exam not covered by the learning system. No CPIM exam questions are derived from the learning system. Thus, it is essential for candidates to use the current ECM in their studies.

APICS CPIM Instructor-Led Review Courses and Educational Programs

The instructor-led courses and programs combine the *APICS CPIM 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 recognized instructors at ascm.org/recognized-instructor-list or find local ASCM partners that provide ASCM CPIM 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.

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 manuals (ECMs), which determine 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 group of supply chain management subject matter experts work with ASCM staff, and a third-party vendor to create 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 an 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 addressing 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 revised by APICS exam subcommittee members. Exam subcommittees, ASCM staff, and a third-party exam development contractor all review the potential test questions for correctness of form, spelling, and grammar.

Each test question is reviewed multiple times before it appears on an exam. New test questions initially appear on exams in what is referred to as a "pretest" status in order to collect statistics on the questions. Test questions in this pretest status do not count toward a candidate's score. 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 candidate'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 CPIM Certification Maintenance: Continuing Professional Development

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

CPIM certified individuals are required to collect and report 75 professional development maintenance points (or 100 points for CPIM Fellows) in these five-year intervals to keep their certification active for an additional five years. If they do not submit their professional development 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. Individuals placed in suspension status are not allowed to refer to or make use of their certification. During this period, certificants may submit their maintenance application to keep their certifications in good standing. Maintenance activities cannot be completed during this period and all reported activities must have been completed prior to the certification expiration date. Individuals who do not maintain their CPIM certification will no longer be

certified. Consequently, their CPIM certification will be invalidated, and they will be required to retake and pass the exam again.

The Importance of Certification Maintenance

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

The APICS CPIM certification maintenance program upholds both the objectives of the APICS CPIM 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 CPIM-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 CPIM designation, please visit ascm.org/maintenance.

APICS Certified in Planning and Inventory Management Fellow (CPIM-F)

The distinguishing characteristic of a Certified in Planning and Inventory Management Fellow (CPIM-F) is the willingness to share acquired knowledge with others through presenting, teaching, publishing, and actively 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 CPIM certification is required to be eligible for CPIM-F status. To obtain the APICS CPIM-F designation, an application form must be completed and submitted online with the required number of qualifying activity 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 the corresponding APICS certification exam), presentations, published works, classroom instruction, and non-paid ASCM volunteer activities.

To apply for or learn more about the CPIM-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.

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; ASCM 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 ASCM's legal department 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 ASCM Code of Ethics may result in sanctions up to and including decertification.

Bibliography and References for CPIM

All test candidates should familiarize themselves with the following references for the CPIM exam. The list of references below can also be found online on the CPIM Exam References webpage. 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, 19th ed., 2025	ASCM
2	Change - How Organizations Achieve Hard-to-Imagine Results in Uncertain and Volatile Times, 1st ed., 2021	Kotter, John P., Akhtar, Vanessa, and Gupta, Gaurav,
3	Crafting & Executing Strategy - The Quest for Competitive Advantage - Concepts and Cases, 2024 Release	Thompson, Arthur A., Peteraf, Margaret, Gamble, John E., and Strickland, A. J
4	GRI Standards	Global Reporting Initiative
5	Introduction to Materials Management, 9th ed., 2022	Chapman, Stephen N., Gatewood, Ann K., Arnold, Tony J.R., and Clive, Lloyd M
6	Lean Production Simplified - A Plain-Language Guide to the World's Most Powerful Production System, 3rd ed., 2015	Dennis, Pascal
7	Making Sustainability Work - Best Practices in Managing and Measuring Corporate Social, Environmental and Economic Impacts, 2nd ed., 2014	Epstein, Marc J. and Buhovac, Adriana R.
8	Managing Quality - Integrating the Supply Chain, 7th ed., 2022	Foster, Thomas S. and Gardner, John W.
9	Manufacturing Planning & Control for Supply Chain Management - CPIM Reference, 3rd ed., 2024	Jacobs, Robert F., Berry, Wiliam L., Whybark, Clay D., and Vollman, Thomas E.
10	Operations Strategy, 7th ed., 2023	Slack, Nigel and Lewis, Michael
11	Supply Chain Logistics Management, 6th ed., 2023	Bowersox, Donald J., Closs, David J., Cooper, Bixby M., and Bowersox, John C.
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13	Technology in Supply Chain Management and Logistics - Current Practice and Future Applications, 1st ed., 2019	Pagano, Anthony M. and Liotine, Matthew
14	Transportation - A Global Supply Chain Perspective, 10th ed., 2023	Novack, Robert, Gibson, Brian, and Suzuki, Yoshinori

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Scope of the Subject Matter

Please read the introductory material in this manual for essential information about the examination. This exam includes nine major content areas, as described below. The concepts included in these content areas apply to manufacturing and service organizations.

The CPIM subject matter was validated during the 2024 job task analysis (JTA), during which, the program's scope expanded to encompass additional knowledge related to technology and sustainability. These changes make the content outline better aligned with current business strategies that are being utilized to better assess and evaluate the marketplace, customer behavior, and internal processes. When reviewing the exam content outline, we highly recommend that candidates carefully review topics that are new or unfamiliar, as there is a strong assumption that the candidate has experience and/or knowledge of basic methodologies related to planning and inventory management prior to beginning their studies for the CPIM exam.

The subject matter established in the scope of the CPIM program is organized into the following nine content areas:

Align the Supply Chain to Support the Business Strategy. This section acknowledges principles and techniques used to understand the business environment in which an organization operates, to align business and functional strategies, and to make decisions to support competitive advantage in the short and long term. This involves making choices about resources, processes, technologies, and facility layouts, including their inherent trade-offs and how these choices may change in support of different product/service life cycle stages. Supporting the long-term sustainability of the organization and adjustment to changing conditions requires monitoring key performance indicators (KPIs) and managing supply chain risk.

Conduct Sales and Operations Planning (S&OP) to Support Strategy. This section includes the principles and techniques used to facilitate communication and decision-making among various parts of an organization to support business strategies. This includes the evaluation of supply and demand at an aggregate level and reconciliation of product/service portfolios, demand, supply, and financial plans while considering the trade-offs of available choices.

Plan and Manage Demand. This section includes the principles and techniques used to understand the markets in which an organization chooses to operate, the customer's needs and expectations within those markets, and how those needs and expectations align with the organization's resources and business strategies. This involves understanding various sources of demand, generating forecasts using appropriate tools, and systematically monitoring and adjusting to actual demand performance versus expectations.

Plan and Manage Internal Supply Sources. This section includes the principles and techniques used to create, manage, and maintain a master schedule of independent items and the capacity plan required to implement the schedule. These plans are used to create, manage, and maintain the material requirements plan for inventory planning, as well as the final assembly schedule (FAS) to support customer demand. An important part of managing supply is the consideration of trade-offs, material costs, and risk to ensure continuity of supply and support competitive priorities and supply chain strategy. Choices and decisions may vary across a product's or service's life cycle.

Plan and Manage External Supply Sources. This section includes the principles and techniques needed to plan and manage external supply sources. External suppliers can be categorized into various forms such as domestic or international and then considered sole, single, or multisource. An ability to both understand today's supply marketplace and manage risks is critical for professionals as supply decisions need to be focused both on cost and availability. Supplier relationships are also reviewed to include supplier scorecards and potential trade-offs that need careful planning and support.

Plan and Manage Inventory. This section includes the principles and techniques needed to manage inventory in support of the organization's resource availability, business and functional strategies, and tactical planning. Decisions regarding inventory types, volumes, replenishment methods, and material handling impact inventory investments and availability. Inherent in inventory management is the consideration of trade-offs between service and cost. Included here is the storage and tracking of inventory, as well as processes to manage inventory returns for proper disposition.

Plan, Manage, and Execute Detailed Schedules. This section includes the principles and techniques used to implement the material and capacity plans. This involves understanding and managing workflows in consideration of specific capacity, labor, and inventory resources to facilitate the timing and routing through processes, including the adjustment of schedules, queues, and work prioritization to meet demand as well as service and inventory goals.

Plan and Manage Distribution. This section includes the principles and techniques used to design a distribution network considering the various investments, cost and service trade-offs, and competitive priorities. This section also includes the creation of distribution plans to support strategic goals, service of customer orders, and both outbound and inbound material flows.

Manage Quality, Continuous Improvement, and Technology. This section includes the principles and techniques used to evaluate products, services, and processes, as well as to improve their efficiency, effectiveness, and productivity. It also covers the use of various tools that support organizational goals and establish a better understanding of market expectations. An area of focus herein includes the use of appropriate systems, techniques, tools, and the consideration of emerging technologies to support supply chain processes.

In addition to the knowledge areas and skills encompassed in these nine main content areas, the candidate preparing for the CPIM certification must have a fundamental understanding of the following key business concepts:

- Current and advanced technology options
- International business regarding both customers and suppliers
- Opportunities with sustainability and green initiatives

Exam Percentage by Content Area

The following table identifies the nine main content areas of the exam, which are denoted throughout the content outline by a Roman numeral. 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. Align the Supply Chain to Support the Business Strategy	12%
II. Conduct Sales and Operations Planning (S&OP) to Support Strategy	10%
III. Plan and Manage Demand	12%
IV. Plan and Manage Internal Supply Sources	12%
V. Plan and Manage External Supply Sources	11%
VI. Plan and Manage Inventory	14%
VII. Plan, Manage, and Execute Detailed Schedules	12%
VIII. Plan and Manage Distribution	8%
IX. Manage Quality, Continuous Improvement, and Technology	9%

Content Outline

The content outline provides an overview of the major content areas assessed on the CPIM exam. The terms provided in the "examples include" lists throughout the outline are intended to give the candidate an understanding of the topic; however, they are not exhaustive.

I. Align the Supply Chain to Support the Business Strategy

A. Understand the Business Environment and Corporate Strategy

1. Support the corporate mission, vision, and values
2. Understand and utilize the organization’s order winners and qualifiers, product and service differentiation, and competitive priorities (examples include: availability, cost, quality, delivery, reliability, responsiveness, and agility)
3. Understand the purpose and techniques used to perform various industry competitive analyses (examples include: five-force model, industry standards, SWOT, and benchmarking)
4. Understand how value chain analysis identifies and supports activities that create customer value
5. Understand and utilize the push-pull boundary to align with the business strategy (examples include: make-to-stock (MTS), assemble-to-order (ATO), configure-to-order (CTO), make-to-order (MTO), engineer-to-order (ETO), postponement, and remanufacturing)

B. Comprehend, Align, and Implement Functional and Operational Strategies

1. Influence operations strategy through leveraging core competencies, utilizing available resources, and managing costs while adhering to company, regulatory, and intellectual property policies
2. Identify and leverage technology choices (examples include: enterprise resource planning (ERP), automation, advanced planning, and artificial intelligence (AI)) to improve efficiency, costs, and organizational capabilities
3. Understand make-buy analysis to assess costs, capacity availability, quality, inventory levels, risk, and other considerations

C. Design Processes to Align with Strategic Goals

1. Examine the trade-offs of manufacturing process choices within the product-process matrix (examples include: project, fixed-position, job shop, batch, mass customization, assembly line, repetitive, intermittent, discrete, and continuous flow)
2. Examine trade-offs within the service decision (examples include: degree of contact, opportunity for sales, and production efficiency)
3. Utilize appropriate manufacturing layouts to support product and service design decisions (examples include: fixed position, process/functional layout, cellular layout, product focused, assembly line, front room, and back room)
4. Align process choices and layouts with product/service life cycles

D. Define and Monitor Key Performance Indicators (KPIs) to Evaluate Performance in Relation to the Organization's Strategic Goals

1. Monitor and utilize financial performance metrics to inform decision-making (examples include: cash-to-cash cycle time, cash conversion cycle, cost per unit, and cash flow)
2. Monitor and utilize operational performance metrics to inform decision-making (examples include: customer service levels, order fill rate, schedule adherence, and stockout percentage)
3. Leverage KPI tools to drive improvement initiatives (examples include: supply chain maturity assessment, Supply Chain Operations Reference (SCOR) metrics, and balanced scorecard)

E. Identify and Manage Supply Chain Risks

1. Use supply chain mapping and event monitoring for risk identification within regulatory requirements to support different levels of risk tolerance

2. Assess the impact of potential events that impact the supply chain (examples include: supply disruption, financial, environmental, physical, political, cyber, intellectual property, and branding)
3. Support risk management activities through business continuity planning (BCP) (examples include: risk avoidance, acceptance, transfer, replacement, prevention, mitigation, recovery, pooling, and resiliency)
4. Use appropriate risk management tools and guidance (examples include: failure mode and effects analysis (FMEA) and ISO risk management standards)
5. Comply with security requirements/regulations (examples include: physical and cyber)

F. Support Sustainability Goals (Environmental, Economic, and Social)

1. Understand the impact and support the mitigation plans for the triple bottom line (TBL) and sustainability goals
2. Monitor and report sustainability metrics
3. Review sustainability guidelines (examples include: Global Reporting Initiative (GRI), ISO sustainability standards, and United Nations (UN) Global Compact)
4. Use safety and environmental standards to control and protect the organization and environment
5. Support organizational sustainable procurement strategy and goals

II. Conduct Sales and Operations Planning (S&OP) to Support Strategy

A. Understand the Role of the S&OP Process in the Organization

1. Understand the role of the S&OP process in the planning and control hierarchy
2. Identify the roles and responsibilities of various departments and levels of management in the S&OP process
3. Identify the planning horizon, product families, and the appropriate aggregation level
4. Implement the steps of the S&OP process
5. Understand and utilize the various inputs and outputs of each of the S&OP steps

B. Evaluate the Aggregate Demand Plan

1. Understand and assess the impact of product portfolio, new product introduction (NPI), and life cycle stages

2. Evaluate demand from all sources (examples include: market, customer base, forecast, open customer orders, service-related parts, safety/buffer stock, interplant, and internal requirements)

C. Evaluate the Aggregate Supply Plan

1. Evaluate key supply capabilities
    a. Evaluate external supply base, supply footprint, capacities, and risks
    b. Evaluate internal supply capacities, inventory status, and inventory targets
2. Incorporate product life cycle considerations into the supply plan (examples include: new product introductions (NPIs) and obsolescence)
3. Develop and validate an aggregate production plan to support the organization's strategic choices
4. Evaluate the resource plan to support the aggregate supply plan
5. Evaluate strategic buffers
    a. Identify bottlenecks, capacity-constrained resources (CCRs), and supply chain risks
    b. Evaluate types, sizes, and locations of buffers (examples include: lead time, inventory, and capacity)

D. Reconcile Portfolio, Demand, Supply, and Financial Plans

1. Evaluate trade-offs related to different volume/mix combinations
2. Evaluate alternative supply and demand plans and associated risks
3. Evaluate the applicable financial implications of the plan (examples include: revenue, capacity usage, cost of goods sold (COGS), purchase price variance (PPV), and margin)
4. Evaluate trade-offs among customer service, inventory, and backlog levels
5. Evaluate different methods for balancing supply and demand
    a. Adjust supply (examples include: overtime, outsourcing, agility, flexibility, and temporary suppliers)
    b. Adjust demand (examples include: lead time adjustment, demand shaping, substitutions, and complementary products)

III. Plan and Manage Demand

A. Support Customer Needs and Specifications

1. Support various customer segments based on needs, business unit strategies, and required capabilities

2. Support customer relationship management (CRM) activities determined by customer segmentation
3. Monitor KPIs in alignment with customer service policies
4. Determine appropriate use of point-of-sale (POS) data and support collaborative planning, forecasting, and replenishment (CPFR)
5. Maintain effective customer communications using appropriate tools
6. Monitor order delivery performance metrics

B. Understand Marketing and Product Management Considerations

1. Support marketing strategies
2. Evaluate the impact of marketing promotions on demand (examples include: product/service cannibalization), capacity utilization, and inventory levels
3. Manage production configuration, product changes, and product life cycles
    a. Understand quality systems and tools (examples include: quality function deployment (QFD), voice of the customer (VOC), concurrent engineering, modular design, and postponement)
    b. Support engineering changes, effectivity plans, and revision control

C. Evaluate Sources of Demand

1. Evaluate demand channels (examples include: retail, wholesale, distributor, e-commerce, omnichannel, service installation, business-to-business (B2B), and business-to-consumer (B2C))
2. Evaluate independent demand (examples include: forecast, customer orders, service or warranty, service contracts, vendor-managed inventory (VMI), samples, testing, distribution or warehouse requirements, inter-company or inter-plant orders, rework, repair, and donations)
3. Evaluate dependent demand

D. Support Demand Forecast Processes

1. Understand demand forecasting concepts
2. Understand the relationship between the forecast and accuracy of the data
3. Understand management considerations and trade-offs related to forecast method selection
4. Evaluate time horizons, time buckets, and levels of aggregation for forecasting purposes

5. Understand and utilize qualitative techniques to create forecasts (examples include: historical analogy, panel consensus, executive opinions, Delphi method, sales force polling, and consumer surveys)
6. Understand and utilize quantitative techniques to create forecasts
    a. Utilize appropriate time series decomposition (examples include: level, trend, seasonality, cyclical, and random variation)
    b. Utilize appropriate time series analysis (examples include: moving average, weighted moving average, and exponential smoothing)
    c. Utilize appropriate output from associative techniques (examples include: linear regression and leading indicators)
    d. Utilize appropriate advanced data analytics (examples include: machine learning (ML) and artificial intelligence (AI))

E. Evaluate Forecast Performance and Respond to Demand Variation or Changes

1. Evaluate forecast performance to goals using appropriate forecast error metrics (examples include: bias, cumulative forecast error (CFE), mean absolute deviation (MAD), mean absolute percent error (MAPE), mean squared error (MSE), demand filters, and tracking signals)
2. Collaborate with internal and external stakeholders to improve forecast accuracy (examples include: product line management, sales, customers, and suppliers)
3. Mitigate the bullwhip effect

IV. Plan and Manage Internal Supply Sources

A. Support Master Scheduling Processes

1. Understand the role of master scheduling in the planning and control hierarchy
2. Evaluate the impact of different business environments and strategies on the master scheduling process
3. Evaluate sources of demand to be considered in the master scheduling process
4. Evaluate and implement engineering changes
5. Develop new product introduction (NPI) schedules
    a. Understand design for manufacture and assembly (DFMA) and modularization
    b. Evaluate constraints that may impact the NPI schedule
    c. Create a prototype schedule in consideration of supply and demand plans
6. Evaluate and communicate the impact of product end-of-life plans

a. Evaluate product obsolescence timing and inventory impact
b. Evaluate lifetime and minimum order quantity (MOQ) requirements from/for suppliers and customers

7. Develop the master production schedule (MPS)
   a. Determine the level(s) in the bill of material (BOM) where the MPS should be developed based on production strategies (examples include: finished goods, subassemblies, and raw materials)
   b. Evaluate the allocation of resources for customer order promising and order entry (examples include: discrete or cumulative available-to-promise (ATP) and capable-to-promise (CTP))
   c. Evaluate sources and timing of dependent demand
   d. Manage internal and external sources of supply
   e. Evaluate and implement appropriate production strategies based on defined capacity strategies (examples include: lead, lag, chase, level, hybrid, and subcontracting)
8. Utilize planning bills of material (BOMs) to perform two-level or multilevel master scheduling
9. Use and maintain the MPS
   a. Plan and coordinate changes in inventory levels, backlog, capacity, customer orders, time fences, product and process designs, and incoming supplies into the MPS
   b. Maintain the integrity of the MPS when supply or demand changes
   c. Measure actual performance against the MPS

B. Develop a Rough-Cut Capacity Plan

1. Review bill of resources to determine capacity requirements and the impact of the rough-cut capacity plan on supply
2. Identify and manage key resources to support the MPS
3. Monitor work center efficiency and utilization performance to goals
4. Incorporate maintenance schedules and other planned downtime in capacity planning

C. Manage the Material Requirements Plan

1. Manage relevant material requirements plan input and data sources
   a. Review, validate, and utilize item master data and material requirements planning (MRP) parameters as required to support the material planning process (examples include: scrap/yield factor, unit of measure, lot size, and historical demand)
   b. Review, validate, and utilize MPS output driving MRP (examples include: quantities, sources, priorities, customer orders, forecasts, and time phasing of product demand)

c. Review, validate, and utilize engineering data for bills of material (BOMs) (examples include: information on part interdependencies, lead times, and engineering changes)

2. Utilize BOMs for multilevel time-phased requirements and create long-range and short-range material plans that support company needs and supplier constraints
3. Utilize the MRP time-phased record to calculate and display gross requirements, scheduled receipts, projected available balances (PABs), net requirements, planned order receipts, planned order releases, and firm planned orders (FPOs)
4. Review and manage system feedback, such as action messages, to implement the appropriate adjustments and bottom-up replanning to balance supply and demand
5. Manage closed-loop MRP with master planning, final assembly, and configuration processes to monitor material availability with demand quantities, timing, and priorities

D. Support the Final Assembly Scheduling Processes

1. Evaluate sources of demand to be considered in the final assembly schedule (FAS)
2. Develop the FAS to support the demand plan
   a. Evaluate the allocation of resources for customer order promising (examples include: discrete or cumulative available-to-promise (ATP) and capable-to-promise (CTP))
   b. Evaluate current internal and external sources of supply
3. Evaluate and maintain the FAS
   a. Review and manage changes in inventory levels, backlog, capacity, major customer orders, time fences, product and process designs, and incoming supplies into the FAS
   b. Monitor actual performance to the FAS

E. Monitor Product Costs

1. Understand the different types of product costs (examples include: direct, indirect, overhead, fixed, variable, and landed costs, and total cost of ownership (TCO))
2. Understand costing methods that determine the cost of producing a product (examples include: absorption, variable, job, and activity-based costing (ABC)) to compare actual to planned, budgeted, or standard costs
3. Understand costs related to quality (examples include: prevention, appraisal, internal failure, and external failure costs)
4. Review and validate variances in cost through inventory valuation and an analysis of obsolescence, scrap/yield, rework, repairs, returns, and defective output

F. Manage Changes and Supply Disruptions

1. Reprioritize orders within established time fences to respond to supply and demand changes
2. Adjust lead time, lot size, safety stock quantity, replenishment quantities, cycle times, and other parameters as needed to reflect product life cycles, current conditions, and operational strategy
3. Utilize analytics to evaluate potential trade-offs to changes in the existing supply plan (examples include: what-if analysis, simulation, machine learning (ML), and artificial intelligence (AI))
4. Monitor the status of internal redundancies and buffers (examples include: time and inventory)
5. Implement the business continuity plan when needed

V. Plan and Manage External Supply Sources

A. Understand Supplier Selection Processes

1. Understand supplier selection alternatives considering various categories of risk (examples include: sole, single, and multisource; nearshore; offshore; onshore; reshore; friendshore; and special services)
2. Operate within various supplier relationships (examples include: partnership, strategic alliance, joint venture, contract manufacturing, subcontracting, and transactional)
3. Understand goals and benefits of the various supplier relationships (examples include: improvements in technology, inventory levels, customer service, quality, lead times, visibility, cost, impacts on the environment, damage and loss prevention, continuous improvement, access to new markets, and time-to-market)
4. Monitor the status of appropriate supplier certifications

B. Perform Supplier Relationship Management (SRM)

1. Communicate procurement planning, new product introduction (NPI), and engineering change control to support supplier performance
2. Measure supplier performance using appropriate methods (examples include: balanced scorecard, price-based metrics, time-based metrics, cost-based metrics, quality-based metrics, and environmental, social, and corporate governance (ESG) metrics)
3. Understand contract terms and obligations with suppliers (examples include: inventory levels, delivery expectations, information sharing, and inventory liability)

4. Understand effective communication techniques, cultural differences, commercial versus government interests, and information technology (IT)
5. Use data necessary for collaboration (examples include: risk assessments, technical and quality specifications, engineering changes, supply chain inventories, and future demand)

C. Purchase/Procure Goods and Services

1. Utilize the selected methods for procuring materials and services (examples include: contracts, blanket orders, purchase orders, consignment, vendor-managed inventory (VMI), outsourcing, and e-commerce)
2. Utilize appropriate methods of releasing or requesting materials and services (examples include: pull system, supplier scheduling, electronic data interchange (EDI), and continuous replenishment)
3. Utilize appropriate logistics methods (examples include: modes of transportation, third- or fourth-party logistics (3PL or 4PL), cross-docking, point-of-use delivery, full truckload (FTL), less-than-truckload (LTL), intermodal, and direct shipment)

D. Manage Supplier Changes and Disruptions

1. Reprioritize supplier orders within established time fences to respond to supply and demand changes
2. Review and adjust supplier lead time, lot size, safety stock quantity, and replenishment quantities in relevant planning systems
3. Utilize analytics to evaluate potential trade-offs to changes in the existing external supply plan (examples include: what-if analysis, simulation, machine learning (ML), and artificial intelligence (AI))
4. Monitor the status of external redundancies and buffers (examples include: time and inventory)
5. Implement the supplier business continuity plan when needed

VI. Plan and Manage Inventory

A. Inventory Planning

1. Calculate target inventory levels to support given service and financial goals
    a. Evaluate the impact of sourcing risks (examples include: financial, political, transportation, and environmental) on inventory planning decisions

b. Understand the trade-offs in stocking levels, customer service, sustainability impact, and other network constraints in different operational environments
c. Understand centralized versus decentralized inventory management strategies

2. Understand the types and classifications of inventory
   a. Understand the types of inventory (examples include: raw materials, work in process (WIP), semifinished goods, finished goods, floor stock, and maintenance, repair, and operating (MRO) supplies)
   b. Understand the classifications of inventory (examples include: cycle stock, lot-size, seasonal, anticipation, hedge, decoupling, consignment, in-transit (pipeline), point-of-use, service part, vendor-managed inventory (VMI), excess, obsolete, and scrap)
3. Understand item segmentation (examples include: ABC classification, perishability, hazardous materials, special handling, supply risk, and customer risk)

B. Inventory Management

1. Utilize appropriate push or pull replenishment methods (examples include: material requirements planning (MRP), distribution requirements planning (DRP), reorder point (ROP), periodic review, visual review system, min-max system, two-bin inventory system, and kanban systems)
2. Use appropriate techniques to determine inventory levels while considering operational constraints and service trade-offs
   a. Appropriate dynamic techniques (examples include: landed cost, lot-for-lot (L4L), and fixed order quantity (FOQ) policies)
   b. Appropriate fixed techniques (examples include: economic order quantity (EOQ) and period order quantity (POQ))
3. Calculate safety stock and/or days of supply (DOS) needs based on inventory costs and customer service level objectives
4. Manage maintenance, repair, and overhaul (MRO) inventories based on appropriate inputs (examples include: mean time between failure (MTBF), mean time to repair (MTTR), mean time to failure (MTTF), forecasts, and sales history)
5. Understand special handling requirements of inventory to comply with regulations, environmental standards, and protocols of materials handling, personal protective equipment (PPE), and safety

C. Monitor and Manage Inventory Costs

1. Understand and manage the elements of total carrying costs, total ordering costs, total stockout costs, and the trade-offs of each
2. Understand and monitor inventory valuation methods (examples include: first in, first out (FIFO); last in, first out (LIFO); average cost system; and transfer pricing)
3. Understand and review projected or standard cost versus actual cost
4. Calculate and review inventory metrics (examples include: inventory turns and days of supply (DOS))

D. Inventory Control

1. Manage inventory locations and quantities considering the trade-offs of different storage methods, flow, material handling options, and transaction management (examples include: stock location systems, automated storage/retrieval systems (AS/RS), vendor-managed inventory (VMI), consignment, and hazardous materials)
2. Monitor inventory accuracy to support business objectives (examples include: audit programs, physical inventory, cycle counting, and spot inventory checks)
3. Evaluate and reduce inventory inaccuracies and losses
    a. Evaluate and reduce sources of inventory inaccuracy (examples include: put-away, picking, bill of material (BOM), registration, transaction, data entry, and labeling errors)
    b. Evaluate and reduce sources of loss (examples include: shrinkage, scrap, theft, shelf life, and damage)
4. Utilize appropriate inventory traceability and tracking techniques throughout the supply chain from point of origin to final destination
    a. Create and monitor advance ship notice (ASN) and delivery information
    b. Monitor the proper identification and traceability of inventory (examples include: country of origin declaration, documentation requirements, and chain of custody and integrity)
    c. Monitor inventory movement using appropriate tracking techniques (examples include: barcoding, radio frequency identification (RFID) tagging, internet of things (IoT), location intelligence, and satellite)
    d. Ensure adherence to traceability standards (examples include: ISO traceability standards and global trade identification number (GTIN))
    e. Maintain lot control and serial numbers
    f. Adhere to product recall guidelines

5. Monitor off-site or deployed inventory and assets (examples include: tooling, infrastructure, customer-owned materials, and supplier-owned materials)

E. Manage Returns and Product Disposition

1. Manage reverse logistics processes around the waste hierarchy, considering company acceptance guidelines, regulatory requirements, recall guidelines, and customer expectations
2. Monitor timing and volume of returned deployed inventory and other assets (examples include: rentals, leases, subscriptions, and samples)
3. Understand and monitor the disposition process to support sustainability, quality, financial, and supply goals
    a. Understand the waste hierarchy (examples include: prevent, reduce, reuse, remanufacture, recycle, recover, repurpose, refurbish, repair, and disposal) and manage inventory appropriately
    b. Understand the circular economy implications (examples include: company rules, regulations, environmental standards, product costs, ownership, lead times, life cycle assessment (LCA), distressed goods, and material handling)
4. Evaluate the use of alternate providers to meet reverse logistics needs (examples include: third-party logistics (3PL) providers and brick-and-mortar locations for returns)

VII. Plan, Manage, and Execute Detailed Schedules

A. Plan Detailed Schedules

1. Determine production or flow rate
    a. Track the elements of lead time, including queue, setup, run, wait, and move times
    b. Calculate load from all sources, such as planned orders, firm planned orders (FPOs), released orders, repetitive schedules, past-due orders, rework orders, and work in process (WIP), including run times and setup times
    c. Evaluate throughput by measuring efficiency, utilization, productivity, takt time, cycle time, and input/output control (I/O control)
2. Create work sequences to improve efficiency, resolve supply and demand imbalances, and consider time fence policies and the resource calendar
    a. Utilize appropriate tools to create efficient schedules in a push environment (examples include: time standard, priority control, dispatch list, setup matrix, lot splitting, overlapped schedule, alternate operations or routings, and sequencing rules)

b. Utilize appropriate tools to create an efficient pull environment (examples include: mixed-model scheduling, rate-based scheduling, synchronization, balancing operations, and line balancing)

3. Manage bottlenecks utilizing lean and theory of constraints (TOC) techniques (examples include: improve flow, couple and decouple operations as needed, and elevate the bottleneck as appropriate)
4. Plan non-standard demand
   a. Identify the impact of unplanned or non-standard load (examples include: samples, tests, repairs, rework, and engineering prototypes)
   b. Assess impacts of industry-specific conditions on resources (examples include: remanufacturing, by-products, co-products, and recycled material)

B. Create Production and Labor Schedules

1. Evaluate theoretical, demonstrated, available, and rated capacity
2. Recognize demand and capacity characteristics to manage loads (examples include: hours, load, and work center utilization)
3. Create and apply the load on capacity using appropriate operations scheduling techniques (examples include: infinite and finite capacity planning, finite scheduling, and load balancing)
4. Apply appropriate simulation and modeling techniques to assess the viability of various options or opportunities (examples include: scenario planning, artificial intelligence (AI), and machine learning (ML))
5. Manage various methods of balancing capacity and load (examples include: rescheduling, order splitting, modifying order quantities, outsourcing, and workforce development)
6. Determine and maintain safety capacity or capacity cushions
7. Load operations and adjust capacity to accommodate process variability and planned downtime
8. Manage constraints and balance flow using process flow scheduling in process industries in batch, discrete, and/or continuous mode
9. Utilize labor schedules and recommend staffing based on human resources (HR) policies, available labor pool, labor skills matrix, and contract labor

C. Implement and Manage Detailed Schedules

1. Release manufacturing and service orders, allocate, and issue materials as scheduled
2. Determine process stability, process capability, and theoretical and demonstrated capacity

3. Manage material routing
    a. Evaluate the size of process batches and transfer batches to support production and inventory plans
    b. Review equipment and labor statuses, work orders, preventive maintenance schedules, and their impact on the plan
    c. Determine when alternate operations or routings should be utilized
4. Manage the size of queues
    a. Review input/output (I/O) analysis, capacity, load, and open orders
    b. Determine and implement prioritization rules
5. Manage exceptions and variances to maintain the supply plan
6. Monitor backflush/inventory transactions and close work orders

VIII. Plan and Manage Distribution

A. Plan Distribution

1. Determine network configuration trade-offs (examples include: total costs, inventory investment, customer service, lead time, replenishment frequency, available space, and inbound and outbound transportation costs)
2. Develop the distribution plan
    a. Develop a distribution location-specific product forecast
    b. Review distribution plans and master schedules to support sales and operations planning (S&OP) decisions
    c. Review inventory levels and locations required within the distribution network to support supply and demand plans
    d. Develop the replenishment planning parameters for stock keeping units (SKUs) within the distribution network
    e. Undertake time-phased planning logic for distribution requirements planning (DRP)
3. Monitor key performance indicators (KPIs) of the distribution network (examples include: level of service, on-time schedule performance, lead time, inventory turns, safety stock levels, stockouts, and customer satisfaction)

B. Manage Customer Orders

1. Evaluate inventory availability and lead time in support of sales and marketing goals
2. Evaluate open customer orders (backlog) to meet on-time delivery goals

3. Adjust past-due customer orders (backorders) considering resource availability, cost, and service trade-offs

IX. Manage Quality, Continuous Improvement, and Technology

A. Manage Quality

1. Manage processes and outputs utilizing appropriate quality tools to identify process problems and their root causes (examples include: basic seven tools of quality (B7) and seven new tools of quality (N7))
2. Understand internal and external benchmarking for process improvement
3. Understand regulatory requirements pertaining to product management
4. Incorporate customer and stakeholder quality-related feedback into planning and inventory management processes

B. Manage Continuous Improvement

1. Understand and utilize lean concepts (examples include: kaizen events, reduction of waste and non-value-added activities, throughput improvement, process flexibility, inventory reduction, and one-piece flow)
2. Understand and utilize lean tools (examples include: pull systems, kanban, takt time, standardized work, leveling workload, total productive maintenance (TPM), single-minute exchange of die (SMED), quick changeover, value stream mapping (VSM), A3 method, and gemba walk)
3. Support and participate in improvements to workflow and work area design (examples include: five S's (5s), automation, visual management, andon, and layouts)
4. Support and participate in structured problem-solving processes (examples include: plan-do-check-act (PDCA) and define, measure, analyze, improve, control (DMAIC))
5. Monitor process performance and reduce variation using statistical process control (SPC) methods to manage common, assignable, and special cause variation (examples include: P charts, X-bar charts, R charts, and C charts)

C. Manage Technology

1. Participate in the development of systems requirements or technical specifications to support business needs
    a. Determine current and ideal state utilizing appropriate tools (examples include: flowcharts, benchmarking, user stories, user interfaces, and process mapping)

   b. Identify gaps, system limitations, costs, process knowledge needed, resources required, and applicable organizational or regulatory policies
2. Implement and maintain technology systems
3. Manage integrity of master data
4. Understand and utilize emerging technologies as appropriate for competitive advantage (examples include: artificial intelligence (AI), internet of things (IoT), 3D printing, and robotic process automation (RPA))

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, 19th edition*. Definitions for those terms followed by an asterisk (*) below are included in the Supplemental Glossary listed below the key terms.

In studying for the APICS CPIM certification, candidates may discover multiple terms used to denote the same technique. Examples of this include "sales and operations planning (S&OP)" versus "production planning" and "master production schedule (MPS)" versus "master schedule." 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.

CPIM Key Terminology

advanced planning and scheduling (APS)
allocation
alternate routing
back scheduling
balance sheet
batch processing
big data
bill of distribution
block scheduling
blockchain
buy online pickup in-store (BOPIS)*
break-even analysis
break-even point
budgeted capacity
buffer management
capacity management
capacity requirements planning (CRP)
carbon footprint
carbon handprint
cause-and-effect diagram
cellular manufacturing
certified supplier
change management
check sheet
competitive analysis

concurrent design
constraints management
continuous process improvement (CPI)
continuous production
control chart
control limit
cost of poor quality
cost of quality
critical ratio
critical to quality (CTQ)
cross-training
cumulative lead time
customer-supplier partnership
delivery lead time
demand lead time
design for manufacturability (DFM)
design for the environment (DFE)
design of experiments (DOE)
direct material
discrete manufacturing
distribution channel
distribution inventory
distribution warehouse
executive sales and operations planning (executive S&OP)

CPIM Key Terminology

expedite
external setup time
extrinsic forecasting method
field service
fishbone analysis
fishbone chart
five whys
flow manufacturing
flow processing
forecast horizon
forward integration
forward scheduling
friendshoring
functional product
green reverse logistics
group technology (GT)
health, safety, and environment (HSE)
histogram
horizontal dependency
hoshin planning
house of quality (HOQ)
idle time
internal setup time
intrinsic forecast method
inventory policy
jidoka
Just-in-time (JIT) manufacturing
lean enterprise
Lean Six Sigma (LSS)
least unit cost
level schedule
Little's Law
load leveling
manufacturing calendar
manufacturing execution systems (MES)
manufacturing resource planning (MRP II)
materials management
mixed-model production
modular bill of material (BOM)

muda
multilevel bill of material (BOM)
muri
network planning
operations management
opportunity cost
option overplanning
order point
outlier
overall equipment effectiveness (OEE)
parent item
Pareto's law
performance measure
performance objective
periodic replenishment
phantom bill of material (BOM)
poka-yoke
priority planning
process control
process flow diagram
product lifecycle management (PLM)
product mix
production activity control (PAC)
pull signal
push system
pyramid forecasting
quality at the source
quality control
random-location storage
reorder quantity
replenishment lead time
resource planning
root cause analysis
safety lead time
seasonal index
seasonal inventory
setup cost
seven wastes
single-level bill of material (BOM)

CPIM Key Terminology

six sigma
social responsibility
standard costs
standard time
strategic drivers
strategic plan
strategic planning
strategic sourcing
supplier partnership
synchronized production
tariff
time-phased order point (TPOP)
total quality management (TQM)
transportation inventory
value added
value stream
vertical integration
visual control
warehousing
waterfall analysis*
where-used list

Supplemental Glossary

The following key terms are not found in the *ASCM Supply Chain Dictionary, 19th edition*, so definitions have been provided below.

buy online, pickup in-store (BOPIS) – An omni-channel fulfillment method where a customer orders a product online and picks it up in a store. Implementation requires cross-functional coordination between multiple departments internal and external to the organization. Inventory reservation / allocation, systems, and space are key considerations that must be considered.

waterfall analysis – A tool for visualizing and reviewing changes in a predicted or expected result over time, leading up to and resulting during the time period (known as "lag"). It is often used to measure forecast volatility (to improve forecast accuracy / bias, thereby impacting capacity and inventory planning) or supply volatility (to improve supply accountability and reliability).

Sample Questions

The following ten 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 36.

1. Which of the following factors would have the most significant impact on the competitive position of a make-to-order (MTO) organization that competes on delivery speed?

   (A) Relocation of suppliers
   (B) Increased labor costs
   (C) Outsourcing of customer service
   (D) Shifts in customer demand

2. Which of the following statements about forecasting is true?

   (A) Forecasts are more accurate for individual products.
   (B) Forecasts are most useful for items with dependent demand.
   (C) Forecasts should include an estimate of error.
   (D) Forecasts typically are more accurate when projected over a longer period.

3. Improving the performance of a constraint in a job shop environment will:

   (A) increase production throughput.
   (B) decrease the product mix the job shop produces.
   (C) increase the cycle time.
   (D) reduce the quantity of finished goods.

4. Use the following purchase cost data for product Z to answer the question below.

   0 units on hand (December 27)
   100 units at $10 = $1,000 (received on December 28)
   10 units at $11 = $110 (received on January 3)
   10 units at $8 = $80 (received on January 10)

   If this company is using a weighted average costing method and 100 units were sold on January 8, what is the cost per unit for the sale?

   (A) $9.92
   (B) $10.00
   (C) $10.09
   (D) $10.50

5. Forecasts with the longest time horizons are typically used as inputs to which of the following processes?

   (A) Business planning
   (B) Final assembly scheduling
   (C) Sales and operations planning (S&OP)
   (D) Master production scheduling

6. When a pull system is used, which of the following factors most significantly influences the level of work-in-process (WIP) inventory?

   (A) Number of open shop orders
   (B) Quantity of parts represented by each signal
   (C) Number of workstations in the process
   (D) Takt time required for the process

7. A manufacturing facility is considering adopting cellular flow. Which of the following factors is most important to consider?

   (A) Availability of shipping methods
   (B) Maturity of the product line
   (C) Distance to the supplier
   (D) Stability of the production schedule

8. In a distribution environment, which of the following outcomes will occur if the planner fails to address exception messages during the planning cycles?

   (A) Planned orders are not converted on time.
   (B) Replenishment lead times are incorrect.
   (C) The statistical order point is increased.
   (D) The planning horizon is too short.

9. Based on the information below, for the master schedule, what is the available-to-promise (ATP) for Period 4 if the discrete method is used?

Lead time: 2 weeks	Lot size: 30 units
Demand time fence (DTF): 3 days	On hand: 15 units
Planning time fence: 7 days	Safety stock: 6 units

Period	1	2	3	4	5
Forecast	10	22	20	24	28
Customer orders	5	26	15	6	30
Projected available balance (PAB)					
Available-to-promise (ATP)					
Master production schedule (MPS)	30		30		

(A) 22 units
(B) 24 units
(C) 35 units
(D) 37 units

10. The chart below shows the gross requirements for an item in a material requirements planning (MRP) system. Stock on hand is 500 units, and there are no current scheduled receipts. The item has a lead time of four periods and is being ordered lot-for-lot (L4L). What would be the correct planned order release(s) for the item?

The MRP Grid

Technique
Order quantity / lot size – lot-for-lot (L4L)
On hand: 500
Safety stock: 0
Allocated quantity: 0
Low-level code: 3
Lead time: 4

			Periods							
			1	2	3	4	5	6	7	8
x	Gross requirements			100		300	200		400	
	Scheduled receipts									
	Projected available	500		400		100				
	Net requirements									
	Planned order receipts									
	Planned order releases									

(A) 100 in Period 1, 400 in Period 3
(B) 100 in Period 4, 400 in Period 6
(C) 100 in Period 5, 400 in Period 7
(D) 500 in Period 5

Answers to Sample Questions

Note: References to the content outline appear in parentheses.

1. **D** (IA) - Option D is correct because as customer demand shifts, the organization may find itself with capacity in excess or less than required.

   Option A is incorrect because relocation of suppliers would not have a direct impact on the speed of delivery at acceptable levels. Option B is incorrect because increased labor costs would have an impact on cost but not the speed of delivery. Option C is incorrect because outsourcing customer service does not impact product speed of delivery.

2. **C** (IIID) - Option C is correct because forecasts are inaccurate; therefore, every forecast should include an estimate of error.

   Option A is incorrect because forecasts are more accurate for families or groups rather than individual products. Option B is incorrect because forecasts are not used for dependent demand items. Option D is incorrect because forecasts are more accurate for near-term periods.

3. **A** (VIIA) - Option A is correct because, according to the theory of constraints (TOC), increasing throughput of the bottleneck improves the throughput of the total system.

   Option B is incorrect as the product mix will not be affected by performance changes. Option C is incorrect as an improvement in performance should lead to a decrease in cycle time. Option D is incorrect as an improvement in performance could lead to an increase in finished goods if they are not being sold at the new pace of production.

4. **C** (VIC) - Option C is correct because this is the weighted average cost for the inventory available on January 8.

   Option A is incorrect because it includes the weighted average cost of the 10 units at $8.00 received after the sale date. Option B is incorrect because it is the first in, first out (FIFO) cost of the product. Option D is incorrect because it is the average of the inventory unit cost available on January 8, not the weighted average cost.

5. **A** (IIID) - Option A is correct because business planning is performed at the highest level of aggregation and over the longest horizon, and it would typically be done for fiscal quarters or years.

   Options B, C, and D are incorrect because they refer to processes that would have shorter horizons and intervals.

6. **B** (VIA) - Option B is correct because the level of work-in-process (WIP) inventory when a pull signal is employed is a function of the number of pull signals and the quantity represented by each pull signal.

   Option A is incorrect because shop orders are characteristic of a push system and are not relevant in a pull system. Option C is incorrect because the number of workstations in the process determines the minimum WIP level, but it does not determine the total WIP level. Option D is incorrect because the takt time determines the rate at which the process needs to operate, but it does not determine the WIP level.

7. **D** (IXB) - Option D is correct because cellular manufacturing layout works best when the production schedule is stable. An unstable production schedule will cause disruptions to flow, especially in a cellular manufacturing strategy.

Option A is incorrect because shipping methods are not related to the manufacturing layout. Option B is incorrect because a mature product line does not ensure that one has a stable production schedule. Option C is incorrect because one can implement a cellular flow strategy regardless of where suppliers are located. For example, raw material inventory in front of the cell can buffer against long lead times from the supplier.

8. **A** (VIIIA) - Option A is correct because it is a direct result of failing to address exception messages.

   Options B, C, and D are incorrect because they refer to system parameters that exception messages would not address.

9. **B** (IXA) - Option B is correct because the available-to-promise (ATP) for Period 4 is based on a newly planned master production schedule (MPS) of 30 units for that period, less the customer orders of 6 units for that period. Because another MPS of 30 units will occur in Period 5, demand for that period is not considered by the ATP for Period 4.

   Options A, C, and D are incorrect based on the explanation for the calculation for discrete ATP.

10. **A** (IXC) - Option A is correct because more supply is needed based upon the net requirements. In this case, 100 more units are needed in Period 5. There are 100 units left over from Period 4, but that is 100 units less than the gross requirements of 200 units in Period 5. Given the L4L lot size, the net requirement quantity is suggested as the planned order receipt in Period 5, and with a 4-period lead time, the corresponding planned order release is suggested for Period 1. This will bring the projected available in Period 5 to 0 units, which is acceptable when there is no safety stock requirement. Using the same logic, the net requirement of 400 units in Period 7 leads to a planned order release in Period 3.

    Option B is incorrect because the lead time is 4 periods, not 1 period. Option C is incorrect because the question asks for the planned order release timing, not the planned order receipts. Option D is incorrect because with a L4L lot size, the planned order receipt is the current period's net requirement, and additional supply should not be ordered. Also, the question asks for the planned order release, not the planned order receipt.

The MRP Grid

Technique
Order quantity / lot size – lot-for-lot (L4L)
On hand: 500
Safety stock: 0
Allocated quantity: 0
Low-level code: 3
Lead time: 4

			Periods							
			1	2	3	4	5	6	7	8
x	Gross requirements			100		300	200		400	
	Scheduled receipts									
	Projected available	500		400		100				
	Net requirements						100		400	
	Planned order receipts						100		400	
	Planned order releases		100		400					

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