



The Association of Technology,  
Management, and Applied Engineering

## **STUDY GUIDE**

FOR THE

# **CERTIFIED TECHNOLOGY MANAGER (CTM) EXAM**



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## Exam Content

The major content areas of the exam are: Leadership/Self-Management, Systems, Processes, Operations, People, Project, Quality, and Risk. The major areas are broken down as follows:

<u>Content Area</u>	<u>Number of Questions</u>
<b>Leadership</b>	10
Principles	
Leading	
Decision Making	
Psychology	
<b>Self-Management</b>	18
Integrity	
Responsibility	
Self-Monitoring	
Discipline	
Values and Ethics	
<b>Systems</b>	18
Strategic Management	
Facilities	
Materials	
Finance and Accounting	
Supply Chain	
Lean	
<b>Processes</b>	19
Methods	
Productivity	
Process Design	
Improvement	
Control	
<b>Operations</b>	19
Planning and Control	
Staffing	
Organizing	
Directing	

<u>Content Area</u>	<u>Number of Questions</u>
<b>People</b>	19
Management	
Supervision	
Listening	
Group Dynamics	
Respect	
Empowerment	
<b>Project</b>	19
Management	
Control	
Planning and Estimating	
<b>Quality</b>	19
Management	
Control	
Statistics	
Reliability	
<b>Risk</b>	19
Safety	
Ergonomics	
Business Law	
Patent Law	

## **Section 1: Leadership/Self-Management**

### **Body of Knowledge**

Leadership is a process of social influence, which maximizes the efforts of others towards the achievement of goals. This section may cover any of the following: communication methods, human needs, work motivation, human nature, decision making, leadership, management principles, psychology, and seminal works (Maslow, Herzberg, Mayo, McGregor, etc.).

Self-management is the methods, skills, and strategies by which individuals can effectively direct their own activities toward the achievement of goals and objectives. This section may cover any of the following: integrity, leadership traits, responsibility, self-monitoring, discipline, values, and ethics.

### **Sample Questions for Section 1: Leadership/Self-Management**

1. Who developed the human needs hierarchy theory?  
A. Frank Taylor    B. Henry Gantt    C. Elton Mayo    D. Abraham Maslow
2. This doctrine opposes governmental interference in economic affairs beyond the minimum necessary for the maintenance of peace and property rights.  
A. mercantilism    B. laissez-faire    C. colonialism    D. machiavellian
3. Who used the letters O and P to identify social influences and relationships between individuals and groups?  
A. French & Raven    B. McGregor & Hill    C. Vroom & Yetton
4. Who coined the term "Theory X"?  
A. Douglas McGregor    B. Frank Taylor    C. Abraham Maslow    D. Jon Hill
5. Who developed the two factor theory of work motivation regarding hygiene?  
A. McGregor    B. Herzberg    C. Maslow    D. Hill    E. Mayo
6. Participative decision making (PDM) model of leadership was developed by:  
A. French & Raven    B. McGregor & Hill    C. Vroom & Yetton

### **Leadership/Self-Management References**

- Essentials of Management; Author: Dubrin; Cengage
- Introduction to Leadership; Author: Northouse
- QBQ! Author: Miller
- Industrial Organization; Author: McGrawHill
- Any leadership or management book

## Section 2: Systems

### Body of Knowledge

Systems consist of the management of technology across disciplines and companies in an integrated fashion for the purpose of business venture and development. This section may cover any of the following topics: facilities management, lean thinking, supply chains, accounting, financial analysis, strategic management, materials, and inventory systems.

### Sample Questions for Section 2: Systems

1. What is the term for material in various stages of completion in the production facility?  
A. raw materials      B. finished goods      C. work-in-process      D. set-up
2. What is the name of the method for controlling production so excessive forward movement of material is restricted?  
A. MRP      B. MRPII      C. Kanban      D. Group Technology
3. Which of the following led to the philosophy of producing materials as needed, thereby, reducing inventories?  
A. CPM      B. MRP      C. MRPII      D. JIT
4. All of the following are overhead expenses except  
A. legal      B. advertising      C. production material costs      D. warehousing
5. Hoshin Kanri is a form of  
A. systemic strategic planning      B. quality improvement  
C. Quality Function Deployment      D. Deming's Wheel
6. A supply chain in which material processing is owned and controlled from raw materials to finished product is referred to as  
A. vertically integrated      B. horizontally integrated  
C. decentralized      D. a matrix organization

### Systems Management References

- Manufacturing Facilities Design and Material Handling; Author: Stephens
- Introduction to Materials Management Author: Arnold
- Supply Chain Management: From Vision to Implementation; Author: Fawcett; Ellison
- Lean Thinking: Banish Waste & Create Wealth in Your Corporation; Author: Womack & Jones: Simon and Schuster
- Any managerial or financial accounting textbook

## Section 3: Processes

### Body of Knowledge

A process is the transformation of input elements into output elements with specific properties, within defined parameters or constraints. This section may cover any of the following topics: productivity, utilization, labor standards, time and motion study, process design, methods, process control, standardization, and process improvement.

### Sample Questions for Section 3: Processes

1. Which one of the following statements is not correct with respect to a continuous process?
  - A. It typically operates 24 hours a day, seven days a week
  - B. It does not require group or individual charting of process variables
  - C. It stops only for scheduled maintenance or emergencies
  - D. It normally uses sensors for automatic data collection and process control
2. Who was the first to identify the smallest measurable unit of motion often referred to as “therbligs”?
  - A. Henry Gantt
  - B. Frederick Taylor
  - C. Elton Mayo
  - D. Frank Gilbreth
3. What would be the best way to assist with improving productivity?
  - A. hire more workers
  - B. rotate jobs
  - C. allow employees to work overtime
  - D. time and motion studies
  - E. none of these
4. The product-process matrix compares
  - A. various process options to volume and variety
  - B. net present value to cost volume
  - C. production volume to breakeven cost
  - D. cost to payoff amount
5. A method is a
  - A. protected right or title for a set period
  - B. adopted course or principle of action
  - C. process, or series of steps or acts, for performing a function or a task
  - D. work of literature
6. Measurements taken at various points in the transformation process for control purposes are called
  - A. plans
  - B. directions
  - C. controls
  - D. feedback
  - E. budgets

### Process Management References

- Operations and Supply Chain Management; Author: Jacobs
- Operations Management; Author: Stevenson

## Section 4: Operations

### Body of Knowledge

Operations management is the management of technology within a specific industrial specialty. This section may cover any of the following topics: planning, control, organization, staffing, and directing.

### Sample Questions for Section 4: Operations

1. Specific details on how overall goals are to be achieved is known as:  
A. strategic planning  
B. objective setting  
C. tactical planning  
D. goal attainment
2. The military is a prime example of  
A. flat organizational structure  
B. line organization  
C. staff organization  
D. decentralization
3. A job description is a  
A. operation sequence given to a specific set of tasks  
B. written statement of what, how, and why a job exists  
C. list of the knowledge, skills, and abilities needed to perform a job  
D. group of jobs paid at the same rate
4. The concept referring to the rights inherent in a managerial position to give orders and expect the orders to be obeyed is  
A. responsibility.  
B. accountability.  
C. authority.  
D. coordination.  
E. work simplification.
5. When to order inventory is a managerial phrase called  
A. supply source  
B. discount rate  
C. order point  
D. order quantity
6. Task centered management emphasizes  
A. accomplishment of financial targets  
B. support of employee development and needs  
C. coaching and mentoring others  
D. accomplishment of organizational goals

### Operations Management References

- Lean Thinking: Banish Waste & Create Wealth in Your Corporation; Author: Womack & Jones: Simon and Schuster
- Operations and Supply Chain Management; Author: Jacobs
- Operations Management; Author: Stevenson



## Section 5: People

### Body of Knowledge

Managing people involves the deployment and handling of human resources to work together to accomplish desired goals and objectives using available resources efficiently and effectively. This section may cover any of the following topics: industrial management, supervision, team building, respect, and empowerment.

### Sample Questions for Section 5: People

1. Labor unions that do NOT require employees to join a union are:  
A. closed shop.    B. open shop.    C. union shop.    D. accessible shop
2. MBO is an acronym for:  
A. military behavioral objectives    B. management behavioral objectives  
C. management by objectives    D. marketing best options  
E. none of these
3. When goals are projected, it is recommended that they be expressed in  
A. measurable terms    B. management terms  
C. organizational jargon    D. supervisory objectives
4. Which of the following is not usually considered a responsibility of the supervisor?  
A. purchasing    B. staffing    C. controlling    D. managing
5. A real team has all of these characteristics except:  
A. common goal    B. high performance  
C. show trust and respect    D. prefer action to analysis
6. The need for quicker decisions has led companies to increasingly use this management technique  
A. larger span of control    B. suggestion boxes  
C. empowerment    D. universal leadership

### People Management References

- Supervision Today! Author: Robbins
- Effective Supervision; Author: Geotsch

## Section 6: Project

### Body of Knowledge

Projects are the one-time application of a process to produce a unique product or service. This section may cover any of the following topics: scheduling, estimating, project control, and project management.

### Sample Questions for Section 6: Project

1. Which of the following uses the terms ES, EF, LS, LF and deals with slack time?  
A. PERT    B. Gantt    C. CPM    D. JIT    E. FEA
2. The term for a network planning technique where the activities that make up the project and how they are related is graphically presented is a(n):  
A. Gantt chart.    B. PERT chart.    C. Operation sheet.    D. Job card.
3. Using the PERT formula  $t_E = (t_O + 4t_M + t_P) / 6$ , what is the expected activity duration if the most likely is 19, optimistic is 12, and the pessimistic is 21?  
A. 18    B. 8    C. 20    D. 14
4. In project scheduling, the most common method for determining the critical path is the use of the  
A. network diagram    B. schematic    C. flow chart    D. Pareto
5. Project ownership, authority, cross-functional cooperation, and prioritization are some of the reasons for the establishment of a  
A. work breakdown structure    B. critical path  
C. project management office    D. community of practice
6. Nine areas of project management knowledge have been established by  
A. International Project management Association  
B. Project Management Professionals Certification Center  
C. Project Management Institute  
D. Association for Project Management

### Project Management References

- Project Management; Author: Pinto
- Project Management for Engineering, Business, and Technology; Author: Nicholas
- Any project management textbook

## Section 7: Quality

### Body of Knowledge

Quality management involves the use of quality assurance and control of processes and products to achieve consistent and predictable quality. This section may cover any of the following topics: basic statistics, control charts, sampling methods, reliability, probability, variability, distributions, and quality indicators.

### Sample Questions for Section 7: Quality

1. Quality characteristics that are classified as conforming or nonconforming to specifications such as a “go/no go gage” applications are referred to as:  
A. variable            B. continuous            C. attribute            D. either A or C
2. Which one of the following is not correct with respect to the total area under the curve associated with  $\pm 1$  sigma,  $\pm 2$  sigma, and  $\pm 3$  sigma?  
A. 99.73%            B. 95.46%            C. 90.34%            D. 68.26%
3. Variation is present in every process. Which one of the following statements is not true?  
A. principal sources of variation include equipment, materials, environment, and operator.  
B. automation has increased the effects of environmental variation.  
C. equipment variation includes, but is not limited to, tool wear and vibration.  
D. material variations can occur in both the finished product and raw material.
4. With respect to process capability, which of the following situations is the most desirable?  
A.  $6 \text{ sigma} > USL - LSL$     B.  $6 \text{ sigma} < USL - LSL$     C.  $6 \text{ sigma} = USL - LSL$
5. The optimal capability index ( $C_p$ ) for non-sigma company is frequently established at?  
A. 0.67            B. 1.25            C. 1.33            D. 1.00
6. If repeatability is large compared to reproducibility, the reason(s) for it may center on which of the following reasons?  
A. the gage needs maintenance  
B. the gage could be redesigned to be more rigid  
C. the clamping for gaging needs to be improved  
D. all of the above are acceptable reasons

### Quality Management References

- Quality Improvement; Author: Besterfield
- Quality; Author: Summers
- Quality Management; Author: Goetsch

- Six Sigma Black Belt CSSBB Primer; Author: Wortman

## Section 8: Risk

### Body of Knowledge

Risk management is the identification, assessment, and prioritization of risk followed by coordinated and economical application of resources to minimize, monitor, and control their probability and/or impact. This section may cover any of the following topics: business law, discrimination, patent law, OSHA regulations, workers compensation, industrial hygiene, ergonomics, safety, accident prevention, environmental controls, personal protective equipment, fire protection, hazardous materials, and administrative control.

### Sample Questions for Section 8: Risk

1. What does the acronym OSHA stand for?
  - A. Organization for Safety and Help Administration
  - B. Organization for Safe and Help Administration
  - C. Occupational Safety and Health Administration
  - D. Occupational Safety and Help Administration
2. Which type of fire extinguisher would work on a flammable metals fire?
  - A. A
  - B. B
  - C. C
  - D. D
3. What are solid particles that are formed when metal or other solids vaporize and the molecules condense in fresh air?
  - A. mist
  - B. fumes
  - C. gas
  - D. vapors
  - E. dust
4. What does LEL stand for?
  - A. lead exposure limit
  - B. limited exposure level
  - C. local exhaust limits
  - D. lower exposure limits
  - E. none of these
5. What is a Title VII violation?
  - A. Hiring only 30-40 years old people
  - B. Firing employees older than 50 years
  - C. Classifying employees by age
  - D. All of the above
  - E. None of the above
6. What addresses specific hazards such as handling hazardous waste?
  - A. regulation
  - B. standard
  - C. citation
  - D. section
  - E. code

### Risk Management References

- Occupational Safety and Health for Technologists, Engineers, and Managers; Author: Goetsch
- Accident Prevention Engineering and Technology; Author: Natl. Safe. Coun.
- Safety and Health for Engineers Author: Brauer
- Industrial Safety and Health Management; Author: Asfahl and Rieske
- Any business law textbook

## Recommendations for Taking the ATMAE Exam

- Thoroughly review this Study Guide and review the reference textbooks.
- You do NOT have to pass each section. Only a composite passing score is required. Rest well the night before the exam.
- Do NOT leave any questions blank. All questions are multiple-choice, so make an educated guess at questions containing content you may not be familiar with.
- Don't panic! You do know this material or your instructor, mentor, or colleague would not want you to take the exam.
- Pace yourself. There are 160 questions and you have 120 minutes (2 hours) to finish.
- Don't spend too much time on one question because all questions are worth the same.
- Flag questions you are unsure of and come back to them at the end if you have time.
- Maintain a positive attitude. You can always retake the exam if you do not pass.

## Answers to Sample Questions

### Section 1: Leadership/Self-Management

1. d 2. b 3. a 4. a 5. b 6. c

### Section 2: Systems

1. c 2. c 3. d 4. c 5. a 6. a

### Section 3: Processes

1. d 2. d 3. d 4. a 5. c 6. d

### Section 4: Operations

1. c 2. b 3. b 4. c 5. c 6. d

### Section 5: People

1. b 2. c 3. a 4. a 5. d 6. c

### Section 6: Project

1. c 2. b 3. a 4. a 5. c 6. c

### Section 7: Quality

1. c 2. c 3. b 4. b 5. c 6. d

### Section 8: Risk

1. c 2. d 3. b 4. d 5. e 6. d

## **ATMAE Certification Examination Information**

### **Policy**

The Board of Certification shall design and administer certification examinations for all individuals. The examinations shall be administered online as requested. The areas covered by the examinations and the minimum acceptable scores shall be determined by the Board of Certification.

### **Examination Information**

The ATMAE Certification Examination is currently available for use for individual certification and as a program assessment examination. The exam is open book, 160-question, multiple-choice examination.

### **Individual Examinations**

Individuals interested in taking the exam on an individual basis should contact ATMAE to make arrangements. Individuals must pay an examination fee to sit for the exam. If the individual passes and wants to become certified, they will be responsible for submitting an application and paying the appropriate ATMAE membership fee and certification documentation fee.

### **Certification after Examination**

Examinees who have passed the ATMAE Certification Examination and who apply for ATMAE Certification will be certified by ATMAE upon receipt of their application and payment of all applicable fees. Examination results are usually available from the ATMAE Office within 30 days of the date examination score sheets have been submitted to ATMAE for scoring. Applicants must be ATMAE members or join ATMAE in order to be certified. If applying for certification after passing the exam, you will need to pay relevant membership fees and indicate on the application form the approximate date of the exam and the College or University at which you took the exam so that ATMAE can verify your exam results.

### **Program Assessment**

When used for program assessment purposes, the exam fees are typically paid by the Program or Department using the exam. Aggregate exam scores, and comparative score information, are released to the Program or Department contact after the exams have been scored and the examination fee has been paid.

For more information about the ATMAE Certification Examination or to obtain scores and determine your ATMAE Membership status before applying for certification, contact ATMAE by phone at (734) 677-0720 or by email at [ATMAE@ATMAE.org](mailto:ATMAE@ATMAE.org)

### **Certificates**

Certificates appropriate for framing are issued for one-year periods upon initial certification and upon annual renewal. In addition, individuals who passed the certification exam and stay current with all applicable membership and certification dues will be listed on the ATMAE Certification home page for recognition status by employers and colleagues.

**Note: If you are an individual with disabilities and need academic accommodations, please call ATMAE at (734) 677-0720 to make the necessary arrangements for you to take the test.**