ATMAE

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STUDY GUIDE FOR THE CERTIFIED TECHNOLOGY MANAGER (CTM) CERTIFICATION EXAM

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ATMAE Certification Examination

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 also 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 with questions on Production, Planning & Control; Safety; Quality; Management & Supervision; and other rudimentary questions pertaining to Algebra, Trigonometry, Physics, Chemistry and English.

Individual Examinations

Individuals interested in taking the exam on an individual basis should contact ATMAE to make arrangements. Individuals must pay an examination fee of $20 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**

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.

Exam Content:

The four major content areas from which the exam is comprised are: Production, Planning and Control; Quality Control; Safety; and Management.

Section 1: Production, Planning, and Control

Body of Knowledge

This section may cover any of the following topics: inventory management; industrial organization structures; production philosophies (JIT, MRP, KANBAN, Group Technology, etc.); production charts (process flow chart, Gantt, PERT, etc.); industrial waste; preventative maintenance; overhead vs. production costs; laws regarding discrimination; plant layout and materials handling; patents, copyrights, trademarks, etc.; material data safety sheets; Environmental Protective Agency forms; in-house vs. outsourcing; labor standards; purchasing; locating industrial sites; product life cycles; inspection techniques; forecasting; fluid power; time and motion study; scientific management and some fundamental Physics, English, Economics, and Trigonometry.

Sample Questions for Section 1

These are sample questions that you will not find in the ATMAE exam, but they will help you familiarize with the exam. The answers are on page **13**.

1. What are the four tools of the marketing mix?

A. Production, Price, Place, and Promotion
B. Production, Price, Promotion, and Positioning
C. Product, Price, Promotion, and Publicity
D. Product, Price, Place, and Promotion

Remember the four Ps of marketing

2. How much work against gravity does a person with a mass of 90 kilograms do when he climbs stairs to a height of 20 meters? Assume that acceleration due to gravity is 9.8 meters per second squared (9.8 m/s^2)

A. 1800 N B. 892 N C. 882 N D. 113.5 N

3. What is a Title VII violation?

A. Hiring only 30-40 years old people
B. Firing employees older than 50 years old
C. Classifying employees by age
D. All of the above

4. Sin ($\alpha + \beta$) =

A. $\sin\alpha \cos\beta + \cos\alpha \sin\beta$
B. $\tan\alpha \sin\beta + \tan\beta \sin\alpha$
C. $\sin\alpha \tan\alpha + \sin\beta \tan\beta$
D. $\cos\alpha \sin\alpha - \sin\beta \cos\beta$

5. "Thyself" is the archaic form of which of the following pronouns?

A. Myself B. Yourself C. Themselves D. Himself

6. 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

7. 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

8. 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. Gannt chart. B. PERT chart. C. Operation sheet. D. Job card.

9. Who was the first to identify the smallest measurable unit of motion often referred to as "therbligs"?

A. Henry Gannt B. Frederick Taylor C. Elton Mayo D. Frank Gilbreth

10. Which of the following led to the philosophy of producing materials as needed, thereby, reducing inventories?

A. CPM B. MRP C. MRPII D. JIT

References

- Minty, G. (1998). *Production planning and controlling: A problem-based approach.* Tinley Park, IL: The Goodheart-Willcox Company, Inc.
- Tony Arnold J.R. (2004) *Introduction to Materials Management*, 5th Edition, Prentice Hall Publishing.
- Pfeiffer, William S. *Technical Writing – A Practical Approach* Merrill/MacMillian Publishing Company, 2003.
- Any book covering fluid power calculations.
- Any book covering basic trigonometry, physics, and economics.

Section 2: Quality Control

Basic Knowledge

Basic statistics; upper and lower control limits; various QC charting methods (R-chart, p-chart, u-chart, np chart, etc.); sampling methods; reliability; variability; attributes; military standards; distributions; quality indicators; types of errors; probability; and QC curves.

Sample Questions for Section 2

1. What is one of the principles of ISO 9000:2000?

Tip: ISO 9000 has to do with quality management

A. Selection of suppliers
B. Strategic management
C. Involvement of people
D. Management of inventories

The correct answer is C: involvement of people. Principle eight talks about suppliers but not about the selection of them. Strategic management and management of inventories are not specifically talked about in any principle.

2. Quality characteristics that are classified as conforming or nonconforming to specifications such as a "go/no go gage" applications are referred to as _____ data?

A. variable B. continuous C. attribute D. either A or C

3. 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%

4. 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.

5. Which one of the following statements is correct with respect to a proper description of random (chance) variation?

A. it is a natural or expected variation.
B. when only random causes of variation are present in a process, the process is considered to be in a state of statistical control.
C. all of the above statements are correct descriptions of random causes of variation.
D. none of the statements above are true.

6. With respect to process capability, which of the following situations is the most desirable?

A. $6\sigma > USL - LSL$ B. $6\sigma < USL - LSL$ C. $6\sigma = USL - LSL$

7. The optimal capability index (Cp) for non-Six Sigma Company is frequently established at _____ ?

A. 0.67 B. 1.25 C. 1.33 D. 1.00

8. Which one of the following statements is <u>not</u> 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

9. 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 need to be redesigned to be more rigid
C. the clamping or location for gaging needs to be improved
D. all of the above are acceptable reasons
E. only (a) and (c) are acceptable reasons

10. If reproducibility is large compared to repeatability, the reason(s) for it may center on which of the following reasons?

A. the operator needs to be better trained on how to use and read the gage
B. there is excessive within-part variation
C. a fixture may be needed to help the operator use the gage consistently
D. all of the above are acceptable reasons
E. only (a) and (c) are acceptable reasons

<u>References</u>

- Besterfield, D. H. (2001). *Quality control* (6th ed.). Upper Saddle River, NJ: Prentice-Hall, Inc.
- Delavigne, K. T., & Robertson, J. D. (1994). *Deming's profound changes: When will the sleeping giant awaken?* Englewood Cliffs, NJ: PTR Prentice Hall.
- Goetsch, D. L., & Davis, S. (2000). *Introduction to total quality* (3rd *edition)* New York: Macmillan College Publishing Co., Inc.
- Goldratt, E. M. (1999). *Theory of constraints*. Great Barrington, MA: North River Press.
- Goldratt, E. M. & Cox, J. (1992). *The goal: A process of ongoing improvement* (2nd ed). Great Barrington, MA: North River Press.
- Gitlow, H.S., & Gitlow, S.J. (1987). *The Deming guide to quality and competitive position.* Englewood Cliffs, NJ: Prentice-Hall.

Section 3: Safety

Body of Knowledge

OSHA regulations and history; workers compensation; industrial hygiene; ergonomics; safety inspections; accident prevention; ventilation; personal protective equipment; respiratory protection; fire protection; citations; and NIOSH.

Sample Questions for Section 3

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. NIOSH is a part of the

A. Department of Commerce.
B. Department of Labor.
C. Department of Health & Human Services.
D. Department of Defense.

3. Which type of fire extinguisher would work on a flammable metals fire?

A. A B. B C. C D. D

4. 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

5. What does TLV mean?

A. Time limit value
B. Tiny liquid vapor
C. Term limit value
D. Total limit value
E. Threshold limit value

6. 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

7. What is the maximum penalty for a willful violation?

A. $2,000 B. $5,000 C. $7,000 D. $70,000

8. What addresses specific hazards such as handling hazardous waste?

A. regulation B. standard C. citation D. section E. code

9. This is when the worker is incapable of work for a period of time and then expected to fully recover.

A. Temporary Total Disability
B. Temporary Partial Disability
C. Schedule Disability
D. Non Schedule Disability

10. **Which OSHA record keeping form summarizes all the work related injuries and illnesses for the year?**
    A. OSHA 100 B. OSHA 300 C. OSHA 300A D. OSHA 301

References

- Goetsch, D. L. (2005). *Occupational safety and health for technologists, engineers, and managers* (5th ed.). Upper Saddle River, NJ: Pearson Education, Inc.

- Asfahl, C. R. (2004). *Industrial safety and health management* (5th ed.). Upper Saddle River, NJ: Pearson Education, Inc.

Section 4: Management

Body of Knowledge

This section may include any of the following topics: communication methods; classes of human needs; informal vs. formal information; work motivation techniques; human nature; time and motion study; productivity performance; time standards; physiological measures; charting work; inventory control; MBO; decision making processes; unions; job evaluation; history of work study; Business Law, facilities layout & materials handling, industrial communication, industrial ergonomics, industrial supervision, leadership, marketing, and management and behavior pioneers (Maslow, Herzberg, Mayo, Taylor, Gilbreath, etc.).

Sample Questions for Section 4

1. Who developed the human needs hierarchy theory?

A. Frank Taylor C. Elton Mayo
B. Henry Gannt 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. Which of the following uses the terms ES, EF, LS, LF and deals with slack time?

A. PERT B. Gannt C. CPM D. JIT E. FEA

5. Who coined the term "Theory X"?

A. Douglas McGregor B. Frank Taylor C. Abraham Maslow D. Jon Hill

6. 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

7. Who developed the two factor theory of work motivation regarding hygiene?

A. McGregor B. Herzberg C. Maslow D. Hill E. Mayo

8. What would be the best way to assist with improving productivity?

A. hire more workers D. time and motion studies
B. rotate jobs E. none of these
C. allow employees to work overtime

9. Participative decision making (PDM) model of leadership was developed by:

A. French & Raven B. McGregor & Hill C. Vroom & Yetton

10. **Labor unions that do NOT require employees to join a union are:**
    A. closed shop. B. open shop. C. union shop. D. accessible shop

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- Robbins, S. P. (2003). *Organizational Behavior* (10th edition). Upper Saddle River, NJ: Pearson Education, Inc.
- Johnson, S. (1998). *Who moved my cheese?* New York: B. P. Putnam's Sons
- Keirsey, D. (1998). *Please understand me II*. Del Mar, CA: Prometheus Nemesis Book Company.
- Hitt, W. D. (1988). *The leader-manager: Guidelines for action.* Columbus, OH: Battelle Press.
- Niebel, Benjamin, Andris Freivalds (2003). *Methods, Standards, and Work Design* (11th edition). New York, NY: McGraw-Hill.

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 160 minutes (3 ½ 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 for Sample Questions

Section 1: Production, Planning and Control

1. d 2. c 3. d 4. a 5. b 6. c 7. c 8. b 9. d 10. d

Section 2: Quality Control

1. c 2. c 3. c 4. b 5. c 6. b 7. c 8. b 9. d 10. e

Section 3: Safety

1. c 2. c 3. d 4. b 5. e 6. d 7. d 8. b 9. a 10. c

Section 4: Management

1. d 2. b 3. a 4. c 5. a 6. c 7. b 8. d 9. c 10. b