NAIT CERTIFICATION EXAM STUDY GUIDE

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TABLE OF CONTENTS

NAIT Certification Information & Policies

Purpose of NAIT Certification

The primary purpose of the National Association of Industrial Technology (NAIT) certification program is to provide recognition of the attainment of certain professional standards by Industrial Technologists.

Benefits of Certification: Why get certified?

- NAIT Certification announces that you have a recognized level of expertise in a specific field, a mark of distinction that sets you apart.
- NAIT Certification provides external validation of your knowledge and competence among others not familiar with the profession, improving your marketability.
- NAIT Certification shows your commitment to the profession and your own professional growth, factors that can affect career advancement.
- NAIT Certification requires a dedication to continuing education, promoting your continued growth and development as a professional.
- NAIT Certification may help you access travel grants for educational activities that support your organization's continuous improvement efforts and your professional development.
- NAIT Certification provides a link between you, NAIT and the professional community, a bond of support, strength, and belonging.

Authority and Responsibility for NAIT Certification Program

NAIT is dedicated to the establishment and maintenance of professional standards for industrial technologists and derives the authority and responsibility for certification from its Constitution and Bylaws which state "...a Board of Certification may be established to coordinate and conduct all certification activity of the Association...the Board shall be an autonomous decision-making body with final authority for all certification decisions." NAIT established the Board of Certification at the October 19, 1991 Executive Board meeting.

Eligibility for NAIT Certification

Individuals meeting the following criteria are eligible to be certified by NAIT:

1) Have an industrial technology-related degree (AS, BS, MS or Doctorate) or an equivalent degree, teach or serve as an administrator in an industrial technology-related degree program, or be professionally employed in a capacity related to the discipline of Industrial Technology. Individuals are also eligible in the last semester prior to receipt their AS or BS degree, if their impending graduation is verified on the application by their academic advisor.

and

2) You must take and pass the NAIT Certification Examination*. The exam is offered at many colleges and universities accredited by or affiliated with NAIT or you can also contact NAIT to arrange an individual exam session. The exam may be offered at NAIT's annual convention each fall.

(* Eligibility policy effective January 1, 2005.)

Certification Levels

Certified Industrial Technologist (CIT)
CIT is the initial certification status awarded to eligible applicants. CIT status is awarded for a maximum of eight years and is not renewable. Upon completion of the initial eight-year CIT certification and acquisition of 75 Professional Development Units (PDUs), recertification is at the CSIT level. CITs with 75 PDUs at the end of the fifth year of CIT certification may request an upgrade to CSIT status.

Certified Senior Industrial Technologist (CSIT)
CSIT is awarded to eligible applicants with five years of post-graduate professional experience who have completed 75 PDUs of continuing education activity in the five years prior to their application. CSIT certification is renewable every five years and requires 75 PDUs of continuing education activity within the prior 5-year CSIT period.

NAIT Membership

Applicants for certification must be NAIT members (or include payment for membership with the application for certification).

Documentation
Appropriate documentation of professional experience and PDUs must be included on the application for certification. NAIT reserves the right to verify degree status, professional experience, and PDUs.

Fees
Each NAIT member receiving certification will be required to pay the following fees:

Certified Industrial Technologist (CIT)
$20 - Examination Fee (unless paid by institution)
$45 - Application Fee (paid once at initial application)
$25 - Annual Renewal Fee (paid at end of first year and each year thereafter)

Certified Senior Industrial Technologist (CSIT)
$20 - Examination Fee (unless paid by institution)
$75 - Application Fee (paid once at initial application)
$25 - Annual Renewal Fee (paid at end of first year and each year thereafter)

The annual renewal fee will be paid at the same time as the NAIT membership fee. NAIT members applying for initial CIT or CSIT certification will receive credit for a portion of their existing dues and NAIT office will prorate their existing dues to establish a new membership renewal date coincident with the certification renewal date. NAIT Membership and Certification are billed simultaneously and both the membership fee and the certification renewal fee must be paid to maintain a valid NAIT Certification.

Certification status must be continuous throughout the certification period. Failure of individuals to pay the annual NAIT membership fee and/or the annual certification fee within 60 days of the date due will result in suspension of certification. Upon payment of all fees that are owed, the certification will be reinstated as long as the certified member is in compliance with all other relevant policies. As certification status must be continuous, NAIT reserves the right to treat a request for reinstatement of a certification as a new application. This is most common when a certification has been lapsed for three years or more and database and hard copy records of the certification are no longer available; in such cases, NAIT may require the holder of the lapsed certificate to provide documentary evidence of their prior NAIT Certification.

NAIT Certification Examination

Policy

The Board of Certification shall design and administer certification examinations for individuals who do not meet the prerequisite criteria for certification (i.e., graduate of or faculty member in a NAIT-accredited Industrial Technology program). The examinations shall be administered at least once each year at the NAIT Annual Convention and at other times as determined by the Board of Certification. The areas covered by the examinations and the minimum acceptable scores shall also be determined by the Board of Certification.

Examination Information

The NAIT Certification Examination is currently available for use for individual certification and as a program assessment examination. The exam is a closed 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.

Examination Sessions

Individuals must pay an examination fee of $20 to sit for the exam. The NAIT Certification Examination will be offered annually at the NAIT Convention, generally on the Saturday that is the final day of the convention. The examination fee must be paid prior to taking the exam. Individuals interested in taking the exam on an individual basis should contact NAIT to make arrangements; with the assistance of the individual, NAIT will assist in arranging a site and an exam proctor. If the individual passes and wants to become certified, they will be responsible for submitting an application and paying the appropriate NAIT membership fee and certification documentation fee.

Certification after Examination

Examinees who have passed the NAIT Certification Examination and who apply for NAIT Certification will be certified by NAIT upon receipt of their application and payment of all applicable fees. Examination results are usually available from the NAIT Office within 45 days of the date examination score sheets have been submitted to NAIT for scoring. Applicants must be NAIT members or join NAIT 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 NAIT 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. Individual exam scores are not released to the Program or Department unless the examinee signed the confidentiality waiver at the time of taking the exam. Programs and Departments using the examination as an exit examination usually obtain confidentiality waivers from the examinees so that their individual scores may be released. For more information about the NAIT Certification Examination or to obtain scores and determine your NAIT Membership status before applying for certification, contact NAIT by phone at (734) 677-0720 or by email at *nait@nait.org*.

Certificates

Certificates appropriate for framing are issued for one-year periods upon initial certification and upon annual renewal. Additional file copies of the certificate are available upon request for employers.

Examination Study Guide

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 NAIT 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?

Remember the four Ps of marketing

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

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 J B. 892 J C. 882 J D. 113.5 J

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. Gantt 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 Gantt 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 right 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 <u>not</u> correct with respect to the total area under the curve associated with ± 1σ , ± 2σ , and ± 3σ ?

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 <u>not</u> 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, vibration, and part positioning.
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. both 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 establish 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 variability associated with repeatability is large compared to reproducability, 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 potential root causes
E. only (a) and (c) are potential root causes

10. If variability associated with 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 potential root causes
E. only (a) and (c) potential root causes

References

- 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.
- *ISO 900-2000 Standards* (or comparable reference material about these standards)

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 solid vaporizes 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 Gantt 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/CPM B. Gantt C. JIT D. 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

References

- 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 NAIT Exam

- **Rest well the night before the exam.**
- **Don't panic! You already know the topics.**
- **Pace yourself. You have 180 minutes to complete 160 questions.**
- **Don't spend too much time in one question because all questions are worth the same.**
- **Answer all questions! Questions left blank will be marked wrong.**
- **Maintain a positive attitude. The exam is also a learning experience.**

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. a 5. a 6. c 7. b 8. d 9. c 10. b