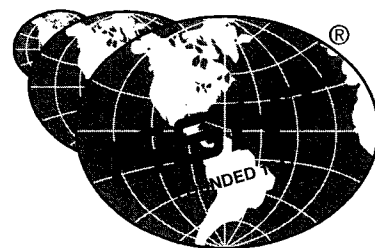


Questions and Answers

Levels I, II, and III

Visual and Optical Testing Method

*Supplement to
Recommended Practice
No. SNT-TC-1A
Book I*



pg 1-38

The American Society
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Compiled by the Visual Committee of the Personnel Qualification Division, Education & Qualification Council of The American Society for Nondestructive Testing, Inc.

This publication contains suggested questions and answers in the visual and optical testing method for use in conjunction with *Recommended Practice No. SNT-TC-1A*, available from ASNT.

Published by
The American Society for Nondestructive Testing, Inc.
1711 Arlingate Lane
PO Box 28518
Columbus, OH 43228-0518

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ISBN: 1-57117-072-3

Printed in the United States of America

first printing 02/99

second printing with revisions 10/02

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Recommended Training References

Visual and Optical Testing

The following references were used in formulating the questions contained in this book.

- A.* *ASM Handbook*, ninth edition, Volume 17, *Nondestructive Evaluation and Quality Control*, Metals Park, OH: ASM International, 1989.
- B. *Hobart Institute of Welding Technology Welding Guide*, Troy, OH, Hobart Institute of Welding Technology, 1995.
- C.* *Nondestructive Testing Handbook*, first edition, Robert C. McMaster, ed. Columbus, OH, The American Society for Nondestructive Testing, Inc., 1959.
- D. *Visual Examination Technology: Competency Area 101 (Level I) Practical/Specific*, Charlotte, NC, EPRI NDE Center, December, 1996.
- E.* *Nondestructive Testing Handbook*, second edition: Volume 8, *Visual and Optical Testing*, Michael Allgaier, Stanley Ness, technical eds., Paul McIntire and Patrick O. Moore, eds., Columbus, OH, The American Society for Nondestructive Testing, Inc., 1993.
- F. *Visual Examination Technology: Competency Area 102 (Level II) General*, Charlotte, NC, EPRI NDE Center, December, 1996.
- G. *Welding Handbook: Welding Technology*, Volume 1, eighth edition, Miami, FL, American Welding Society, 1987.

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Each question found in this book contains bold letter(s) and page number(s) immediately following the answers. For example,

6. A discontinuity associated with metal overflow during forging is called a:
- a.seam.
 - b.flake.
 - c.lap.
 - d.lamination.

A.493

In this example, the letter “A” refers to Reference A in the list provided above and “493” is the specific page range in Reference A where the answer to the question can be found. Always select the “most correct” answer.

Reference Usage List

Reference A: Total = 8

Level I (4)

Level II (4)

Level III (0)

Reference B: Total = 2

Level I (0)

Level II (2)

Level III (0)

Reference C: Total = 7

Level I (4)

Level II (3)

Level III (0)

Reference D: Total = 40

Level I (29)

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Level III (0)

Reference E: Total = 168

Level I (39)

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Level III (85)

Reference F: Total = 32

Level I (7)

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Reference G: Total = 27

Level I (5)

Level II (22)

Level III (0)

Level I Questions

Visual and Optical Testing Method

- | | |
|---|---|
| <p>1. Steel mill products may have:</p> <ul style="list-style-type: none"> a. stress cracks. b. die burns. c. arc drags. d. laminations. <p style="text-align: right;">A.549</p> | <p>6. A jagged, nonintegrally bonded piece of metal that leaves a depression in another metal after it is removed, is called a:</p> <ul style="list-style-type: none"> a. seam. b. blister. c. scab. d. gouge. <p style="text-align: right;">A.549 and 568</p> |
| <p>2. A high-intensity source of light may cause an inspection problem because:</p> <ul style="list-style-type: none"> a. it produces excessive glare. b. it produces considerable heat. c. it has a short bulb life. d. the lamp head cannot be adjusted. <p style="text-align: right;">E.54-55</p> | <p>7. The physical characteristics of color are:</p> <ul style="list-style-type: none"> a. hue, purity, and brightness. b. wavelength, spectrum, and contrast. c. acuity, perception, and distance. d. none of the above. <p style="text-align: right;">C.10-2</p> |
| <p>3. A common inspection instrument that is used to visually inspect internal bore surfaces is a:</p> <ul style="list-style-type: none"> a. magnifying glass. b. borescope. c. phototube. d. microscope. <p style="text-align: right;">C.11-12</p> | <p>8. When scale is partially rolled into the surface of a steel plate it is called:</p> <ul style="list-style-type: none"> a. scabs. b. rolled-in-scale. c. pits. d. tears. <p style="text-align: right;">E.226</p> |
| <p>4. Glare can be reduced on an inspection surface by using:</p> <ul style="list-style-type: none"> a. visible light. b. spectral light. c. screens. d. polarized light. <p style="text-align: right;">C.10-3</p> | <p>9. A valve that provides linear motion during operation is called:</p> <ul style="list-style-type: none"> a. a gate valve. b. a ball valve. c. a butterfly valve. d. all of the above. <p style="text-align: right;">D.3PS:4/20</p> |
| <p>5. A discontinuity associated with metal overflow during forging is called a:</p> <ul style="list-style-type: none"> a. seam. b. flake. c. lap. d. lamination. <p style="text-align: right;">A.493</p> | <p>10. An attachment to a component that is welded, cast, or forged is called:</p> <ul style="list-style-type: none"> a. a nonintegral attachment. b. an integral attachment. c. a restraint. d. a clamp. <p style="text-align: right;">D.5PS:5/27</p> |

11. Devices that restrict the movement of hanger springs and prevent damage during installation are called:
- clips.
 - travel stops.
 - shims.
 - grout.
- D.6PS:16/19**
12. The combined static and friction head (vertical difference in elevation) is called:
- pump head.
 - total head.
 - brake horse power.
 - maximum head.
- D.4PS:10/12**
13. Wear due to erosion/corrosion on a valve is typically found in:
- the valve body.
 - the valve seating area.
 - the valve disk.
 - all of the above.
- D.3PS**
14. Which of the following is a type of component support?
- Plate and shell.
 - Linear.
 - Component support standards.
 - All of the above.
- D.5PS:8/27**
15. A valve is a mechanical device that:
- moves fluids or gases.
 - controls flow.
 - is rarely used in a nuclear power plant.
 - is always welded into a system.
- D.3PS:3/20**
16. Devices that limit or allow no motion in one or more directions are called:
- hangers.
 - supports.
 - restraints.
 - clamps.
- D.5PS:8/27**
17. Bolting failures typically occur at:
- the thread root area.
 - the head to shank area.
 - nicks or gouges.
 - all of the above.
- D.2PS**
18. The two major categories of pumps are:
- static and friction head.
 - dynamic and displacement.
 - single stage and multi-stage.
 - turbine and condensate.
- D.4PS:7/12**
19. A mechanical device that raises, transfers, or pressurizes fluids is:
- a valve.
 - a snubber.
 - an electric motor.
 - a pump.
- D.4PS:3/12**
20. A discontinuity that is not associated with welds is:
- undercut.
 - overlap.
 - laminations.
 - underfill.
- D.1PS:7/10**
21. During an examination of a groove weld, which of the following dimensions is normally measured?
- The root opening.
 - Weld reinforcement.
 - Base material thickness.
 - All of the above.
- D.1PS:6/10**
22. A welding symbol over the reference line refers to:
- the area on the arrow side.
 - the area near the end of the arrow.
 - the area opposite of the arrow.
 - a field weld.
- D.1PS:4/10**
23. A valve that uses linear motion, which is used to regulate flow, is called a:
- butterfly valve.
 - globe valve.
 - swing check valve.
 - ball valve.
- D.3PS:4/20**
24. A device that restricts movement during an abnormal or seismic event is called a:
- restraint.
 - snubber.
 - hanger.
 - support.
- D.5PS:8/27**

25. A centrifugal pump is classified as:
- a dynamic pump.
 - a reciprocating pump.
 - a displacement pump.
 - all of the above.
- D.4PS:7/12**
26. The device in a pump that moves or compresses fluid is called:
- a pump casing.
 - a packing gland.
 - a disk.
 - an impeller.
- D.4PS:8/12**
27. The closure element of a diaphragm valve is called:
- the weir.
 - a flexible elastomer.
 - the bonnet.
 - the disk.
- D.3PS:15/20**
28. Component supports are divided into groups. Which of the following is not considered to be a group of component supports?
- Hangers.
 - Supports.
 - Integral attachments.
 - Snubbers.
- D.5PS:5/27**
29. During a visual examination, a welding discontinuity that could not be detected would be:
- undercut.
 - underfill.
 - cracks.
 - side wall lack of fusion.
- D.1PS:7/10**
30. For component supports, the principal movement axis is:
- the horizontal axis.
 - the vertical axis.
 - the longitudinal axis.
 - all of the above.
- D.5PS:4/27**
31. A device that is typically installed vertically with the support member in tension is called a:
- support.
 - restraint.
 - snubber.
 - hanger.
- D.5PS:6/27**
32. A valve subassembly that is considered to be part of the pressure vessel assembly is called the:
- drive.
 - stem.
 - body.
 - disk.
- D.3PS:6/20**
33. A device that raises, transfers, or pressurizes fluids by pressing, forcing, or throwing the fluid through apertures or pipes is called a:
- valve.
 - pump.
 - snubber.
 - bolt.
- D.4PS:3/12**
34. Valves that use rotational motion to make a seal are called:
- ball valves.
 - gate valves.
 - globe valves.
 - all of the above.
- D.3PS:16/20**
35. Service-induced discontinuities can be the result of:
- vibration.
 - stress risers.
 - corrosion.
 - all of the above.
- D.2PS:9/15**
36. A device that is typically installed vertically with the support member in compression is called a:
- support.
 - hanger.
 - snubber.
 - spring can.
- D.5PS:7/27**
37. Typical reportable discontinuities for component supports include:
- drawing anomalies.
 - workmanship.
 - operational.
 - all of the above.
- D.8PS:12/21**

38. A physical attribute that cannot be visually inspected during welding is:
- a. the welding process.
 - b. the acceptability of the weld, with regard to its appearance.
 - c. alignment and fit-up.
 - d. joint preparation.
- A.469**
39. An inherent discontinuity in forgings that cannot be detected using visual testing is:
- a. bursts.
 - b. cracks.
 - c. seams.
 - d. laps.
- E.274-275; F.4G:5/11**
40. Every inspector is affected differently by perception, fatigue, and attitude. In visual inspection, these factors are classified as:
- a. physiological factors.
 - b. uncontrolled factors.
 - c. production factors.
 - d. classic distress factors.
- E.57-62**
41. To examine areas around bends inside a pipe section, the visual examiner uses a:
- a. telescope.
 - b. fiberoptic borescope.
 - c. borescope.
 - d. microscope.
- F.3G:8/19**
42. On a thickness gage, twenty thousandths of an inch is represented by:
- a. 0.2
 - b. 0.02
 - c. 0.002
 - d. 0.0002
43. In a casting, a visual examiner could expect to find:
- a. laminations.
 - b. stringers.
 - c. bursts.
 - d. hot tears.
- E.276**
44. Porosity is:
- a. material used during the welding process.
 - b. gas entrapped below the surface of a material.
 - c. gas entrapped below or at the surface of a material.
 - d. foreign crystallized material entrapped below the surface of a material.
- F.4G:10/11**
45. A visual examiner could expect to find a crater crack:
- a. at the beginning of the weld.
 - b. somewhere between the beginning and the end of the weld.
 - c. at either the beginning or the end of the weld.
 - d. at the end of the weld.
- G.368**
46. A discontinuity with a small star-shaped pattern where a weld starts or stops is usually an indication of:
- a. surface porosity.
 - b. undercut.
 - c. a crater crack.
 - d. slag.
- F.6G:14/18**
47. During the visual examination of a full penetration double bevel weld joint, visual examination cannot locate:
- a. undercut.
 - b. underfill.
 - c. crater cracks.
 - d. insufficient penetration.
- F.6G**
48. The initiation of a fatigue crack could occur at:
- a. weld toes.
 - b. notches.
 - c. section changes.
 - d. thread roots.
 - e. all of the above.
- F.7G**
49. A welding discontinuity typically referred to as distortion is caused by:
- a. the use of a tungsten electrode in the GTAW welding process.
 - b. the uncontrolled heating and cooling of the weld metal.
 - c. exposure to radiation and other NDE techniques.
 - d. the excess amount of porosity in the weld metal.
- G.241 and 261**

50. When measuring plate thickness, the most accurate reading is given by a:
- steel ruler.
 - steel tape.
 - mechanical gage (micrometer).
 - feeler gage.
- F.3G:17/19**
51. When choosing a magnifier, major consideration should be given to:
- power or magnification.
 - working distance.
 - field of view.
 - all of the above.
- C.11-1**
52. Visual inspection is the most extensively used inspection method on weldments because:
- it is simple and relatively inexpensive.
 - it does not normally require special equipment.
 - it gives important information about conformity to specifications.
 - all of the above.
- G.469**
53. In order to render valid results, visual examination must include a:
- trained operator.
 - procedure for conducting the tests.
 - standard for interpreting and reporting the results.
 - all of the above.
- G.469**
54. The maximum diameter of a borescope that can be used for the test is determined by:
- object depth.
 - entry port size.
 - objective distance.
 - direction of view.
- E.74-75**
55. A device that provides the means for comparing a test surface to a standard surface finish is called a:
- measuring magnifier.
 - surface calibrator.
 - surface comparator.
 - surface magnifier.
- E.76-81**
56. An instrument that can be equipped with forward oblique, right angle, or retrospective visual systems is called:
- an angulated borescope.
 - a microscope.
 - a panoramic borescope.
 - a stereoscope.
- E.82-91**
57. The use of chemical solutions to attack material surfaces in order to improve the visibility of discontinuities for visual inspection at normal and low power magnification is called:
- microetching.
 - macroetching.
 - replication.
 - vibroetching.
- E.118-123**
58. A “charged coupled device chip” is used with:
- a fiberoptic borescope.
 - an angulated borescope.
 - a video imaging device.
 - a profile gage.
- E.128-130**
59. Cracks, suckback, undercut, and overlap are discontinuities found in:
- castings.
 - forgings.
 - extrusions.
 - weldments.
- E.128-130**
60. In welding, weld metal protrusion beyond the fusion line at the weld toe is called:
- overlap.
 - undercut.
 - reinforcement.
 - incomplete fusion.
- E.163-175**
61. In accordance with *SNT-TC-1A*, certification of visual NDT personnel is the responsibility of:
- ASNT.
 - the employer.
 - the NDT Level III.
 - an outside agency.
- E.181-187**

62. The ability of metal to return to its original size and shape after being loaded and unloaded is called:
- a. plastic deformation.
 - b. elastic deformation.
 - c. tensile strength.
 - d. stress-strain deformation.
- E.194**
63. Cracking under the combined action of corrosion and tensile stress is referred to as:
- a. fatigue cracking.
 - b. creep cracking.
 - c. stress corrosion cracking.
 - d. tensile stress cracking.
- E.209**
64. A groove formed at the toe or root of a weld when the base metal is melted away and left unfilled by weld metal is referred to as:
- a. underfill.
 - b. cold lap.
 - c. crack.
 - d. undercut.
- E.260**
65. Excessive clearance in pumps will result in:
- a. accelerated corrosion.
 - b. increased cavitation.
 - c. reduction in pump efficiency.
 - d. increased impeller wear.
- E.269**
66. A mechanical device that controls flow into, inside of, or out of a piping system is called a:
- a. blind flange.
 - b. pump.
 - c. valve.
 - d. flow controller.
- E.270**
67. Hot tears, inclusions, porosity, and cold shuts are:
- a. forging discontinuities.
 - b. casting discontinuities.
 - c. welding discontinuities.
 - d. processing discontinuities.
- E.276**
68. The distance a magnifier can be moved toward or away from a subject while keeping it in good focus is called:
- a. depth of field.
 - b. field of view.
 - c. focal spot.
 - d. magnification distance.
- E.292-300**
69. Radiant energy that excites the retina and produces a visual sensation is called:
- a. vision.
 - b. light.
 - c. spectrum.
 - d. color.
- E.30**
70. The visible portion of the electromagnetic spectrum extends from:
- a. 100-400 nm.
 - b. 210-370 nm.
 - c. 380-770 nm.
 - d. 570-891 nm.
- E.30**
71. Photometers used to measure the reflectance of materials or surfaces in specialized ways are called:
- a. radiometers.
 - b. glossmeters.
 - c. spectrophotometer.
 - d. reflectometers.
- E.30**
72. The portion of the eye that regulates the quantity of light admitted is called the:
- a. iris.
 - b. pupil.
 - c. retina.
 - d. cones.
- E.60**
73. In general, the total magnification of borescopes is in the range of:
- a. 3×-4×.
 - b. 2×-8×.
 - c. 4×-10×.
 - d. 5×-15×.
- E.88**
74. A method used for copying the topography of a surface that cannot be moved or one that would be damaged in transferal is called:
- a. NDT.
 - b. in-situ NDT.
 - c. replication.
 - d. surface metallography.
- E.108**