

Materials & Processed

1. ***the difference between die casting and permanent mold casting is that:***

- a) lighter alloys such as aluminum cannot be cast in permanent molds
- b) the permanent mold process is limited to thickness over 0.015"
- c) **the mold in the die cast process is destroyed after use**
- d) pressure is applied to the liquid metal in the die-cast process

2. ***Which of the processes listed below is used the most frequently to bond honeycomb cores to the outer sheets?***

- a) **Adhesive bonding**
- b) Diffusion bonding
- c) Brazing
- d) Friction welding

3. ***Corrosion attacks metals by***

- a) Indirect chemical action
- b) **Electro chemical reaction**
- c) Galvanic action
- d) Oxygen content

4. ***In the making of seamless or electric resistance welded (ERW) pipe or tubing. The most common discontinuities are oriented***

- a) Transverse to the pipe or tube axis
- b) Parallel to the pipe or tube axis**
- c) Parallel to the maximum shear stress plane
- d) Perpendicular to the maximum shear stress plane

5. ***Which of the following is true regarding the investment or lost wax casting process?***

- a) Tolerances are typically plus or minus 1/16"
- b) Per-entrant angles cannot be produced during casting and must be machined
- c) Large castings up to 8 feet in diameter are easily produced
- d) In many cases tolerances are sufficient without further machining**

6. ***Carbon steel is:***

- a) Non-ferritic, cubic faced
- b) An alloy**
- c) Non-ferritic, martensitic.
- d) Pearlitic

7. *When inspecting complex solder joint, the normal NDT method used is:*

- a) Eddy Current
- b) Acoustic Emission
- c) VT
- d) **UT**

8. *Electrical discharge machining is useful in NDT testing because it can produce:*

- a) Fine surface finishes
- b) **Small holes and notches**
- c) Sharp reductions in cross sectional area
- d) Natural flaws for precision calibration blocks

9. *Which of the following alloy would have a negative effect on the corrosion resistance of steel:*

- a) Silicon
- b) Nickel
- c) Molybdenum
- d) **Sulfur**

10. *In the international system of units, the distinction between upper- and lower-case letter should be observed. For example, the meanings of the prefix m (Milli) and M (Mega) differ by:*

- a) 2 orders of magnitude
- b) 6 orders of magnitude
- c) **9 orders of magnitude**
- d) 12 orders of magnitude

11. *Which of the following materials has the highest electrical conductivity?*

- a) Aluminum (Pure)
- b) Lead (Pure)
- c) Copper (Pure)
- d) **Silver (Pure)**

12. *A process that joins two members together by using capillary action to flow the filler material is called:*

- a) **Soldering if the temperature does not exceed 800 F**
- b) Brazing if the temperature does not exceed 800 F
- c) Resistance welding
- d) Oxyfuel gas welding

- 13- ***Which of the following properties of aluminum alloys is most affected by the presence of geometric stress risers***
- a) Ductility
 - b) Corrosion resistance
 - c) Conductivity**
 - d) Endurance limits
- 14- ***The highest quality steel is made in which of the following types of furnaces***
- a) **Electric arc furnace**
 - b) Basic oxygen furnace
 - c) Blast furnace
 - d) Reduction melt furnace
- 15- ***Coating one metal with another metal for the purpose of protecting against corrosion attacks is known as***
- a) Anodizing
 - b) Press fitting
 - c) Cladding**
 - d) Austenization
- 16- ***The electrical discharge machining EDM process is used in the NDT field mainly to produce***
- a) Specific size calibration blocks**
 - b) Specific size and shape artificial flaws
 - c) ASTM distance amplitude blocks
 - d) Polarized ceramic high frequency crystals
- 17- ***Trough what mechanism does heat treating, when property performed, remove work hardened properties:***
- a) Local remelting
 - b) Recrystallization**
 - c) Local plastic flow
 - d) Diffusion of denser element to the grain boundaries

18. **Soldering is a process using a filler metal with a melting point**
- a) Below 450 Degrees C (840 Degrees F)
 - b) Above 450 Degrees C (840 Degrees F)
 - c) Between 450 Degrees C (840 Degrees F) and 840 Degrees C (1544 Degrees F)
 - d) Of 100 Degrees C (212 Degrees F)
19. **All of the following materials can be joined to carbon steel by welding or brazing except**
- a) Nickel Alloys
 - b) Aluminum
 - c) Copper
 - d) Cast iron
20. **An ultrasonic technique that uses one transducer to send signal and a second transducer to receive signals from the same side of the object is called:**
- a) Through transmission
 - b) Resonance
 - c) Pitch-Catch
 - d) Double pulse echo
21. **In the forging process, excess metal that must be removed by secondary operation is called:**
- a) Dross
 - b) Flakes
 - c) Flash
 - d) Busts
22. **A surface condition produced during casting of an ingot, caused by hot molten splashing on the mold surface is called a:**
- a) Bloom
 - b) Piping
 - c) Blowhole
 - d) Scab
23. **A technical specialty that predicts material behavior based upon the size and location of discontinuities, material properties and stress distribution is known as:**
- a) Fracture control
 - b) Fatigue and fracture control
 - c) Fracture mechanics
 - d) Failure prediction

ASNT TC-1A & CP 189

1- *The recommended training course outlines for NDT Level I, II and may be found in:*

- a) **ANSI/ASNT CP-105**
- b) ANSI/ASNT CP-189
- c) ASME Section V
- d) ASNT SNT-TC-1A

2- *In accordance with CP-189, technicians who attend a 40 Hour NDT training course will receive credit for the training if they:*

- a) Sign an attendance sheet
- b) Receive a certificate signed by the instructor
- c) **Pass a final exam**
- d) Record dates, times, course outline and instructor

3- *In accordance with SNT-TC-1A, qualification is defined as indicating that a person has:*

- a) **Demonstrated the skill and knowledge and documented training and experience to properly perform a specific job**
- b) Passed the general, specific, and practical examination in a method with minimum scores of 80% in each examination
- c) Complete the classroom training for the basic examination, the specific examination for the employer's product line, the applicable method examination
- d) Complete all training and examination for classification to job title

4- *Per CP-189, when an individual with an ASNT Level III certificate terminates their employment to accept a position with another company their employer issued certification:*

- a) **Remains valid**
- b) Is revoked by ASNT
- c) May be reissued by their new employer
- d) Expires

5- *for an individual with a Bachelor of science degree. What is the minimum number of months experience as a Level II are needed to qualify for Level III certification?*

- a) **12 months**
- b) 18 months
- c) 24 months
- d) 48 months

- 6- *In accordance with SNT-TC-1A, what minimum level of personnel may be qualified to properly perform specific evaluations for acceptance or rejection determination according to written instruction:*
- a) trainee
 - b) Level I
 - c) **Level II**
 - d) Level III
- 7- *There is a total of Level of qualification per CP-189:*
- a) 3
 - b) 4
 - c) 5
 - d) **6**
- 8- *The qualification level in CP-189 which does not exist SNT-TC-1A:*
- a) understudy
 - b) **NDT Instructor**
 - c) NDT Manager
 - d) Professional Level III
- 9- *In accordance with SNT-TC-1A an individual may be recertified to the former level of certification after termination of employment and upon employment with a new employer without additional training, provided the individual:*
- a) Holds a valid ASNT Level III certificate
 - b) **Is being recertified within Six Months of termination**
 - c) Has been certified as at least a level II or III by the previous employer
 - d) Has been certified as a Level III by their previous employer
- 10- *When the ASNT Level III certificate has expired and an CP-189 certificate had been issued based on this, the employer-based certificate:*
- a) **Expires**
 - b) Is suspended
 - c) Is revoked
 - d) Is maintained
- 11- *Per SNT-TC-1A, time of flight diffraction and phased array certification requires:*
- a) **160 hours of additional training in each technique**
 - b) Completion of Level I and **II** ultrasonic testing training as per requisites
 - c) 1200 hours of experience in the applicable technique
 - d) 2000 hours of total NDT experience
- 12- *According to ASNT-TC-1A, NDT personnel may be re-examined and have their certificates or revoked at what interval:*

- a) At the discretion of the employer
- b) Annually at anniversary of the issuance of their certification
- c) Upon the anniversary of their employment
- d) Every three years

13- **A certified RT Level I worked 20% of each month performing RT and the remaining 80% in other NDT methods per SNT-TC-1A, what experience is required to achieve RT Level II Certification:**

- a) The minimum hours for RT Level II
- b) The total Hours in NDT
- c) Both the minimum hours for RT Level II and the total hours in NDT
- d) The sum of the minimum hours for RT Level II and total hours in NDT

14- **In accordance with CP-189, an individual's certification in a method shall be suspended by the employer if the individual has not performed the duties in that method during a consecutive twelve (12) month period. In SNT-TC-1A, suspension is:**

- a) Defined the same as in cp-189
- b) Defined as not having performed the duties during a period of more than six (6) consecutive months
- c) Defined the same as revocation is defined in CP-189
- d) To be addressed in the employer's written practice

15- **In evaluating qualifications in accordance with SNT-TC-1A, you find that an individual has limited familiarity with the method in which certification is sought. What action should you take?**

- a) Issue a limited certification
- b) Require additional training
- c) Require additional experience
- d) Follow employer's written practice

16- **In accordance with SNT-TC-1A, a college graduate with a 4-year degree in business administration would need how many months of NDT Level II experience to become an NDT Level III?**

- a) Same as a four years engineering graduate
- b) Same as a high school graduate
- c) Same as two years of college study in science
- d) Same as 4 years BS degree in biology

17- **The topical outline found in CP-105**

- a) Are specifically written for Level I/II combined courses
- b) Are progressive with Level II building on Level I
- c) Are stand alone and may not be added to
- d) Must be followed exactly

18- **CP-189 contains the definition of an NDT instructor according to ASNT-TC-1A the NDT instructor is:**

- a) Defined but does not have to be qualified and designated as in CP-189
- b) Defined but must be qualified and designated as in CP-189
- c) **Not defined**
- d) Not defined and cannot be used in the employer's written practice

19- An outside agency Level III has developed an employer's written practice and written examination. the company's quality assurance manager administered one of these exams to a Level II candidate. The company's NDT foreman graded the exam using the answer key prepared by Level III consultant. According to SNT-TC-1A, which person cannot certify the technician?

- a) **Outside agency Level III**
- b) QA Manager
- c) Company president
- d) NDT Foreman

20- In accordance with recommendation of SNT-TC-1A, it is desirable that the NDT Level III have general familiarity with:

- a) **Other appropriate NDT methods**
- b) All methods listed in SNT-TC-1A
- c) Fracture mechanics
- d) NDT Method required in ISO 9712

21- In accordance with CP-189, a candidate must be able to read with corrected or natural vision in at least one eye the:

- a) **Jaeger #1 at not less than 12"**
- b) Jaeger #2 at not less than 12"
- c) Jaeger #1 at 10"-15"
- d) Jaeger #3 at 12"-24"

22- In order to assure that personnel being trained for a specific method are understanding the information presented, the best way an instructor could verify this is:

- a) Give a final exam at the end of the last training session
- b) **The training program should include sufficient examination to ensure understanding**
- c) Assume the candidates are understanding as no one ask question
- d) Make the written exam an open book exam

23- In accordance with CP-189, when a candidate for Level I or Level II candidate is working in two method of NDT, what minimum experience requirements must be met:

- a) **The candidate must meet the required minimum hours in each specified method**
- b) The candidate must meet the required total hour in NDT for each method
- c) The candidate must meet either the required minimum hours in each method or total hour in NDT for both method
- d) The candidate must meet the required minimum hours in each method and the total hours in NDT

24- SNT-TC-1A recommends that the NDT Level III candidate should meet which of the following minimum requirements:

- a) **Graduated from a four-year engineering or science curriculum from a college or university plus**

one-year experience in NDT comparable to that of an NDT Level II

- b) Two years' experience in NDT comparable to that of an NDT Level II if a high school graduate
- c) Six years' experience NDT if the candidate did not graduate from school
- d) Graduated from Two year vocational or junior college with the required of training hours listed for both NDT Level I and NDT experience comparable to that of an NDT Level II

25- ***CP-189 requires that the NDT instructor***

- a) Have 4 or more years of experience as an NDT Level II
- b) Have 10 more years of experience as Level II
- c) Have academic credentials at least equivalent a B.S in Engineering or SNT-TC-1A Level III Certification
- d) Be designated by an NDT Level III Individual

Methods

- 1- ***Iridium 192 emits 600 mR/hr. per curie at 1 Meter, what is the radiation intensity at 100 Meter from a 10 Curie source of Iridium 192?***
 - a) 0.06 MR/Hr
 - b) 0.6 MR/Hr
 - c) 6 MR/Hr
 - d) 60 MR/Hr

- 2- ***Using X-rays, 1.0" aluminum is most likely radio graphically equivalent to approximately what thickness of steel:***
 - a) 5.5 "
 - b) 3.1 "
 - c) 1.1 "
 - d) 0.2 "

- 3- ***Which of the following is a normal film loading sequence for double loading a film cassette for radiography using Iridium 192?***
 - a) Film, screen, film, screen
 - b) Screen, film, screen, film
 - c) Screen, film, film, screen
 - d) Film, screen, screen, film

- 4- ***If the radiation intensity 25 feet from and Iridium 192 radiation source is 200 mR/hr, what intensity would it be at 150 feet from the source of radiation?***
 - a) 2 mR/hr
 - b) 5.55 mR/hr
 - c) 25 mR/hr
 - d) 33.33 mR/hr

- 5- ***A radiographic technician inspecting parts using gamma radiation below 12 MeV should take the following precautions after the parts radiographed:***
 - a) Place parts in lead lined storage room until the emitted radiation reaches an acceptable level
 - b) Use a Geiger-Mueller survey instrument to assure safe handling
 - c) Wait 10 mins before handling
 - d) None of the above steps are necessary

- 6- ***A common precaution used for avoiding static marks on radiographic film is to:***
 - a) Place lead screens on both sides of the film
 - b) Wear white gloves when handling the film
 - c) Avoid white light in the dark room
 - d) Slide film out of the box slowly

7. *A portable device which supplies a high intensity of longitudinally directed magnetic flux between poles is the:*
- a) AC. Prod and cable unit
 - b) Horizontal bench AC unit for head shots
 - c) Half wave unit with clamps for central conductor
 - d) Hand –held yoke
8. *Which MT Technique would provide the best sensitivity for detection of discontinuities laying below the surface:*
- a) Half-Wave direct current with dry particles
 - b) Alternating current with dry particles
 - c) Direct current with surge and dry particles
 - d) Direct current with dry particles
9. *The current required for circular magnetization of a carbon steel pipe is proportional to the:*
- a) Wall thickness
 - b) Pipe diameter
 - c) Mass per meter
 - d) Tube grade
10. *The best choice for detecting shrinkage cracks in a radius of magnesium casting with rough surface would be*
- a) Solvent removable visible dye PT
 - b) Post emulsifiable fluorescent PT
 - c) Water washable fluorescent PT
 - d) Solvent removable fluorescent PT
11. *As the viscosity of a liquid penetrant increases, capillary action:*
- a) Slow
 - b) Speed up
 - c) Remains constant
 - d) Disappears
12. *What is the proper environment for interpreting the result of fluorescent penetrant test?*
- a) White light in darkened area
 - b) Black light in a normally lighted area
 - c) Ultraviolet light in an adequately darkened area
 - d) High intensity ultraviolet light in normally lighted area
13. *Which penetrant testing technique allows the use of a pre-rinse operation to remove excess penetrant:*
- a) Water washable
 - b) Post emulsifiable using lipophilic materials
 - c) Solvent removable
 - d) Post emulsifiable using hydrophilic

14. *Which of the following contains a U-shaped frame supporting a hardened steel anvil?*

- a) Dial indicator
- b) Surface roughness comparator
- c) **Micrometer**
- d) Vernier caliper

15. *A fiber optic borescope relies on which of the following physical to work:*

- a) Light travels from one fiber through to an adjacent fiber
- b) **Light is reflected at clad interfaces and stays within one fiber**
- c) Images are inverted at each 90-degree bend in the fiber
- d) A virtual image is formed between the ocular end and the retina

16. *What inspection instrument should be used to measure a dimensional rather than an absolute dimension*

- a) Dial indicator
- b) **Surface roughness comparator**
- c) Micrometer
- d) Vernier caliper

17. *The velocity of sound in steel:*

- a) Is greater as the frequency increases
- b) Is lower than the velocity of sound in water
- c) **Changes if mode conversion occurs**
- d) Is dependent of reflection factor

18. *Which of the following is limitation of ultrasonic digital thickness gauges?*

- a) Cannot be used under field condition
- b) May not detect gradual thickness changes
- c) **May give erroneous readings on rough surfaces**
- d) Require a high level of skill to operate

19. *The resolution of an ultrasonic system refers to its ability to:*

- a) **Separate the front surface reflection and the reflection from a discontinuity just beneath the front surface**
- b) Differentiate between grain noise and electrical noise on the ultrasonic instrument baseline
- c) Detect a small discontinuity of less than one-half wavelength
- d) Compare the reflection from a small discontinuity with an artificial discontinuity in a reference standard

20. *A helium mass spectrometer leak detector is used:*

- a) Exclusively for leak location test techniques
- b) Only for leak testing in the vacuum mode
- c) For both leak location and leakage measurement techniques
- d) Only in conjunction with residual gas analyzer

21. *Success in electromagnetic testing depends on the proper use of:*

- a) The newest available equipment
- b) Level III examiners to perform test
- c) Reference standards
- d) Most recent editions of codes and standards

22. *Heat energy may be transferred from one point to another by convection or radiation.*

What drives the energy transfer in all cases?

- a) Pressure difference
- b) Emission force
- c) Energy wave length delta
- d) Temperature difference

23. *Acoustic emission testing makes use of the Kaiser effect. This phenomenon is best explained as:*

- a) Felicity integration during the final loading in an acoustic emission test
- b) A proportional increase in acoustic emission as load increase to yield
- c) Absence of acoustic emission until previously encountered load levels are exceeded
- d) Random noise generated due to high mechanical background noise