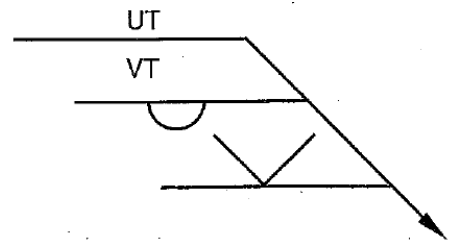


2022 Skills USA Nebraska High School Welding Competition  
Fundamentals Examination

1. What flame type has excessive fuel?
  - a. **reducing**
  - b. neutral
  - c. cutting
  - d. oxidizing
  - e. equalized
  
2. For the SMAW electrode designation E60X3 the “X” refers to:
  - a. the tensile strength of the weld deposit
  - b. **the position in which the electrode can be used**
  - c. the type of coating
  - d. the recommended type of current
  - e. flux chemistry
  
3. A welding process commonly used to join light gage stainless steel tubing for critical applications is:
  - a. SMAW
  - b. GMAW
  - c. **GTAW**
  - d. OFW
  - e. FCAW
  
4. Which of the following discontinuities are not found with GMAW?
  - a. incomplete fusion
  - b. porosity
  - c. **tungsten inclusions**
  - d. incomplete penetration
  - e. cracks
  
5. The first operation required by the symbol in the Figure is:
  - a. Ultrasonic inspection of the base metal
  - b. visual inspection of joint preparation
  - c. **welding a V-groove from the other-side of the joint**
  - d. welding a backing weld from the arrow-side of the joint
  - e. backgouging and back welding from the arrow-side of the joint
  
6. The surface of a member included in the groove of a weldment best describes:
  - a. root opening
  - b. groove angle
  - c. weld interface
  - d. **groove face**
  - e. none of the above



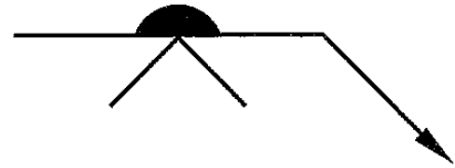
2022 Skills USA Nebraska High School Welding Competition  
Fundamentals Examination

7. The width of the cut during a cutting process is referred to as:

- a. root opening
- b. kerf
- c. bevel
- d. bevel angle
- e. chamfer

8. The welding symbol shown in the Figure depicts:

- a. a backing weld other-side followed by a V-groove weld arrow-side
- b. a V-groove weld arrow-side followed by a back weld other-side
- c. a V-groove weld arrow-side with melt-through
- d. a bevel groove weld made one-half the way around the diameter of a pipe
- e. a V-groove weld arrow-side with the root finished to a convex contour



9. The junction of the weld face with the exterior surface of the base metal is referred to as the:

- a. face
- b. root
- c. leg
- d. toe
- e. edge

10. The overhead fillet position is designated as:

- a. 5F
- b. 4F
- c. 3F
- d. 2F
- e. 1F

11. Which of the following discontinuities is not associated with GTAW?

- a. lack of fusion
- b. slag inclusions
- c. tungsten inclusions
- d. porosity
- e. undercut

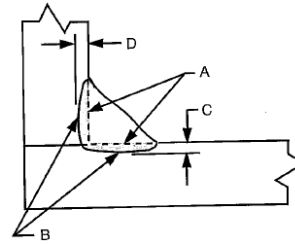
12. The welding process that requires a tubular electrode is:

- a. SMAW
- b. GMAW
- c. FCAW
- d. ESW

2022 Skills USA Nebraska High School Welding Competition  
Fundamentals Examination

13. The dimension “D” in the Figure is referred to as:

- a. fusion face
- b. fusion zone
- c. depth of fusion
- d. weld interface
- e. fusion line



14. A triangle shaped weld symbol represents what type of weld?

- a. bevel groove
- b. flare groove
- c. flange groove
- d. V-groove
- e. fillet weld

15. Devices that prevent the gases from mixing in the hoses are called what?

- a. back stoppers
- b. one-way valves
- c. needle valves
- d. gas valves
- e. reverse flow check valves

16. In SMAW, an increase in arc length results in:

- a. increased current; increased voltage
- b. decreased current; increased voltage
- c. increased heat input; decreased voltage
- d. decreased current; decreased voltage
- e. decreased current; increased heat input

17. A single-wire, submerged arc welding machine is operating at 32 volts, 600 amps, and is traveling at 8 inches per minute. Using the formula provided below, what is the heat input for this situation?

$$\text{Heat input} = \text{J/in} \quad \text{J/in} = \frac{\text{V} \times \text{A} \times 60}{\text{Travel Speed (ipm)}}$$

- a. 2400 J/in
- b. 1 152 000 J/in
- c.  $1.44 \times 10^5$  J/in
- d. 14 400 J/in

18. Which of the following is considered to be an acceptable way to provide backing for a V – groove weld in a carbon steel butt joint?

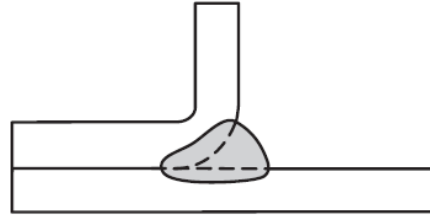
- a. copper backing bar
- b. ceramic backing

2022 Skills USA Nebraska High School Welding Competition  
Fundamentals Examination

- c. flux backing
- d. backing weld
- e. all of the above

19. What weld type is shown in the Figure?

- a. single-flare-bevel-groove weld
- b. single-bevel-groove weld
- c. double-v-groove-weld
- d. double-flare-bevel-groove weld
- e. none of the above



20. What is the maximum safe working pressure when using acetylene?

- a. 20 lbs
- b. 10 lbs
- c. 15 lbs
- d. 30 lbs
- e. 45 lbs

21. The pipe welding test position in which the axis of the pipe is horizontal and the pipe is rotated so that welding takes place at or near the top is designated as:

- a. 2G
- b. 2F
- c. 1G
- d. 3G
- e. 6GR

22. Why is it important to know the position the joint is in before selecting a filler metal?

- a. filler metals only work in one position
- b. it is not important to understand the positions
- c. some filler metals have position limitations
- d. the weld will be weak if done in the flat position
- e. all of the above


23. The five basic joint types are:

- a. groove, fillet, plug, slot, and spot
- b. butt, corner, edge, lap, and T-joints
- c. groove, fillet, plug, slot, and ring
- d. butt, corner, seam, lap, and T-joints
- e. none of the above

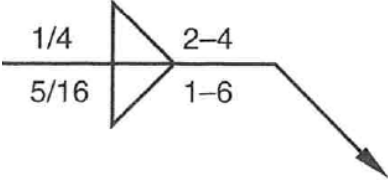
24. When a weld is made in the groove between the workpieces, it is referred to as a:

- a. butt weld
- b. joint

2022 Skills USA Nebraska High School Welding Competition  
Fundamentals Examination

- c. fillet weld
  - d. groove weld
  - e. none of the above
25. Groove, fillet, plug, slot, spot and projection, stud, seam, back or backing, surfacing and edge are all considered:
- a. weld types
  - b. joint types
  - c. fillet welds
  - d. groove welds
  - e. none of the above
26. What weld type is shown in the Figure?
- a. single-bevel-groove weld
  - b. double-bevel-groove weld
  - c. double-v-groove weld
  - d. double-flare-bevel-groove weld
  - e. none of the above
- 
27. Low-hydrogen electrodes can be properly identified by which digit of a classification number?
- a. first digit
  - b. second digit
  - c. first and second together
  - d. second to last digit
  - e. last digit
28. Information that appears to the left of the weld symbol refers to:
- a. the weld length
  - b. the weld size
  - c. the electrode size
  - d. the number of passes required
  - e. none of the above
29. The flux covering on an SMAW electrode provides which of the following?
- a. gas shielding for the molten pool
  - b. arc stabilization
  - c. alloying
  - d. deoxidation
  - e. all of the above
30. Fuel gas hoses are what color?
- a. blue
  - b. green
  - c. red

2022 Skills USA Nebraska High School Welding Competition  
Fundamentals Examination

- d. red and green striped  
e. yellow
31. For the SMAW electrode designation E7018 the “70” refers to:
- the tensile strength of the weld deposit
  - the position in which the electrode can be used
  - the type of coating
  - the recommended type of current
  - flux chemistry
32. The size of the arrow side weld in the Figure is:
- 1/4 in
  - 5/16 in
  - 1 in
  - 2 in
  - 1 in deposited every 6 in
- 
33. The length of the other side weld in the Figure above is:
- 1 in
  - 6 in
  - 2 in
  - 4 in
  - Continuous down the length of the joint
34. The pitch of the other side weld in the Figure above is:
- 1/4 in
  - 4 in
  - 5/16 in
  - 1 in
  - 6 in
35. If the contour symbol is used but the finishing method is not specified on the welding symbol:
- it is the inspector’s choice
  - it is the fabricator’s choice
  - the desired contour must be as-welded
  - it should be found in the code specified
  - it is the welder’s choice
36. Which of the welding techniques below describes a welding process in which the filler metal feeding is machine operated while the joint travel speed and guidance are the responsibility of the welder?
- semiautomatic
  - manual
  - machine

2022 Skills USA Nebraska High School Welding Competition  
Fundamentals Examination

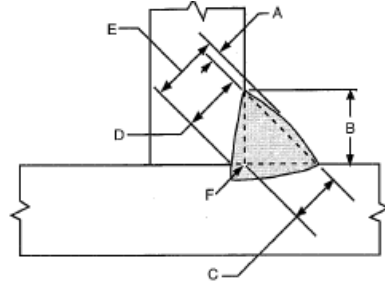
- d. automatic
  - e. mechanized
37. The welding process that uses a nonconsumable electrode is:
- a. GMAW
  - b. SAW
  - c. GTAW
  - d. FCAW
  - e. SMAW
38. Of the following discontinuities, which is most likely to be a flaw caused during the manufacture of steel?
- a. porosity
  - b. lamination
  - c. undercut
  - d. crack
  - e. inclusion slag
39. Which discontinuity occurs in the heat-affected zone and can result from excess moisture in the weld zone?
- a. throat crack
  - b. crater crack
  - c. underbead crack
  - d. porosity
  - e. centerline crack
40. SMAW is typically used in which type of application?
- a. semiautomatic
  - b. machine
  - c. manual
  - d. automatic
  - e. mechanical
41. The use of preheat on a medium carbon steel weld test plate will perform all of the following except:
- a. reduce distortion
  - b. reduce the possibility of hydrogen cracking
  - c. result in the formation of martensite
  - d. produce a wide heat-affected zone
  - e. diffuse hydrogen
42. The welding variables used to calculate heat input are:
- a. voltage and current
  - b. current and travel speed

2022 Skills USA Nebraska High School Welding Competition  
Fundamentals Examination

- c. voltage, current, and travel speed
- d. travel speed, preheat temperature, and voltage
- e. voltage, current, and preheat temperature

43. The dimension “E” in the Figure is:

- a. the actual throat
- b. the effective throat
- c. the theoretical throat
- d. weld size
- e. convexity



44. The dimension “D” in the Figure above is:

- a. the actual throat
- b. the effective throat
- c. the theoretical throat
- d. weld size
- e. weld leg

45. The use of preheat will result in:

- a. a faster cooling rate and wider heat-affected zone
- b. a faster cooling rate and narrower heat-affected zone
- c. a slower cooling rate and a wider heat-affected zone
- d. a slower cooling rate and narrower heat-affected zone
- e. none of the above

46. What does WPS stand for:

- a. Welding Process Standard
- b. Weld Production Specification
- c. Welder Production Sheet
- d. Welding Procedure Specification
- e. Worker Process Standard

47. In the performance of a vertical position weld, the type of weld progression having a side-to-side motion is called:

- a. stringer bead technique
- b. stagger bead technique
- c. unacceptable
- d. weave bead technique
- e. none of the above

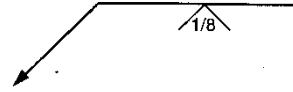
48. Which of the following is not considered a type of joint?

- a. butt
- b. T
- c. fillet



2022 Skills USA Nebraska High School Welding Competition  
Fundamentals Examination

- d. corner
  - e. edge
49. For the welding symbol in the Figure, the  $1/8$  dimension refers to what?
- a. groove angle
  - b. root face
  - c. depth of preparation
  - d. weld size
  - e. root opening



50. For the welding symbol in the Figure, the  $3/4$  dimension refers to what?
- a. weld size
  - b. effective throat
  - c. depth of preparation
  - d. root opening
  - e. none of the above

