

## Area Applied Agricultural Engineering CDE

### Area Qualifying Exam 2022

Please select the single best answer for each item below and record on the answer sheet provided.

1. Oxygen is an essential part of the \_\_\_\_\_ process.
  - A combustion
  - B demolition
  - C sintering
  - D winterizing
2. Metallurgy is the\_\_\_\_\_.
  - A joining of dissimilar materials
  - B process of mechanically tapering the ends of drill bits
  - C science and technology of the applications and uses of various metals
  - D numbering of unique versions of bimetallic products
3. Mechanical testing is another name for \_\_\_\_\_ testing.
  - A acid
  - B destructive
  - C heavy equipment
  - D investigative
4. A training or employment credential that you own is said to be \_\_\_\_\_.
  - A certified
  - B industrial
  - C portable
  - D validated
5. The variance between the published welding standard and acceptable welding quality is called \_\_\_\_\_.
  - A allowable
  - B discontinuity
  - C tolerance
  - D slipshod
6. The welding process using the acronym SMAW means \_\_\_\_\_.
  - A shielded metal arc welding
  - B specific manual application work
  - C specialized metal and welding
  - D standard metal arc welding
7. The root pass or root run is \_\_\_\_\_.
  - A designed to burn down to the backer plate
  - B the first weld pass or run deposited in a joint where further runs are needed
  - C only allowed in welds requiring more than five passes
  - D the best way to join several branching cracks in a repair
8. TIG welding is the acronym for \_\_\_\_\_ welding.
  - A traditional induction gouge
  - B terminal increment gouge
  - C tungsten inert gas
  - D testing in grade

9. Welding test coupons are scored visually for \_\_\_\_\_.  
A angle of electrode  
B middle of plate position  
C slag inclusions  
D wear patterns
10. Weld appearance indicates both correct \_\_\_\_\_ and correct \_\_\_\_\_.  
A angle, argon level  
B lead, limit of amperage  
C process, procedure  
D tension, timing
11. When handling electrical equipment, the safest shoes to wear are \_\_\_\_\_ shoes.  
A combination leather and Kevlar  
B firm leather  
C rubber-soled  
D work-rated
12. The safety color code that identifies the cutting edge on a portable band saw is \_\_\_\_\_.  
A ivory  
B green  
C red  
D orange
13. Laboratory safety rules are intended mainly to protect the \_\_\_\_\_.  
A floor area  
B students  
C gas manifold area  
D ventilation system
14. Most laboratory accidents are caused by \_\_\_\_\_.  
A air pressure leaks  
B carelessness  
C open flames  
D liquids
15. The safety color code used to identify first-aid equipment and supplies is \_\_\_\_\_.  
A ivory  
B green  
C red  
D orange
16. The type of fire extinguisher commonly found in public buildings is the \_\_\_\_\_.  
A carbon dioxide  
B foam  
C dry chemical  
D soda acid
17. Burning oil, paint, and other flammable liquids are \_\_\_\_\_ fires.  
A Class B  
B common  
C spill  
D typical shop

- 18 A brittle metal with high wear resistance but limited tensile strength is \_\_\_\_\_.  
A aluminum  
B cast iron  
C magnesium  
D molybdenum
- 19 One sizing system for twist drills is the \_\_\_\_\_ system.  
A decimal  
B relational  
C octagonal  
D numerical
- 20 When heat is applied, metals tend to \_\_\_\_\_.  
A contract  
B expand  
C degrade  
D withdraw
- 21 The gas oxygen is \_\_\_\_\_ than air.  
A less pure  
B heavier  
C more fluid  
D less flammable
- 22 A fillet weld is also called a \_\_\_\_\_ weld.  
A cover  
B beginner's  
C T  
D root
- 23 During set-up, the oxygen cylinder valve should be opened \_\_\_\_\_.  
A completely  
B intermittently  
C regularly  
D last
- 24 The rate at which melted electrode is added to the weld puddle or pool is the \_\_\_\_\_ rate.  
A burn  
B deposition  
C flow  
D growth
- 25 Weld joints are \_\_\_\_\_ to allow complete penetration.  
A beveled  
B measured  
C cut  
D chilled
- 26 The most effective technique for cleaning and preparing weld metal is \_\_\_\_\_.  
A chilling  
B grinding  
C heat-treating  
D quenching

- 27 An effective welding precaution is the wearing of \_\_\_\_\_.  
A cloth gloves  
B leather gloves  
C polyester shirts  
D contact lenses
- 28 GMAW uses a consumable \_\_\_\_\_ electrode.  
A cladded rod  
B metal wire  
C thoriated tungsten  
D weatherproof
- 29 A common shielding gas for GMAW processes is \_\_\_\_\_.  
A carbon dioxide  
B carbon monoxide  
C di-hydrogen oxalate  
D sodium chloride
- 30 One advantage of GTAW welds is that the welds are \_\_\_\_\_.  
A cleaner  
B deeper  
C higher  
D warmer
- 31 Heat aluminum stock to at least \_\_\_\_\_ degrees F prior to welding.  
A 32  
B 70  
C 120  
D 212
- 32 The components of a welded joint are composed of \_\_\_\_\_ metal.  
A ferrous  
B ferruginous  
C parent  
D repurposed
- 33 To begin welding on a construction site, a \_\_\_\_\_ permit is required.  
A contractor's  
B hot work  
C municipal  
D temporary
- 34 A single run of weld metal deposited on the parent metal is a \_\_\_\_\_.  
A bead  
B cover  
C root pass  
D stringer
- 35 Plasma is the \_\_\_\_\_ state of matter.  
A most common  
B fourth  
C imaginary  
D ultimate

- 36 A GMA welder has a \_\_\_\_\_ duty cycle.  
A 100%  
B 80%  
C 60%  
D 20%
- 37 One of four factors to consider when determining correct welding amperage is \_\_\_\_\_.  
A length of welding lead  
B distance to ground  
C speed of travel  
D age of machine
- 38 A common welding method is \_\_\_\_\_.  
A sideways  
B regular up  
C opposite side  
D vertical up
- 39 A continuous \_\_\_\_\_ sound indicates proper arc length.  
A crackling  
B drumming  
C humming  
D zooming
- 40 One common GMAW arc transfer process is \_\_\_\_\_.  
A constitutional  
B conventional  
C width-modulated  
D mechanical
- 41 One safety concern in TIG welding is \_\_\_\_\_.  
A hard to see the arc  
B metal cools too quickly  
C intense heat  
D overloaded breakers
- 42 One type of plasma arc cutting is the \_\_\_\_\_ process.  
A bubble arc  
B pulsed arc  
C transfer arc  
D wide arc
- 43 Plasma arc cutting works most efficiently in \_\_\_\_\_ position.  
A any  
B only overhead  
C the three most common  
D flat
- 44 Preheating cast iron prior to welding reduces \_\_\_\_\_ during cooling.  
A annealing  
B cracking  
C hammering  
D warping

- 45 Prior to arc welding, cast iron should be preheated to \_\_\_\_\_ degrees F.
- A 120 – 200
  - B 200 – 300
  - C 400 – 600
  - D 500 – 700
- 46 A welding symbol indicates \_\_\_\_\_.
- A base metal of weld
  - B cover bead specifications
  - C desired type of weld
  - D major angle of weld
- 47 A steel sample marked with C indicates \_\_\_\_\_.
- A made in China
  - B basic open hearth carbon steel
  - C chromium alloy steel
  - D average carbon content
- 48 The ability of a steel sample to be stretched is \_\_\_\_\_.
- A ductility
  - B elongability
  - C stretchability
  - D wearability
- 49 The science and technology of the applications of various metals is \_\_\_\_\_.
- A ferrometrics
  - B ferrotechnics
  - C metallurgy
  - D metriculation
- 50 A fabrication shop conducts an inventory of steel angle on hand, and finds they have bins containing 12 feet, 47 feet, 98 feet, and 221 feet, with a total steel angle inventory of \_\_\_\_\_ feet.
- A 178
  - B 378
  - C 478
  - D 578
- 51 Fluency in a second language may be an employability \_\_\_\_\_ in welding careers.
- A advantage
  - B custom
  - C opportunity
  - D requirement
- 52 A benefit of maintaining industry-recognized certifications is \_\_\_\_\_.
- A find basic skills employment
  - B enjoy higher earnings
  - C do frequent skills tests
  - D easier to change careers
- 53 To identify aisles, handrails, and fall hazards, use the color \_\_\_\_\_.
- A ivory
  - B green
  - C red
  - D yellow

- 54 Prior to leaving the work area each day, you should \_\_\_\_\_.  
A clock out  
B be sure all solvent & paint cans are covered  
C initialize the security system  
D secure your locker
- 55 Check the gauge before using a \_\_\_\_\_ extinguisher on Class A fires.  
A anhydrous ammonia  
B encapsulated foam  
C pressurized water  
D regular fire
- 56 A metal that resists rust and is almost pure iron is \_\_\_\_\_.  
A cast iron  
B bronze  
C pewter  
D wrought iron
- 57 Joining metals by using a bronze filler is known as \_\_\_\_\_.  
A annealing  
B brazing  
C bronzing  
D cladding
- 58 The process of combining pure oxygen with a combustible \_\_\_\_\_ is called oxyfuel.  
A base metal  
B fuel gas  
C electrode  
D target
- 59 The metal pieces of a fillet weld are placed in the shape of a \_\_\_\_\_.  
A O  
B L  
C T  
D X
- 60 The size of a welding electrode is determined by \_\_\_\_\_.  
A average weight of 10 electrodes  
B diameter of the core wire  
C weight / number of electrodes in a pound  
D diameter of a bundle of ten electrodes
- 61 Flux or shielding gas is measured and sold by the \_\_\_\_\_.  
A atmospheric weight  
B cubic foot  
C #300 cylinder  
D estimated monthly usage
- 62 Electric power for tungsten arc (TIG) welding should be \_\_\_\_\_.  
A alternating current  
B constant current  
C direct current  
D standard polarity

- 63 A job order for roof service ladders requires 1098 pieces of bar stock, each 9" long. The total length of all the bar stock is \_\_\_\_\_.  
A 1098" or 91.5'  
B 9882" or 823.5'  
C 9512" or 793'  
D 10,900" or 908.33'
- 64 Lenses for GTAW are \_\_\_\_\_ than lenses for SMAW.  
A broader  
B darker  
C more round  
D cheaper
- 65 Minimum ventilation for GTAW should be \_\_\_\_\_.  
A available  
B 10,000 cfm  
C guaranteed  
D fan-delivered
- 66 In plasma-arc cutting, the cutting gas becomes plasma in the \_\_\_\_\_ stream.  
A arc  
B glowing  
C superheated  
D pressurized
- 67 The fabrication symbol for stainless steel is \_\_\_\_\_.  
A STA  
B SLS  
C CHR  
D SST
- 68 The steelmaking process that improves metal properties, increases density, and preforms the final product is \_\_\_\_\_.  
A drop-forging  
B descaling  
C hammering  
D rolling
- 69 In a C-1020 steel, the C indicates \_\_\_\_\_.  
A average  
B carbon  
C 100-ton lots  
D complete
- 70 Gasses used for flux in welding operations are \_\_\_\_\_ gasses.  
A economical  
B inert  
C rare-earth  
D widely available
- 71 Cutting several plates simultaneously is called \_\_\_\_\_ cutting.  
A parallel  
B repetitive  
C speed  
D stack

- 72 The job order for a tank support calls for 14 pieces of wide-flange beam, each 33" long. Without allowing for cut loss, this will require at least \_\_\_\_\_ total of wide-flange beam.
- A 462" or 38.5'
  - B 420" or 35'
  - C 480" or 40'
  - D 525" or 43.75'
- 73 Use a straightedge when plasma cutting due to higher \_\_\_\_\_.
- A spark rate
  - B travel speed
  - C water disturbance
  - D air usage
- 74 Acceptable plasma arc cuts require minimal \_\_\_\_\_ prior to welding.
- A buffing
  - B cleaning
  - C cooling
  - D painting
75. When a stainless steel UNS description is followed by the letter L, that means \_\_\_\_\_.
- A suitable for long lengths
  - B extra low in carbon
  - C lithium alloy
  - D lower heat requirement
- 76 You purchase a 10 lb. box of E6010 welding rods; the E stands for \_\_\_\_\_.
- A extended use
  - B electric
  - C electrode
  - D extruded
- 77 You purchase a 10 lb. box of E6010 welding rods; the 60 means \_\_\_\_\_.
- A length in inches
  - B country of origin
  - C 60,000 psi tensile strength of deposited metal
  - D number in box
- 78 On that label on the 10 lb. box of E6010 welding rods; the 1 means \_\_\_\_\_.
- A all position
  - B brand new
  - C top quality
  - D single use
- 79 On the label on the 10 lb. box of E6010 welding rods; the 0 means \_\_\_\_\_.
- A no deposit required
  - B 0 stub length
  - C all position
  - D DC EP
- 80 The metal to be joined by welding is the \_\_\_\_\_.
- A base metal
  - B parent metal
  - C alloy metal
  - D joint metal

- 81 Poor quality welds are caused by the absorption of \_\_\_\_\_.  
A lithium and molybdenum  
B nitrogen and oxygen  
C oxygen and potassium  
D nitrogen and potassium
- 82 An AWS position code for vertical welding is \_\_\_\_\_.  
A 1U  
B 3U  
C 1H  
D 3F
- 83 In GMAW, conventional stickout is \_\_\_\_\_.  
A the diameter of the electrode  
B the thickness of the parent metal  
C based on the flux gas  
D 0.25" - 0.5"
84. Typical polarity for GMAW and FCAW is \_\_\_\_\_.  
A DC DC  
B DC EP  
C AC EP  
D DC FC
- 85 If the 3<sup>rd</sup> digit in an electrode's classification is \_\_\_\_\_, that electrode is recommended for all-position welding.  
A 0  
B 1  
C 2  
D 3
- 86 If the 3<sup>rd</sup> digit in an electrode's classification is 3, it can be used in \_\_\_\_\_.  
A all position welding  
B flat position only  
C vertical up  
D horizontal
- 87 A welder checks out a 50-lb box of electrodes; he will empty the box in \_\_\_\_\_ hours if he burns 4 lbs. of rods per hour.  
A 11  
B 12.5  
C 10  
D depends on the weld position
- 88 The majority of joints welded are either butt welds or \_\_\_\_\_ welds.  
A fillet  
B flange  
C lap  
D round
- 89 The proper arc length for most SMAW welds is \_\_\_\_\_.  
A the diameter/thickness of a soapstone marker  
B the diameter of a wooden pencil  
C the diameter of the bare end of the electrode being used  
D the thickness of the metal being welded

- 90 A welder's duty cycle is \_\_\_\_\_.  
A the length of a shift  
B the estimated hours required to complete one job  
C the percent of a ten-minute period the welder can be operated  
D the length of time between shifts
- 91 In building a large component, a welder burns 32 pounds of MIG electrode in one 8-hour shift, at the rate of \_\_\_\_\_ pounds per hour.  
A 2  
B 4  
C 8  
D 16
- 92 GMAW electrode holders must be properly \_\_\_\_\_.  
A grounded  
B labelled  
C measured  
D ventilated
- 93 One of the four GMAW arc transfer processes is \_\_\_\_\_.  
A cover transfer  
B moderate transfer  
C nominal transfer  
D spray transfer
- 94 A common flux gas for GMAW processes is \_\_\_\_\_.  
A actinide  
B carbon monoxide  
C helium  
D rubidium
- 95 One type of plasma arc cutting is the \_\_\_\_\_ process.  
A common transfer  
B nontransfer  
C reverse transfer  
D side transfer
- 96 One 50-lb box of generic electrodes is \$61.19, or \_\_\_\_\_ per pound.  
A \$0.99  
B \$0.61  
C \$1.22  
D \$0.91
- 97 a 4X8' sheet of  $\frac{3}{4}$ " steel plate can be cut into \_\_\_\_\_ 12'X12" coupons.  
A 32  
B 24  
C 16  
D 56
- 98 Fitters / grinders start at \$9.65/hour and will gross \_\_\_\_\_ in a 40-hour work week.  
A \$360  
B \$386  
C \$3860  
D \$220

- 99 In oxyfuel cutting (OFC), uneven drag lines are signs of \_\_\_\_\_.  
A slow travel speed  
B fast travel speed  
C flame too cold  
D flame too close
- 100 During PAC operations, if the drag lines are very curved, \_\_\_\_\_.  
A advance the air pressure level  
B reduce the amperage  
C increase height above work  
D decrease travel speed

**2022 Area FFA Competition AAE Written Exam Key**

<b>Number</b>	<b>Answer</b>	<b>Number</b>	<b>Answer</b>	<b>Number</b>	<b>Answer</b>	<b>Number</b>	<b>Answer</b>
1	A	26	B	51	A	76	C
2	C	27	B	52	B	77	C
3	B	28	B	53	D	78	A
4	C	29	A	54	B	79	D
5	C	30	A	55	C	80	B
6	A	31	C	56	D	81	B
7	B	32	C	57	B	82	D
8	C	33	B	58	B	83	D
9	C	34	A	59	C	84	B
10	C	35	B	60	B	85	B
11	C	36	A	61	B	86	B
12	D	37	C	62	B	87	B
13	B	38	D	63	B	88	A
14	B	39	A	64	B	89	C
15	B	40	B	65	B	90	C
16	C	41	C	66	A	91	B
17	A	42	C	67	D	92	A
18	B	43	A	68	D	93	D
19	D	44	B	69	B	94	C
20	B	45	C	70	B	95	B
21	B	46	C	71	D	96	C
22	C	47	B	72	A	97	A
23	A	48	A	73	B	98	B
24	B	49	C	74	B	99	A
25	A	50	B	75	B	100	D