Agricultural Mechanics- Fundamentals and Applications (Herren)

Unit 1 Mechanics in the World of Agriculture

1. The production of plants and animals and the provision and management of related supplies, services, mechanics, products, processing, and marketing defines
   A. Horticulture
   B. Renewable natural resources
   C. Agricultural mechanics
   D. Agriculture

2. Agriscience is
   A. The same as agricultural mechanics
   B. Limited to the sale of agricultural products
   C. Business stemming from agriculture
   D. The science that is behind agricultural production

3. Examples of renewable natural resources are
   A. Oil, gas, and coal
   B. Fish, trees, and wildlife
   C. Rubber, steel, and water
   D. Air, soil, and minerals

4. Over the past 230 years, the number of American farms has
   A. Decreased
   B. Increased
   C. Remained about the same
   D. Not been measured

5. Agricultural mechanics stems mostly from
   A. Physics
   B. Biology
   C. Medicine
   D. Horticulture

6. Agricultural products come from
   A. Soil and coal
   B. Plants and animals
   C. Iron ore and aluminum
   D. Atomic fuel

7. Products of agriculture include
   A. Leather seat covers

B. Paint
C. Flower arrangements
D. All of the above

8. Agricultural mechanics includes the occupation of
A. Garden tractor repairperson
B. Automobile mechanics
C. Pile driver
D. Systems analyst

9. Mechanization of agriculture has resulted in
A. Decrease soil production
B. Decrease farm expenses
C. Increases production efficiency
D. Increased numbers of farm workers

10. Cyrus McCormick invented the
A. Steel plow
B. Cotton gin
C. Milking machine
D. Reaper

Unit 2 Career Options in Agricultural Mechanics

1. American's number one employer is
A. Agriculture
B. Chemicals
C. Oil
D. Steel

2. The estimated number of agriculture-related jobs in the United States is
A. Around 800
B. In the thousands
C. Many millions
D. Not significant

3. The first level of employment in agriculture is
A. Skilled
B. Semiskilled
C. Professional
D. Laborer

4. The National Center for Education Statistics classifies agricultural jobs by the number(s)
A. 01
B. 02

C. 03
D. all of the above

5. The average American uses only _____ percent of his or her income for food
A. 15
B. 5
C. 9.8
D. 20

Unit 3 Shop Orientation and Procedures

1. The agriculture mechanics shop is also referred to as the
A. ag mechanics shop
B. ag mech shop
C. ag shop
D. all of the above

2. The agriculture mechanics shop is a good place for serious students to learn skills that are useful
A. at home
B. in their businesses
C. for leisure
D. all of the above

3. Agricultural mechanics includes
A. woodworking and carpentry
B. metalworking and welding
C. pipe fitting and irrigation
D. all of the above

4. Hands-on experience means
A. made by hand tools only
B. a process of learning by doing
C. a procedure requiring many people to help
D. a wasteful method of education

5. Large open spaces are needed in agricultural mechanics shops as compared with other shops for
A. safe operation of stationary power equipment
B. meeting fire code regulations
C. storing materials for the school custodians
D. student project work

6. Safety in the shop depends on

A. students
B. teachers
C. school shop designer
D. all of the above

7. Safety in the shop depends on
A. students staying in assigned areas
B. students wearing proper clothing
C. use of safety glasses by all persons in the shop
D. all of the above

8. Which of the following enhances student safety in the shop?
A. Shop cleanliness and orderliness
B. Proper instruction
C. Machines that are kept in adjustment
D. All of the above

Unit 4- Personal Safety in Agricultural Mechanics

1. Accidents among farm workers most often involve
A. Burns
B. Drowning
C. Falls
D. Machinery

2. For Safety purposes, moving parts on machines should be
A. Labeled
B. Oiled
C. Painted
D. Shielded

3. Color coding is used in the shop to
A. Alert people to dangers and hazards
B. Make the shop a pleasant place to work
C. Help people react quickly to emergencies
D. All of the above

4. Which of the following is NOT regarded as a major type of accident that causes injury?
A. Assault and battery
B. Electrical contract
C. Falling
D. Inhaling

5. The national organization(s) that helped to develop safety color coding is/are the

A. American Society of Agriculture Engineers
B. American Vocational Association
C. National Safety Council
D. All of the above

6. The safety color used to identify wheels, levers, or knobs that control or adjust machines is
A. Red
B. Yellow
C. Orange
D. None of the above

7. Fire equipment and safety switches are indicated by the color
A. Orange
B. Purple
C. Red
D. Bright green

8. The number of safety colors in the shop color-coding system is
A. Nine
B. Eight
C. Seven
D. Four

9. The number of focal colors in the shop color-coding system is
A. One
B. Two
C. Three
D. Four

10. Suitable eye protection must be worn when working with
A. Chemicals
B. Grinding machinery
C. Welding equipment
D. All of the above

11. Protective clothing used in the shop must
A. Be fire resistant
B. Fit properly
C. Be clean
D. All of the above

12. The best item of protective clothing for agricultural workers is
A. An apron
B. A shop coat

C. Jeans
D. Coveralls

13. The length of time a person is exposed to sound is called
A. Noise intensity
B. Noise duration
C. Decibels
D. Sound pressure

14. Hearing damage may occur if excessively exposed to noise above
A. 30 decibels
B. 60 decibels
C. 75 decibels
D. 90 decibels

Unit 5- Reducing Hazards in Agricultural Mechanics

1. Which is NOT part of the fire triangle?
A. Fuel
B. Combustion
C. Oxygen
D. Heat

2. A commonly used fuel is
A. Acetylene
B. Acetone
C. Oxygen
D. Magnesium

3. Fire can always be prevented of stopped by eliminating
A. Combustible gases in the area
B. Congestion in the shop
C. Improper storage of fuels
D. Any item in the fire triangle

4. Fire hazards associated with painting can be reduced by
A. Using a spray gun instead of a brush
B. Using newspaper to protect bench surfaces
C. Using a special paint booth
D. Painting with several people in the area

5. Effective fire control techniques include
A. Cooling a fire with water
B. Wrapping a blanket around a person whose clothes are on fire

C. Raking dead leaves and grass from an advancing fire
D. All of the above

6. Fires are classified according to
A. Materials involved and techniques that safely extinguish them
B. Size and duration of the fire
C. Season of the year when the fire occurs
D. The amount of material being burned

7. A green triangle on a fire extinguisher means the extinguisher can be used to put out burning
A. Metals
B. Liquids
C. Wood
D. Electrical wires

8. Most fire extinguishers will discharge when
A. The pin is pulled and the lever is pressed
B. The extinguisher is inverted
C. Either (a) or (b), depending on the extinguisher
D. None of the above

9. SMV means
A. Small mechanical vehicle
B. Stop! Moving vehicle
C. Slow- moving vehicle
D. None of the above ‘

10. SMV emblems are required when
A. Vehicles are standing
B. Vehicles travel 25 miles per hour of slower
C. Vehicles travel 30 miles per hour of slower
D. Vehicles travel faster than 30 miles per hour

11. Pesticide labels are
A. Legal documents
B. Used only on insecticides
C. Used primarily on powered chemicals
D. Generally written in two or more languages

Unit 6- Shop Cleanup and Organization

1. Oily rags should be stored in a
A. Cardboard box
B. Plastic bag

C. Wooden box
D. Closed, metal can

2. A clean, organized shop reduces the chance of
A. Fire
B. Lost tools
C. Damage to projects
D. All of the above

3. Brushes and brooms work better if pushed
A. In a continuous path
B. And lifted immediately
C. Back and forth
D. In long strokes

4. Sawdust is useful in shop cleanup to
A. Absorb liquids on the floor
B. Reduce dust in the trash container
C. Condition bristles on the floor brooms
D. None of the above

5. A recommended material for cleaning grease from the floor is
A. Water
B. Gasoline
C. Solvents
D. Sawdust

6. The forepersons' job in the cleanup process is
A. Supervision
B. Reward
C. Evaluation
D. Assigning jobs

7. The best item for cleaning non-greasy machines is a/an
A. Rag
B. Brush
C. Air gun
D. Vacuum cleaner

8. The shop-cleaning method that gives the best control over the cleanup process is the
A. All-pitch-in method
B. Cleanup wheel method
C. Assignment sheet method
D. Honor system method

9. The main advantage of the shop cleanup assignment sheet over the shop cleanup wheel is the
   A. Flexibility is assigning students to tasks
   B. Ease in reassigning tasks
   C. Use of a checklist for evaluations
   D. Use of a foreperson for evaluation

10. Rotating shop cleanup duties
   A. Enables everyone to learn the various cleaning tasks
   B. Promotes fairness in assigning undesirable cleaning tasks
   C. Involves every student on a equal basis
   D. All of the above

Unit 7- Hand Tools, Fasteners, and Hardware

1. The use of hand tools is
   A. For those who cannot afford power tools
   B. For a limited number of highly specialized jobs
   C. Primarily for engine and machinery
   D. The foundation of agricultural mechanics

2. Tools are generally classified according to
   A. Use
   B. Color
   C. Construction
   D. Origin

3. An example of a layout tool is/are
   A. Claw hammer
   B. Outside calipers
   C. Handsaw
   D. Plug cutter

4. Saws are classified as
   A. Kerf tools
   B. Push tools
   C. Flexing tools
   D. Cutting tools

5. Taps are dies are classified as
   A. Holding tools
   B. Digging tools
   C. Cutting tools

D. Turning tools

6. Wrenches are classified as
   A. Turning tools
   B. Digging tools
   C. Other tools
   D. Cutting tools

7. The lowercase letter *d* is used to designate size of
   A. Lumber
   B. Screws
   C. Nails
   D. Bolts

8. Which is not the name of a type of nail?
   A. Lumber
   B. Plasterboard
   C. Roofing
   D. Duplex

9. The term *improved* means a nail
   A. Is made of copper
   B. Is easy to remove
   C. Has a thick shank
   D. Holds better

10. Screws are classified
   A. According to the material they hold
   B. By the metal from which they are made or the finish used
   C. By the shape of their heads
   D. By all of these

11. The number of a screw refers to its
   A. Diameter
   B. Length
   C. Head type
   D. Use

12. The difference between a bolt and a screw is
   A. A bolt has threads
   B. A bolt has a nut
   C. A screw has a slotted head
   D. A screw is suitable for use in wood

13. A bolt used in wood that has a round head over square shoulders is
    A. A stove bolt
    B. A machine bolt
    C. A carriage bolt
    D. None of these

14. How many side are there on a hexagon nut?
    A. Four
    B. Six
    C. Eight
    D. Twelve

15. A 4-40 X ½ machine screw
    A. Has 4 threads per inch
    B. Has 40 threads per inch
    C. Is 4 inches long
    D. Comes for to a package

16. Which is not a type of hinge?
    A. Butt
    B. Strap
    C. T
    D. N

17. The hinge that contains a feature from each of the two other hinges is the
    A. Butt hinge
    B. Strap hinge
    C. T hinge
    D. N hinge

18. The best hinge to use if it is not to be seen is the
    A. Butt hinge
    B. Strap hinge
    C. T hinge
    D. N hinge

19. The best hinge for a very large and extra-heavy door or gate is the
    A. Butt hinge
    B. T hinge
    C. N hinge
    D. Screw hook and strap hinge

20. Corners of frames and doors may be strength-ended by using a
    A. Hasp

B. Butt hinge
C. Flush plate
D. Hook and eye bolt

Unit 8- Layout Tools and Procedures

1. On most rules and tapes used in the shop, the shortest line represents
   A. 1/8 inch
   B. 1/16 inch
   C. 1/64 inch
   D. 1 inch

2. Of the following, the smallest unit of metric measurement is
   A. meter
   B. millimeter
   C. kilometer
   D. centimeter

3. Tapes generally breaks due-to
   A. frequent use
   B. use of spring retractors
   C. use outdoors
   D. forcing the tape back into the case

4. Wooden scales are sometimes called
   A. depth gauges
   B. bench rules
   C. marking gauges
   D. scribers

5. The best tool for measuring the outside diameter of a pipe in its middle section is
   A. a try square
   B. tape
   C. calipers
   D. dividers

Unit 9- Selecting, Cutting, and Shaping Wood

1. Grain in lumber is cause by
   A. the age of the board
   B. annual rings
   C. special drying techniques
   D. the stain

2. Lumber is graded according to its
   A. appearance and soundness
   B. color and species
   C. strength and durability
   D. cost and length

3. A crosscut handsaw with very coarse teeth would have how many teeth per inch?
   A. 6
   B. 8
   C. 12
   D. 14

4. A crosscut handsaw with very fine teeth would have how many teeth per inch?
   A. 6
   B. 8
   C. 14
   D. 20

5. The wood removed by a saw blade leaves an opening called a
   A. bevel
   B. channel
   C. chamfer
   D. kerf

6. The backsaw gets its name from
   A. its use as a backup tool
   B. its fine teeth
   C. its stiff back
   D. its original use in making chair backs

7. A suitable tool for cutting curves is the
   A. compass saw
   B. copying saw
   C. keyhole saw
   D. all of the above

8. The brace and bit has been replaced by the
   A. drill press
   B. copying saw
   C. screwdriver bit
   D. portable electric drill

9. Lumber for construction should be dried to about
   A. 2%

B. 15%
C. 35%
D. 20%

10. The teeth on a file cut
    A. best when oiled
    B. only soft materials
    C. only on the backward stroke
    D. only on the forward stroke

Unit 10- Fastening Wood

1. Two pieces of wood joined together is called
    A. an angle
    B. a joint
    C. a lap
    D. a splice

2. The tool used to push nail heads below the surface of wood is a nail
    A. driver
    B. press
    C. punch
    D. set

3. The strongest nailing method is
    A. clinching
    B. end nailing
    C. flat nailing
    D. toe nailing

4. An advantage of epoxy glue is
    A. ease of use
    B. no mixing
    C. waterproof bond
    D. none of the above

5. The most difficult joint to make, but one of the strongest, is the
    A. miter joint
    B. butt joint
    C. dado joint
    D. dovetail joint

6. The _____-ounce hammer is good for light, general nailing.
    A. 32

B. 13
C. 20
D. 40

7. The glue most commonly used with wood is _____.
   A. Aliphatic resin
   B. Epoxy
   C. Contact cement
   D. Urea

Unit 11- Finishing Wood

1. A dent may be removed from with
   A. A special tool
   B. A grinder
   C. Sandpaper
   D. Steam from a wet rag

2. Holes in wood may be filled with
   A. Glazing compound
   B. Plastic wood
   C. Putty
   D. All of the above

3. Oiled-based stains, varnish, and paints should be thinned with
   A. Alcohol
   B. Lacquer thinner
   C. Turpentine
   D. Water

4. Wood may be colored by applying
   A. Polyurethane
   B. Stain
   C. Varnish
   D. Wax

5. The material used to fill holes after wood has a final finish is
   A. Glazing compound
   B. Plastic wood
   C. Putty
   D. Putty stick

6. Plastic wood is recommended for
   A. Filling nail holes

B. Hiding bad cuts
C. Removing sanding marks
D. All of the above

7. Final sanding should be done with
A. Coarse sandpaper
B. The grain
C. Medium sandpaper
D. A file

8. The correct sequence when applying finishes is
A. Wax, sealer, varnish, stain
B. Stain, sealer, varnish, wax
C. Stain, varnish, wax, sealer
D. Sealer, varnish, wax, stain

9. A clear, durable, water-resistant finish that is brushed on and requires no separate sealer is
A. Polyurethane
B. Shellac
C. Stain
D. Wax

10. The solvent that dissolves the greatest number of finishing products is
A. Alcohol
B. Lacquer thinner
C. Turpentine
D. Varsol

Unit 12- Identifying, Marketing, Cutting, and Bending Metal

1. When using a hacksaw, the number of teeth cutting at one time should be
A. One
B. Two
C. Three
D. Five

2. Another name for snips is
A. Aviation
B. Combination
C. Scissors
D. Shears

3. Standard hacksaw blades come in lengths of
A. 6 and 10 inches

B. 7 and 10 inches
C. 9 and 11 inches
D. 10 and 12 inches

4. Choices of teeth per inch for hacksaw blades are
A. 14, 18, 24, and 32
B. 14, 20, 26, and 32
C. 14, 24, and 36
D. none of the above

5. A hacksaw cuts on
A. the backward stroke only
B. the forward stroke only
C. both the forward and backward stroke
D. the stroke recommended by the manufacturer

6. Single-cut and double-cut refer to
A. tooth patterns on files
B. teeth on a hacksaw blade
C. speed designation for blades
D. widths of saw kerfs

7. Placing a file at a 90-degree angle to the metal and pushing or pulling is
A. burnishing
B. draw filing
C. push filing
D. none of the above

8. It is very important to wear face protection when using a chisel because
A. a chip of metal may hit you
B. the hammer head is likely to come off
C. chisels frequently break in half
D. sight is improved by good face shields

Unit 13- Fastening Metal

1. Metal may be fastened by
A. bolts
B. rivets
C. screws
D. all of the above

2. The process of joining metal by melting a different metal between two pieces is known as
A. gluing

B. soldering
C. washing
D. welding

3. Holes are usually made in heavy metal by using
A. an auger but
B. a forage
C. a punch
D. a high-speed twist drill

4. When drilling, the lightest pressure should be placed on the drill when
A. breaking through
B. midway drilling
C. starting the hole
D. none of the above

5. Threads are cut onto a rod with a
A. die
B. ream
C. stock
D. tap

6. When tapping threads, always start with a
A. bottoming tap
B. plug tap
C. taper tap
D. die

7. The first tool to use in drilling a hole in metal is the
A. center punch
B. drill
C. file
D. ream

8. When cutting threads, oil is used to
A. clean the tool
B. harden the threads
C. lubricate the tool
D. soften the metal

Unit 15- Woodworking with power Machines

1. The number of people permitted in the safety zone around a machine is
A. one

B. two
C. three
D. any number

2. Woodworking machines should be cleaned with
A. a brush
B. the hand
C. a rag
D. an air gun

3. If a machine is worked too hard, the electric motor should stop because of
A. burnout
B. general fatigue
C. overload protection
D. voltage drop

4. When using a band saw, the operator should avoid
A. backing out of cuts
B. crosscutting
C. cutting metal
D. sawing curved lines

5. The band saw blade is held in position when cutting by
A. wheels
B. tires
C. levers
D. guides

6. Jigsaws are best for cutting
A. very short curves
B. straight lines
C. rabbets
D. dados

7. The blade on a table saw should extend how far above the work?
A. 1 inch
B. 2 inches
C. 3 inches
D. none of the above

8. Small pieces of wood should be moved on a saw table by a
A. bare hand
B. gloved hand
C. push stick

D. hammer handle

9. Table saw tables are classified by the
   A. type of teeth
   B. diameter of the blade
   C. unique function
   D. all of the above

10. The most popular use of the radial-arm saw is
   A. ripping
   B. cutoff work
   C. curve cutting
   D. dado cutting

11. Minimum protection when using power machines starts with
   A. steel-toed shoes
   B. a leather apron
   C. finger guards
   D. a face shield

12. When cutting with the radial-arm saw, the operator should
   A. move the wood into the saw
   B. pull the saw into the wood
   C. push the saw into the wood
   D. all of the above are safe

13. An adjustment that should be made on a jointer by the instructor is the
   A. rear outfeed table
   B. front infeed table
   C. fence
   D. miter gauge

14. The maximum safe depth per cut by a jointer is
   A. ½ inch
   B. ¼ inch
   C. 1/8 inch
   D. 1/16 inch

15. The power machine that generates large volumes of wood chips is the
   A. band saw
   B. bench saw
   C. jointer
   D. planer

16. For good results when planning lumber, the operator should
    A. make each final pass while planning with the grain
    B. make each final pass with a shallow cut
    C. end up with the desired thickness
    D. all of the above

Unit 17- Metalworking with Power Machines

1. After installing a drill in a gear chuck, the next important thing is to
    A. start the motor
    B. remove the chuck wrench
    C. place the table off center
    D. check the belt for tightness

2. Round stock is the best held for drilling by a
    A. C clamp
    B. Helper
    C. Vise
    D. V block

3. A grinding wheel may fly apart when running if the wheel does not have
    A. A coarse texture
    B. A coolant device
    C. A clean surface
    D. An adequate speed rating for the motor

4. Grinding wheels are cleaned and restored to roundness with a
    A. Grit cutter
    B. Screwdriver
    C. Wheel dresser
    D. All of the above

5. It is dangerous to grind
    A. With heavy pressure on the metal
    B. Using the side of the wheel
    C. Without wearing a face shield
    D. All of the above

6. Blades for power hacksaws are generally
    A. Less than 12 inches long
    B. 12 inches to 18 inches long
    C. ½ inches to 3/8 inch wide
    D. None of the above

7. A critical step to prevent breaking of power hacksaw blade is
   A. Buy brittle blades
   B. Clamp the work securely
   C. Cool the blade frequency
   D. Provide some slack in the blade

8. Gloves that are worn while doing metalwork should be made of
   A. Asbestos
   B. Cotton
   C. Leather
   D. All are recommended

9. Power metal shears can cut
   A. Angle stock
   B. Flat stock
   C. Round stock
   D. All of the above

Unit 18- Sketching and Drawing Projects

1. A simple plan must
   A. Be done with specialized equipment
   B. Be done by a draftsperson or engineer
   C. Have dimensions
   D. All of the above ‘

2. The triangle recommended as an aid for simple drawing is
   A. 30 degrees by 60 degrees by 90 degrees
   B. plastic
   C. three-sided
   D. all of the above

3. Which scale is best for making a three-view drawing on a sheet of 8 ½” by 11” paper of the project is 4 feet long, 2 feet wide, and 1 ½ feet high?
   A. 1”= 12”
   B. 1”= 6”
   C. 1”= 3”
   D. 1”= 1”

4. Which scale is best for making a drawing of the front view only on an 8 ½” by 11” sheet of paper if the project is 4 feet long, 2 feet wide, and 1 ½ feet high?
   A. 1”= 12”
   B. 1”= 6”

C. 1”= 3”
D. 1”= 1”

5. The process of first drawing the outside object lines for all three views is called
A. blocking in
B. pictorial drawing
C. scale drawing
D. sketching

Unit 21- Repairing and Reconditioning Tools

1. A common problem with wooden handles is
A. rotting
B. splitting
C. rusting
D. fatigue

2. Leather parts should be reconditioned with
A. neat’s-foot oil
B. saddle soap
C. lanolin products
D. any of the above

3. Hammer handles become loose if
A. the handle dries out
B. linseed oil is not applied occasionally
C. the handle is not properly installed
D. all of the above

4. Wooden handles should be treated with
A. linseed oil
B. shellac
C. paint
D. all of the above

5. A solvent recommended for removing grease and light rust is
A. gasoline
B. varsol
C. turpentine
D. water

6. After water touches an unprotected steel surface, rusting start within
A. hours
B. days

C. weeks
D. months

7. Rust may be prevented from forming on metal surfaces by applying
   A. oil
   B. water
   C. saddle soap
   D. all of the above

8. Split wooden handles are best repaired with
   A. nails
   B. screws
   C. glue
   D. tape

9. Driving tool handles are held in place by
   A. bolts
   B. nails
   C. screws
   D. wedges

10. When standard screwdrivers have rounded tips, they
   A. work better
   B. need replacing
   C. slip out of screw slots
   D. should be heated and reshaped

Unit 22- Sharpening Tools

1. The reason for learning tool-sharpening skills is that
   A. better work is possible with sharp tools
   B. sharp tools are easier to use
   C. sharp tools are safer
   D. all of the above

2. A 6” by 2” by 1” oil stone is called
   A. an ax stone
   B. a bench stone
   C. a common stone
   D. a slip stone

3. The best tool to sharpen an axe is a
   A. grinder

B. belt sander
C. portable disc sander
D. all of the above

4. When sharpening tools with a grinder, the tool rest should be
A. removed
B. placed at a 90-degree angle
C. placed to support the tool
D. pushed down out of the way

5. A properly ground drill must have the
A. proper angle
B. proper clearance
C. proper centering
D. all of the above

6. Hatches may be sharpened with
A. the common shop grinder with a medium wheel
B. a disc sander
C. a file
D. all of the above

Unit 23- Using Gas Welding Equipment

1. Gas can be compressed with a
A. cylinder
B. lever
C. pump
D. valve

2. Acetylene may be dangerous because it is
A. compressed
B. flammable
C. explosive
D. all of the above

3. Which has is not a fuel used for torches
A. acetylene
B. oxygen
C. propane
D. none of the above

4. Oxygen and acetylene hoses can stand pressure because they are
A. color coded

B. extra thick
C. made of steel
D. reinforced

5. Oxygen hoses and related equipment are color coded
A. green
B. ivory
C. orange
D. red

6. Acetylene hoses and related equipment are color coded
A. green
B. ivory
C. orange
D. red

7. The acetylene pressure to light a torch should be
A. 5 psi
B. 15 psi
C. 25 psi
D. 50 psi

8. Gas leaks are checked with
A. compressed air
B. flame
C. soapy water
D. Teflon

Unit 24- Cutting with Oxyfuels and Other Gases

1. Combustible gases were first used for welding
A. In the American space exploration program
B. In the 1800s
C. In the early 1900s
D. During World War II

2. The temperatures from gas flames using oxyfuels are
A. 150 degrees to 200 degrees
B. 400 degrees to 500 degrees
C. 1,000 degrees to 2,000 degrees
D. 5,000 degrees to 6,000 degrees

3. The result of burning iron in the presence of pure oxygen is
A. brass

B. propane
C. slag
D. weld

4. When cutting steel, the oxygen stream
   A. aids in keeping the steel hot
   B. drives out slag
   C. supports combustion
   D. all of the above

5. The fuel with the best qualities for welding and cutting is
   A. acetylene
   B. MAPP
   C. Natural gas
   D. Propane

6. A mixture of gases with excellent qualities for cutting is
   A. Acetylene
   B. MAPP
   C. Natural gas
   D. Propane

7. A cutting torch must be adjusted so that it is neutral when
   A. Cutting
   B. Preheating
   C. The oxygen lever is down
   D. All of the above

8. Correct oxygen and fuel pressure will vary with
   A. The tip
   B. The job
   C. The fuel
   D. All of the above

9. When correct torch cut is in progress, there will be a
   A. Smooth, even sound
   B. Spray of sparks
   C. Slightly dished kerf
   D. All of the above

10. When piercing, the clearance is increased after preheating to
   A. Increase for force of the oxygen stream
   B. Introduce more air into the process
   C. Provide time for heat to move through the metal

D. Reduce the hazard from molten metal

11. Plasma arc cutting is used to cut
    A. Aluminum
    B. Stainless steel
    C. Copper
    D. All of the above

Unit 25- Brazing and Welding with Oxy/acetylene

1. Welding is
    A. Uniting
    B. Heating
    C. Fusion
    D. All of the above

2. Brazing is much like
    A. Soldering
    B. Painting
    C. Fusion welding
    D. Arc welding

3. The most popular soldering alloy is
    A. Aluminum silicon
    B. Copper-zinc
    C. Silver
    D. Tin-lead

4. The most popular brazing alloy is
    A. Aluminum
    B. Copper-zinc
    C. Silver
    D. Tin-lead

5. Rust is a form of
    A. Dirt
    B. Galvanize
    C. Oxidation
    D. Weathered paint

6. Metal may be cleaned before brazing with a
    A. Brush
    B. Flux
    C. Emery cloth

D. All of the above

7. Two pieces lying flat and end-to-end may be joined by a
   A. Butt weld
   B. Corner weld
   C. Fillet weld
   D. Lap weld

8. Bonding solder or braze material to a piece of metal is called
   A. Brazing
   B. Fusion
   C. Soldering
   D. Tinning

9. The best distance between cone and puddle when fusion welding is
   A. ½ inch
   B. ¼ inch
   C. 1/8 inch
   D. 1/32 inch

10. The best torch angle for flat welding is
   A. 30 degrees
   B. 45 degrees
   C. 70 degrees
   D. 90 degrees

Unit 26- Selecting and Using Arc Welding Equipment

1. Voltage is a measure of
   A. rate of current
   B. electrical pressure
   C. available energy
   D. all of the above

2. A welder that gets its energy directly from a utility power plant is
   A. an alternator
   B. a generator
   C. a rectifier
   D. a transformer

3. When welding, the flux on an electrode
   A. forms a gas
   B. creates slag
   C. shields the weld

D. all of the above

4. Shielded metal arc welding is also called
   A. brazing
   B. electrode welding
   C. oxyacetylene welding
   D. stick welding

5. Suitable arc welders for farm use are
   A. fairly easy to use
   B. relatively inexpensive
   C. reliable
   D. all of the above

6. The output of a welder is relatively
   A. low voltage and high amperage
   B. high voltage and low amperage
   C. high voltage and high amperage
   D. low voltage and low amperage

7. Types of polarity on DC welders include
   A. reversed
   B. straight
   C. both of these
   D. none of these

8. The proportion of time that a welder can operate without overheating is known as its
   A. AC/DC
   B. AWS classification
   C. Duty cycle
   D. Voltage drop

9. A chipping hammer is used to
   A. Prepare edges for welding
   B. Remove scale from steel
   C. Remove slag
   D. Temper beads

10. An organization of people and agencies interested in promoting welding is the
   A. AWS
   B. EPA
   C. SAE
   D. WPA

Unit 27- Arc Welding Mild Steel and GMAW/GTAW Welding

1. The temperature of an electric welding arc is about
   A. 400 degrees
   B. 840 degrees
   C. 1,800 degrees
   D. 9,000 degrees

2. Welding table should be made of
   A. concrete
   B. Masonite
   C. Metal
   D. Wood

3. Fire extinguisher for welding areas should
   A. Class A fires
   B. Class B fires
   C. Class C fires
   D. All of the above

4. Burning clothes on a human should be extinguished with
   A. A fire blanket
   B. A fire extinguisher
   C. Sand
   D. Any of the above

5. Water in a welding area is useful for
   A. Receiving sparks from piercing
   B. Extinguishing fires
   C. Cooling metal
   D. All of the above

6. Injury to eyes can result from
   A. Chipping without goggles
   B. Viewing welding without shielding
   C. Welding with less that a No. 10 lens
   D. All of the above

7. If only one kind of electrode for all arc welding is to be purchased, the best choice is an
   A. E6010
   B. E6011
   C. E6013
   D. E7018

8. For most welding in agricultural mechanics, the best electrode size is
   A. 1/16 inch
   B. 1/8 inch
   C. 3/16 inch
   D. ¼ inch

9. Correct arc length is approximately
   A. 1/8 inch
   B. ¼ inch
   C. 3/8 inch
   D. ½ inch

10. When welding, the operator sees by
   A. daylight
   B. fluorescent light
   C. light from the arc
   D. all of the above

11. The appearance are strength of a bead arc influenced by
   A. amperage
   B. angle
   C. speed
   D. all of the above

12. The recommended position of the welder for horizontal and vertical welding is
   A. standing
   B. sitting
   C. the most comfortable one
   D. lying flat

13. The recommended weave pattern for the beginning welder doing down hand welding is
   A. circular
   B. figure eight
   C. J
   D. T

14. A second pass should never be done if
   A. The first was a poor weld
   B. The joint was ground
   C. The slag has been removed
   D. The slag has not been removed

15. In metal, the most rapid movement of heat is
   A. Down

B. Equal in all directions
C. Horizontal
D. Up

16. GMAW welding is especially useful for welding
A. Aluminum castings
B. Thin steel
C. Exhaust system parts
D. All of the above

17. The welding process that uses an automatic wire feed is
A. GMAW
B. Oxyacetylene
C. Stick
D. GTAW

Unit 30- Fundamentals of Small Engines

1. The thick plate that covers the cylinder is called a
A. Cap
B. Head
C. Seal
D. Valve

2. The four-stroke cycle begins with the piston
A. Right
B. Left
C. Up
D. Down

3. The compression ratio for most small engines is
A. 6:1
B. 7:2
C. 16:1
D. 2:1

4. Piston rings are need to
A. keep oil from getting in the combustion chamber
B. provide better compression
C. provide more power on the power stroke
D. all of the above

5. The valves are opened and closed by the action of
A. the throttle

B. the wrist pin
C. the camshaft
D. the bearings

6. When the exhaust valve is open and the intake valve is closed, the engine is on the
A. power stroke
B. intake stroke
C. exhaust stroke
D. compression stroke

7. When the engine is on the compression stroke
A. the intake valve is open
B. the exhaust valve and the intake valve are open
C. both valves are closed
D. only the exhaust valve is closed

8. The part of a coil that is made of several hundred turns of heave-gauge is called
A. the main circuit
B. the secondary circuit
C. the primary circuit
D. the complete circuit

9. The purpose of oil is on engine is to
A. lubricate
B. cool
C. clean
D. all of the above

10. Heat in an engine is dissipated by means of
A. cooling fins
B. a radiator
C. a water jacket
D. none of the above

Unit 32- Diesel Engines and Tractor Maintenance

1. Until the 1920s, diesels ran on
A. petroleum-based fuel
B. steam
C. vegetable oil
D. alcohol

2. The compression ratio for a typical diesel engine is
A. 8:1

B. 18:1
C. 6:1
D. 16:1

3. Oil must be
A. of the proper viscosity and grade
B. properly circulated
C. clean and fresh
D. all of the above

4. A hydrometer is used to
A. flush the radiator
B. verify levels of pressure
C. measure water temperature
D. determine if coolant needs changing

5. Compression-ignited engines may require an oil grade of
A. SC
B. CA
C. SD
D. CS

6. Water combined with fuel can cause enough corrosion to ruin the
A. Injector pump
B. Filtering system
C. Fuel tank
D. Radiator

7. Blue smoke indicates that
A. The injectors need serviced
B. The piston rings are worn
C. The filter needs replacement
D. The injector pump is corroded

8. To check for appropriate belt tension, press at the midpoint of the belt. It should move
A. 1 to 2 inches
B. ½ to 1 inch
C. 1/8 to ¼ inch
D. 5/8 to ¾ inch

9. The lubrication of front-wheel bearings on a two-wheel-drive tractor is done
A. through the drive train
B. from the fluid in the transmission
C. by packing with axle grease

D. with a solution of water and calcium chloride

10. If the clutch is manual, the linkage should be adjusted so that there is about _____ of play before the clutch is engaged

A. 1 inch
B. 2 inches
C. ¾ inch
D. 5/8 inch

Unit 33- Electrical Principles and Wiring Materials

1. The major power source for stationary equipment in houses, farm buildings, and agribusinesses is

A. diesel fuel
B. electricity
C. gasoline
D. steam

2. Electricity produces

A. chemical changes
B. heat and light
C. magnetism
D. all of the above

3. A device that produces direct current by means of magnetism is

A. a generator
B. an alternator
C. magnetism
D. all of the above

4. A device used to protect circuits that can be reset is a

A. three-way switch
B. ground-fault interrupter
C. fuse
D. circuit breaker

5. A device in circuits to protect against human shock is a

A. three-way switch
B. ground-fault interrupter
C. fuse
D. circuit breaker

6. Electricity is distributed to branch circuits by

A. an electric meter

B. an entrance head
C. a service drop
D. a service entrance panel

7. Tubes used to carry wires in called
A. armored cable
B. conduit
C. nonmetallic sheathed cable
D. pipe

8. A suitable wire for hire temperature, high moisture locations is
A. type T
B. type THHN
C. type THW
D. WVA

9. A cable consisting of No. 12 wire, one black, one red, one white, and a ground wire will be stamped
A. 12-2
B. 12-3
C. 12-3 w/g
D. 12-3 BRW

10. In order to run copper wire in a building 100 feet to a 10-ampre, 120-volt motor, and hold the voltage drop to 2 percent, the minimum size of the wire must be
A. No. 12
B. No. 10
C. No. 8
D. No. 6

Unit 34- Installing Branch Circuits

1. All electrical connections in a circuit are made
A. In boxes of fixtures
B. By screws
C. With solder
D. With tape

2. All metal electrical boxes must
A. Be grounded
B. Be securely fastened
C. Secure the cable or conduit
D. All of the above

3. Neutral wires are attached to screws colored
   A. White
   B. Green
   C. Silver
   D. Yellow

4. The device that receives electrical plugs is a
   A. Box
   B. Cap
   C. Circuit breaker
   D. Receptacle

5. White wires used as positive wires must be
   A. Connected to black wires
   B. Connected to fixtures
   C. Stripped of all insulation
   D. Taped or pained black

6. A properly wired circuit will be
   A. Grounded
   B. Open
   C. Shorted
   D. All of the above

7. In three-way switch circuits, electricity passes from one switch to the other through
   A. Traveler wires
   B. Neutral wires
   C. Common terminals
   D. None of the above

8. Three-way switch circuits usually include
   A. Two-wire cables
   B. Three-wire cables
   C. Grounded boxes
   D. All of the above

Unit 36- Electric Motors, Drives, and Controls

1. The most reliable factor to use when replacing a motor is
   A. Time required
   B. Specifications of the original motor
   C. Person choice
   D. Cost of motors

2. Another name for the case on a motor is
   A. Bearing
   B. Frame
   C. Shield
   D. Undercarriage

3. Components that transfer power from motor to machine make up the
   A. Clutch assembly
   B. Clutch housing
   C. Drive train
   D. Transmission

4. The device that disconnects a capacitor after a motor is up to speed is a
   A. Centrifugal switch
   B. Repulsor
   C. Sensor
   D. Voltage booster

5. A motor running at 1,750 rpm with a 3-inch pulley will drive a machine with a 2-inch pulley at
   A. 830 rpm
   B. 1,240 rpm
   C. 2,630 rpm
   D. 3,500 rpm

6. The formula for calculating horsepower is W(lb) X D(ft) X T(sec) divided by
   A. 10
   B. 50
   C. 500
   D. 550

7. One type of direct motor drive is
   A. belt and pulleys
   B. differential
   C. flexible shift
   D. transmission

8. The best pulley for changing speeds frequently is
   A. adjustable
   B. standard
   C. step
   D. variable-speed

9. The device that permits shifting of gears is
   A. transmission

B. sensor
C. differential
D. clutch

10. Motors are best protected from burnout by
A. circuit breakers
B. fuses
C. overload protectors
D. all of the above

Unit 39- Hydraulic, Pneumatic, and Robotic Power

1. Fluid power is
A. hydraulics
B. pneumatics
C. pneumatics and hydraulics
D. pneumatics, hydraulics, and electricity

2. Linear power is provided directly by
A. pistons in cylinders
B. fluid couplings
C. motors
D. rotational robot axes

3. Force acting on an area is
A. compression
B. horsepower
C. measured in pounds
D. pressure

4. Important laws of force and pressure in hydraulics were formulated by
A. Bernoulli
B. Bourdon
C. Boyle
D. Pascal

5. Pressure (in psi) = force (in pounds) divided by
A. Area (in square inches)
B. Distance (in inches)
C. Number of pistons
D. Time (in seconds)

6. The volume of a gas is inversely proportional to its
A. Weight

B. Temperature
C. Pressure
D. Area

7. When fluid flows through a pipe and encounters a decrease in pipe diameter, pressure in the narrower area
A. Cannot be predicted
B. Decreases
C. Increases
D. Remains the same

8. Which is not a type of hydraulic pump?
A. Vane
B. Ratchet
C. Piston
D. Gear

9. The full-flow system refers to the use of
A. Valves
B. Spools
C. Lines
D. Filters

10. A hollow sphere working area can be achieved with
A. Three translational axes
B. Two translational axes and one rotational axis
C. Two rotational axes and one translational axis
D. None of the above

Unit 40- Concrete and Masonry

1. Concrete is a mixture of sand, gravel, water, and
A. Clay cement
B. Finishing cement
C. Finishing lime
D. Portland cement

2. Mortar is a mixture of Portland cement, sand, water, and
A. Aggregate
B. Clay
C. Finishing cement
D. Finishing lime

3. The strength and durability of concrete are dependent upon the

A. Purity of water
B. Proportion of stone particles by size
C. Type of cement
D. All of the above

4. A concrete slab that is 6 inches deep by 10 feet wide by 20 feet long will contain
A. 2 cubic yards of concrete
B. 2.5 cubic yards of concrete
C. 3.7 cubic yards of concrete
D. 5.0 cubic yards of concrete

5. Forms for concrete slabs are usually made of
A. 2” X 4”
B. 2” X 8”
C. 2” X 10”
D. none of the above

6. To prevent forms from sticking to the concrete, they are treated with
A. fat
B. oil
C. paint
D. wax

7. Concrete is reinforced with
A. air bubbles
B. aluminum wire
C. steel bars
D. wood fires

8. Concrete is cured by
A. covering with plastic
B. protecting from wind
C. sprinkling with water
D. all of the above

9. A standard-sized block when laid will cover an area
A. 8 inches high by 16 inches long
B. 4 inches high by 16 inches long
C. 8 inches high by 12 inches long
D. none of the above

10. Courses of block are laid in a straight line by using a
A. center point
B. line

C. plumb bob
D. sighting tool