

Agriculture (PA) (0780)

Test at a Glance

Test Name	Agriculture (PA)		
Test Code	0780		
Time	2 hours		
Number of Questions	120		
Format	Multiple-choice questions		
	Content Categories	Approximate Number of Questions	Approximate Percentage of Examination
	I. Soil Science II. Plant Science III. Animal Science IV. Agricultural Economics V. Agricultural Mechanics VI. Leadership and Supervised Occupational Experience	18 18 18 18 24 24	15% 15% 15% 15% 20% 20%

About This Test

The Agriculture (PA) test is designed to measure the professional knowledge of prospective teachers of agriculture in junior and senior high schools in the state of Pennsylvania.

Of the 120 multiple-choice test questions, approximately 40 percent assess knowledge, and approximately 60 percent assess the ability to apply knowledge in the solution of problems. Knowledge questions involve the recall of terms, facts, principles, generalizations, and classifications; application questions invite problem solving through direct application of scientific principles and theories. Examinees typically have completed a bachelor's degree program in agricultural education.

The six content areas of the test cover soil science, plant science, animal science, agricultural economics, agricultural mechanics, and leadership and supervised occupational experience.

This test may contain some questions that do not count toward your score.

Topics Covered

Representative descriptions of topics covered in each category are provided below.

I. Soil Science

- Soil morphology: structure, texture, types, classes, profiles
- Soil and water management: conservation, reclamation, drainage, erosion
- Land use: preservation
- Soil fertility: testing, restoration
- Careers
- Safety
- Marketing issues: futures, standards, inspections, quality control, transportation, advertising, appraisals
- Legal issues: ownership modes, vertical and horizontal integration, contracts and leases, water rights, estate planning
- Agribusiness: service, supplies
- Careers
- Safety issues

II. Plant Science

- Anatomy and physiology
- Crops: forage crops, grains, vegetables, fruits, greenhouse crops, varieties, forestry, ornamental plants
- Plant culture: nutrition, environment, irrigation, photo-periodism, design, planting, pruning, propagation, pests and diseases, timing, rotation, selection
- Harvesting, processing, and storing
- Careers
- Safety issues

III. Animal Science

- Anatomy and physiology
- Types and breeds: dairy and beef cattle, swine, poultry, sheep, horses, goats, bees, fish, small animals, wild animals
- Management: feeding, housing, diseases and parasites, pests, habitat, reproduction, paravetetics, selection
- Products and processing: fiber, milk, meat, eggs
- Careers
- Safety issues

IV. Agricultural Economics

- Economic principles: supply and demand, surpluses, margins, opportunity costs
- Management: records, computers, realty taxes, income taxes, income and expense, budget and actual, profit and loss, asset and liability, appreciation and depreciation, investments, credit, real estate, enterprise analysis, subsidies, government agencies

V. Agricultural Mechanics

- Power and machinery: implements; equipment for feeding, milking, unloading, handling livestock, tilling, planting, and harvesting; engines; tractors; maintenance and repair; troubleshooting; hydraulics
- Soil and water structures: surveying, maintenance and repair
- Construction: plans and designs, electricity, plumbing, water systems, heating and cooling, maintenance and repair, buildings, storage structures, fencing
- Farm shop practices: welding, metalworking, woodworking, using hand tools, using power tools
- Careers
- Safety issues

VI. Leadership and Supervised Occupational Experience

- Leadership topics as linked to FFA and to young and adult farmer programs focus on:
 - personal development, including public speaking, degrees, camps and workshops, sales, contests and awards, visitations
 - organizational concerns, including meetings, parliamentary procedure, committees, officer responsibilities, public relations, program of work, communications media, community service, fund-raising, contests, awards
 - career issues
- Supervised occupational experience: types of experience, such as production, placement, laboratory, conservation; goals; planning; approved practices; competency development; record keeping; analysis; supervision; careers; safety issues

Sample Test Questions

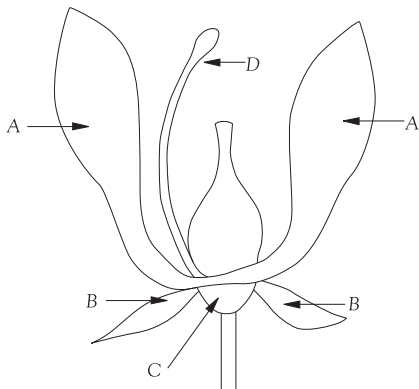
The sample questions that follow illustrate the kinds of questions in the test. They are not, however, representative of the entire scope of the test in either content or difficulty. Answers with explanations follow the questions.

Directions: Each of the questions or statements below is followed by four suggested answers or completions. Select the one that is best in each case.

- If the permeability of the subsoil is rapid, the subsoil texture is most likely classified as
 - coarse
 - medium
 - fine
 - clayey
- The maximum depth plant roots can readily penetrate without encountering a restrictive soil layer is referred to as the
 - permeability
 - effective depth
 - depth to the subsoil
 - depth to the parent material

Directions: Questions 3 and 4 consist of a diagram containing four lettered headings followed by numbered questions. For each numbered question, select the one heading that best answers the question. One heading may be used once, more than once, or not at all.

Questions 3–4 relate to the diagram of the flower shown below.



- Which letter identifies a structure NOT present in a pistillate flower?
- Which letter identifies the receptacle?

Questions 5–8 relate to a market steer project.

Jan. 1 purchased:

1 feeder calf, 600 pounds @ \$70.00/cwt

2 tons ground corn @ \$5.00/cwt

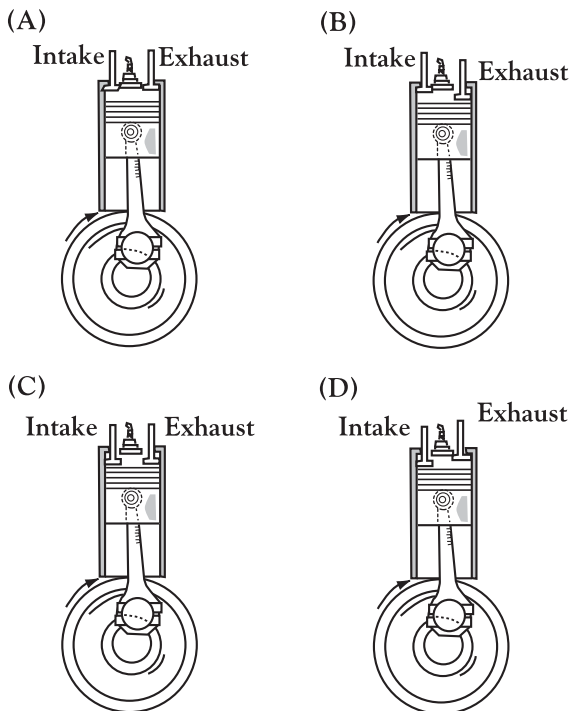
1 ton hay @ \$60.00/ton

Aug. 1 sold:

1 finished steer, 1,100 pounds @ \$65.00/cwt

- The grain-to-gain ratio is
 - 3.6:1
 - 5.5:1
 - 8.0:1
 - 12.0:1
- The average daily gain was most nearly
 - 2.4 lb
 - 2.9 lb
 - 5.2 lb
 - 7.1 lb
- If one considers the purchase price of the steer, the sale price of the steer, and the cost of the feed, the net income is
 - \$ 20.50
 - \$ 35.00
 - \$135.00
 - \$205.00

8. If the steer had been fed 1 ton of corn and 2 tons of hay instead, what would the net income have been, given the same weight gain?
- (A) \$ 40.00
 (B) \$ 75.00
 (C) \$135.00
 (D) \$160.00
9. Before removing a gas-powered lawn mower blade, it is most important to do which of the following?
- (A) Clean off matted grass clippings
 (B) Adjust the wheels to their highest level
 (C) Remove the spark plug
 (D) Empty the gas tank
10. Which of the following diagrams shows the correct positions of the intake and exhaust valves of a four-stroke internal combustion engine during the intake stroke?



11. Which of the following is NOT a purpose of using parliamentary procedure to conduct meetings?
- (A) To ensure that all members have an equal opportunity to participate
 (B) To encourage debate on all issues so that relevant information will be brought forth
 (C) To increase the power of the elected officers
 (D) To transact meetings in an efficient manner
12. The primary purpose of a Supervised Agricultural Experience (SAE) program is to
- (A) provide a basis to apply for and win proficiency awards
 (B) provide the student income with which to learn money management
 (C) earn enough money to qualify for local, state, and national FFA degrees
 (D) apply skills learned in the classroom and to learn new skills in a specialized area
13. Which of the following concepts in *Robert's Rules of Order* requires that motions be dealt with in order of importance?
- (A) Order of business
 (B) Call to order
 (C) Orders of the day
 (D) Order of precedence
14. The loss of water in the form of vapor from plants is referred to as
- (A) transpiration
 (B) respiration
 (C) oxidation
 (D) condensation

15. Which of the following is a disorder in ruminants characterized by an excessive accumulation of gas in the rumen?
- (A) Agalactia
 - (B) Bloat
 - (C) Foot-and-mouth
 - (D) Bovine pleuropneumonia
16. Which of the following is LEAST effective for controlling soil erosion caused by wind and water?
- (A) Planting windbreaks
 - (B) Planting cover crops
 - (C) Removing crop stubble from the surface
 - (D) Using conservation tillage
17. Which of the following is the best power hand tool and the best position for cutting a strip 14 inches wide by 8 feet long from a 4-foot-by-8-foot sheet of 3/4-inch A/C plywood?
- (A) Portable jigsaw, A side up
 - (B) Portable jigsaw, C side up
 - (C) Portable circular saw, A side up
 - (D) Portable circular saw, C side up
18. Which of the following is the most probable effect of tariffs or quotas on domestic prices and domestic production?
- (A) Both prices and production increase.
 - (B) Both prices and production decrease.
 - (C) Prices decrease, but the impact on production is indeterminate.
 - (D) Prices decrease, and production increases.
19. Which of the following breeds of cattle does NOT have Brahman blood?
- (A) Brangus
 - (B) Simmental
 - (C) Santa Gertrudis
 - (D) Barzona
20. Moderate and frequent irrigation would normally be most appropriate for a corn crop growing in a
- (A) dispersed alluvial fan soil
 - (B) heavy-textured soil, such as silty clay
 - (C) light-textured soil, such as a loamy sand
 - (D) region of high humidity
21. A farmer buys a new tractor for \$40,000 and expects to use it for twenty years, after which the tractor will have a salvage value of \$10,000. What is the straight-line depreciation that can be taken for the first year of ownership?
- (A) \$1,500
 - (B) \$1,667
 - (C) \$2,000
 - (D) \$2,250
22. The demand for which of the following products is likely to be the most elastic?
- (A) Milk
 - (B) Bread
 - (C) Salt
 - (D) Pork
23. Which of the following most likely indicates the presence of water in the hydraulic system in a piece of farm machinery?
- (A) A grayish, milk-colored fluid
 - (B) Excessive fluid use
 - (C) Excessive thinning of the fluid
 - (D) A noisy relief valve

Answers

1. The correct answer is A. Permeability refers to the ability of air and water to pass through the subsoil. Coarse-textured soils have larger particles (sand) and larger spaces between the particles that facilitate the passage of water and air. The smaller particles, medium and fine textures, provide more of a barrier to air and water movement.

2. The correct answer is B. The subsoil is easily penetrated by plant roots, and its depth is included in the effective depth measurement. Depending on the makeup of the parent material, effective depth may end at the beginning of the parent material. Very often, however, the parent material is nonrestrictive in the upper portion and is therefore included in the effective depth. Permeability refers to the ability of water and air to move through the soil.

3. A pistillate flower is one that contains only the pistil—the female reproductive portion of a flower. The correct answer, D, identifies the stamen, the male portion of the flower. In pistillate flowers, the stamen is not present. All other flower parts shown in the diagram are present in both staminate and pistillate flowers.

4. The correct answer is C. The swollen base of the flower-supporting stem is called the receptacle.

5. The correct answer is C. The grain-to-gain ratio is determined by dividing the pounds of grain fed by the pounds of gain.

To determine the weight gain, subtract the beginning weight (600 pounds) from the finished weight (1,100 pounds). The result is 500 pounds.

To determine the pounds of grain, convert the 2 tons of corn to pounds. Note that the hay is not included because it is roughage, not grain. The product of 2 times 2,000 pounds is 4,000 pounds of grain fed.

The final step is to divide 4,000 pounds (grain) by 500 pounds (the pounds of gain). The result is 8 or 8:1.

6. To determine the average daily gain on feed, it must be determined how many days the animal was on feed and how much weight it gained. The total gain on feed is then divided by the number of days on feed.

To determine the number of days on feed, the number of days in each month, January through July, are added. The sum is 212 days.

To determine the weight gain, subtract the beginning weight (600 pounds) from the finished weight (1,100 pounds). The result is 500 pounds.

The final step is to divide the gain in pounds (500) by the number of days on feed (212). The result is 2.358 pounds per day, rounded to 2.4 pounds, making choice A correct.

7. Net income for this problem is determined using the following formula and mathematical procedure.

Net income =

(sales price – purchase price) – (cost of corn + cost of hay)

Purchase price =

$$(600 \text{ pounds} \div 100) \times \$70 \text{ per cwt.} = \$420$$

Sales price =

$$(1,100 \text{ pounds} \div 100) \times \$65 \text{ per cwt.} = \$715$$

Cost of corn =

$$(2 \text{ tons} \times 2,000 \text{ pounds per ton}) \div 100 \times (\$5 \text{ per cwt.}) = \$200$$

Cost of hay = 1 ton \times \$60 per ton = \$60

Net income = (\$715 – \$420) – (\$200 + \$60)

Net income = \$35

The correct answer is B.

8. Net income for this problem is determined using the following formula and mathematical procedure.

Net income =

(sales price – purchase price) – (cost of corn + cost of hay)

Purchase price =

$$(600 \text{ pounds} \div 100) \times \$70 \text{ per cwt.} = \$420$$

Sales price =

$$(1,100 \text{ pounds} \div 100) \times \$65 \text{ per cwt.} = \$715$$

Cost of corn =

$$(1 \text{ ton} \times 2,000 \text{ pounds per ton}) \div 100 \times (\$5 \text{ per cwt.}) = \$100$$

Cost of hay = 2 tons \times \$60 per ton = \$120

Net income = (\$715 – \$420) – (\$100 + \$120)

Net income = \$75

The correct answer is B.

9. The best answer is C. Removing the spark plug is an important safety procedure before working on or near the lawn mower blade because doing so will prevent accidental starting of the mower.

10. The correct answer is D. During the intake stroke, the intake valve (as labeled in the diagram) must be open so that fuel can enter the piston cylinder, and the piston must be moving down to pull the fuel down into the cylinder. The exhaust valve must be closed during intake to prevent air from entering the cylinder instead of fuel.

11. The correct answer is C. The power of the officers of the organization is not increased through the use of parliamentary procedure, although it protects their rights just as it does for individuals. Parliamentary procedure ensures that the democratic process is followed. This is accomplished by promoting majority rule while protecting the rights of the minority and by encouraging freedom of speech.

12. The best answer is D. Learning through applying acquired skills while acquiring new skills in a specialized interest is the primary purpose of SAE programs.

13. The correct answer is D. *Robert's Rules of Order* state that motions must be taken in order of priority or precedence. Order of business is the usual agenda that an organization will follow in conducting its meetings. Call to order is made by the chairperson to begin the meeting or to restore order during the meeting. Orders of the day is a privileged motion used when the agenda is not being followed. Point of order is an incidental motion used to stop incorrect actions and to insist on the enforcement of parliamentary rules.

14. The correct answer is choice A. Transpiration is the release of water vapor from living plants.

15. The correct answer is choice B. Bloat is the visible distention of the belly of ruminants due to excess buildup of gases in the rumen.

16. The best answer is C. Crop stubble helps to hold soil in place and thus reduce erosion. The other choices are recommended practices for reducing the effects of wind on the soil.

17. The correct answer is D. The portable circular saw is the best power hand tool for a job requiring a straight cut. Since the blade teeth move up through the wood, the lower-quality C side of the plywood should be the upper surface in order to avoid splinter damage to the more valuable A side.

18. The correct answer is A. Tariffs or quotas mean that some type of restriction is put on imported products. With fewer products on the market, buyers bid up the price of the domestic product to ensure their supply.

19. The correct answer is B. Simmental is the only breed listed that is not a Brahman (*Bos indicus*) cross. Simmentals originated in the Simmen Valley of Switzerland in the Middle Ages.

20. The correct answer is C. Water drains rapidly out of light-textured soils, leaving the root zone dry. Moderate, frequent applications of water will provide more consistent moisture in the root zone than infrequent, heavy watering will.

21. The correct answer is A. The tractor's value will drop by \$30,000 (from \$40,000 to \$10,000) over twenty years. The annual loss in value (depreciation) thus averages \$1,500 per year.

22. The best answer is D. Of the products listed, only pork has several substitutes that consumers can buy if the price of pork becomes too high.

23. The correct answer is A. A grayish, milk-colored fluid is indicative of water in the hydraulic system.



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