APES Unit 5: Soil & Agriculture Review Packet

Part 1: Surface Layer

1. What are some of the ecosystem services provided by soil?
2. What is soil made up of percentage wise?
3. What are the components that dictate soil formation? How would climate change affect the rate of soil formation?
4. Which areas have fertile soil? Infertile soil?
5. What is a soil profile? What are soil horizons?
6. Be familiar with the different physical or chemical properties of soil:
    a. Cation exchange capacity – explain this process, and what it means
    b. Soil pH
    c. Soil texture – how do you use a soil texture triangle?
    d. Particle size – which of three particles is the largest? Smallest? What does this mean about....
        i. Porosity
        ii. Permeability
        iii. Nutrient holding capacity
        iv. Water holding capacity
        v. Aeration/Drainage
7. What are the two different types of agriculture?
8. Describe the Green Revolution.
9. How does soil erosion occur? What are some methods to prevent soil erosion?
10. How does nutrient depletion occur in soil?
11. What is clearcutting and how does it affect soil quality(slash and burn technique)?
12. What are the two types of fertilization? Environmental issues with fertilization?
13. What are the two types of pesticides? Environmental issues with pesticides?
14. Define IPM. What are the benefits and drawbacks from IPM methods?
15. What are the two main issues with irrigation? How can we prevent these issues?What is the most efficient type of irrigation.
16. Explain the process of soil salinization.
17. What are the main agencies associated with governing agriculture?
18. Identify different methods of meat production and describe their benefits and drawbacks in terms of energy consumption, greenhouse gas emission, antibiotic and hormone use, as well as quantity of meat.
19. How does overgrazing affect soil? What is desertification?
20. Describe the causes of and problems related to overfishing.
21. What are some benefits and drawbacks to aquaculture?
22. **Explain the concept of sustainability.**
23. Describe sustainable agriculture and food production practices.

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Part 2: Application - Multiple Choice

1. What are the five primary soil formation factors?
    a. Altitude, climate, parent material, latitude, organisms
    b. Climate, parent material, pH, organisms, topography
    c. Parent material, topography, organisms, timie, latitude
    d. Parent material, climate, pH, latitude, altitude
    e. Climate, parent material, topography, organisms, time

2. What type of soil would be best for a man-made pond, where the goal is to have as little leakage of water as possible?
    a. Mostly clay
    b. Mostly silt
    c. Mostly sand
    d. Equal amounts of sand, silt, and clay
    e. Equal amounts of sand and silt

3. If 12,000,000 kilocalories of chick can be produced per hectare, how much land is needed to provide someone with 2,000 kilocalories/day for a year?
    a. 0.01 ha
    b. 0.02 ha
    c. 0.06 ha
    d. 0.2 ha

4. Which of the following is NOT a benefit of genetically modified organisms?
    a. Decreased pesticide use
    b. Increased profits
    c. Increased resistance to extreme weather
    d. Increased crop yield
    e. Increased genetic diversity

5. Irrigation can result in which of the following environmental problems?
    I. Reduction of evaporation rates
    II. Accumulation of salts in soils
    III. Waterlogging of soil and plant roots

    a. I only b. II only c. III only d. I and II e. II and III

6. The use of synthetic fertilizers increases crop yields, but also
    a. Destroys the nitrifying bacteria in the soil
    b. Increases fish populations in nearby streams
    c. Decreases phosphorus concentrations in the atmosphere
    d. Increases nutrient runoff into bordering surface waters
    e. Slows the release of organic nutrients from compost

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7. In which of the following ways did the Green Revolution increase food production?
   I. The development of disease resistant and high yielding crops
   II. Monocropping and the widespread use of machinery
   III. The application of fertilizers and the use of irrigation techniques

   a. I only b. II only c. III only d. I and III e. I, II and III

8. Which of the following is an environmental advantage of no-till agriculture?
   a. The use of herbicides improves the stability of the soil
   b. Migratory bird populations are reduced
   c. The undisturbed soil is less susceptible to erosion
   d. The crop residues reduce the soil profile

9. Which of the following practices is NOT part of integrated pest management?
   a. Crop rotation
   b. Elimination of pesticides
   c. Use of pest resistant crops
   d. Introduction of biological predators
   e. Frequent inspection of crops

10. Farmers who practice organic agriculture have less of an impact on the environment than farmers who practice industrial agriculture because
    a. Use no-till agriculture exclusively
    b. Import soil to maintain soil fertility
    c. Maintain large farms with single crop
    d. Avoid pesticides and synthetic fertilizers
    e. Have lower labor costs

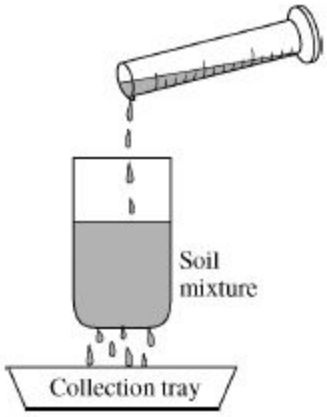
11. Critics using genetically modified organisms as food crops warn of which of the following dangers?
    I. Introduction of new allergens into the food supply
    II. Loss of genetic diversity in food crops
    III. Decreases in food production worldwide

    a. I only b. II only c. III only d. I and II e. I and III

12. Switching from customary large-scale agricultural practices to which of the following is most likely to reduce the exposure of farmworkers and nearby residents to toxic chemicals?
    a. No-till cultivation
    b. Integrated pest-management
    c. Contour plowing
    d. Crop dusting
    e. Use of cover crops

13. A farmer observes that increasingly higher concentrations of a particular pesticide have been required each year over the past ten years to achieve the same level of effectiveness on a specific insect pest. Which of the following best explains this observation?
    a. Some individual insects live longer than others and pass on traits acquired during their lives
    b. Only the most aggressive and territorial insects survive and reproduce
    c. Some individual insects are more likely than others to survive and reproduce due to their inherited traits
    d. Some individual insects produce many offspring, and thus their offspring live longer
    e. Some individual insects reproduce before the pesticide is applied, thereby avoiding its harmful effects

Questions 15 – 16 refer to the diagram below, which shows 100 ml of water being poured through a soil sample. After the water has passed through the soil, 98 ml of water is measured in the collection tray below the sample.



15. Off the following, which is the most likely composition of the soil sample?

	Clay	Silt	Sand
(A)	80%	10%	10%
(B)	50%	40%	10%
(C)	40%	50%	10%
(D)	30%	40%	30%
(E)	10%	10%	80%

16. Which of the following properties of the soil sample most influences the flow of water through the sample?
    a. Color
    b. Fertility
    c. Permeability
    d. pH
    e. Salinity

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17. Which of the following problems is best addressed with contour plowing?
    a. Eutrophication
    b. Denitrification
    c. The pesticide treadmill
    d. Soil erosion
    e. Soil salinization

18. Which of the following represents a correct pairing of an agricultural practice with its environmental consequence?
    a. Paddy rice cultivation and methane emissions
    b. Plowing under cover crops and nutrient depletion
    c. Organic corn cultivation and pesticide accumulation
    d. No-till farming and increased soil erosion
    e. Planting vegetated buffers on stream banks and increased levels of nonpoint source pollution

19. Overgrazing of grasslands can lead to reduced range quality. Two major effects of overgrazing are
    a. Erosion and desertification
    b. Higher fire potential and increased productivity
    c. Eutrophication and increased methane production
    d. Higher primary productivity and ammonification
    e. Soil compaction and subsidence

20. Of the following, which has the highest cation exchange capacity?
    a. Clay
    b. Loam
    c. Sand
    d. Silt
    e. humus

21. Which type of farm would you find using compost in their soil, allowing animals to pasture at all times, and using antibiotics only for ill animals?
    a. cage-free farm for poultry
    b. a concentrated animal feed-lot for beef
    c. grass-fed pasture for meat production
    d. industrial poultry farm

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Part 3: Synthesis – FRQ Practice

Complete the graphic organizer below. This will help prepare you for the FRQ section on your exam

Industrialized Agriculture Component	***Environmental Issues***	***Economic Issues***	***Societal Issues***	***Conservation Methods to maintain soil quality***
Monocropping				
Fertilizers				
GM crops				
Pesticides				
Irrigation				

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