

The number of points (out of a total of 150) that each question is worth is indicated in parentheses. For multiple choice questions, provide the BEST answer. Good luck!

1. (3) Your name: _____
2. (3) A primary advantage of soil-applied herbicides is
 - a. residual activity will continue to provide weed control after the application
 - b. they are much cheaper than foliar-applied herbicides
 - c. their binding to the soil limits environmental contamination
 - d. they provide more consistent weed control
3. (3) As defined by the Federal Noxious Weed Act, a noxious weed is
 - a. any plant deemed especially harmful
 - b. a plant not already present, or not widely present, in the U.S.
 - c. a plant that produces seed that may contaminate crop seed
 - d. defined separately for each state by each state
4. (3) Dinitroaniline herbicides
 - a. require light for activity
 - b. are foliar applied
 - c. are soil applied
 - d. primarily control broadleaf weeds
5. (3) The Casparian strip
 - a. is a barrier to herbicide uptake via roots
 - b. is a barrier to herbicide uptake via leaves
 - c. provides a conduit for herbicide movement through the xylem
 - d. provides a conduit for herbicide movement through the phloem
6. (3) Herbicide metabolism in plants is mediated to large extent by
 - a. P450s and protoporphyrinogen
 - b. P450s and GSTs
 - c. GSTs and peroxidases
 - d. benoxacor and dichlormid
7. (3) Collego is an example of
 - a. a non-selective herbicide
 - b. classical biocontrol
 - c. inoculative biocontrol
 - d. inundative biocontrol
8. (3) Thorough plant coverage is most important for a
 - a. phloem-mobile herbicide
 - b. contact herbicide
 - c. systemic herbicide
 - d. xylem-mobile herbicide
9. (3) A restricted-use herbicide
 - a. can only be used in non-crop areas
 - b. can only be used in non-food crops
 - c. can only be sold to a certified applicator
 - d. can only be used until the existing supplies are exhausted

10. (3) Your Balance Pro herbicide label has become obscured. You can see only that the recommended rate for a silt soil containing < 1.5% O.M. is 3 to 3.75 oz per acre. What would you guess is the recommended rate for a clay soil with > 1.5% O.M.?
- 1.5 to 2 oz per acre
 - 2.25 to 3 oz per acre
 - 3 to 3.75 oz per acre
 - 3.75 to 4.5 oz per acre
11. (3) Bipyrindinium herbicides
- are contact herbicides
 - are translocated in the phloem and xylem
 - primarily control broadleaf weeds
 - primarily control grass weeds
12. (3) The plasma membrane
- is a barrier to herbicide transport through the apoplast
 - houses the photosynthetic apparatus
 - surrounds xylem cells
 - surrounds cell cytoplasm
13. (3) Diphenylether herbicides
- primarily control broadleaf weeds
 - are primarily soil applied, but have some foliar activity
 - are non-selective herbicides
 - are slow acting
14. (3) Triketone herbicides
- are used in non-crop areas
 - are used in aquatic environments
 - are used in soybean
 - are used in corn
15. (3) What term would best describe a waterhemp population that has evolved to survive both diphenylethers and triazines?
- multiple resistance
 - multiple tolerance
 - cross resistance
 - cross tolerance
16. (3) According to the acid-trapping hypothesis, herbicides that are weak acids accumulate inside cells
- because they are attracted to the acidic environment inside the cell
 - because they become ionized inside the cell, hindering movement back across the cell membrane
 - because they raise the pH inside the cell
 - because they lower the pH inside the cell
17. (3) The cost of developing a new herbicide is about
- \$250,000
 - \$5 million
 - \$75 million
 - \$1 billion

18. (3) A phloem-mobile herbicide will accumulate in
- roots
 - meristems
 - flowers and seeds
 - all of the above
19. (3) Acid amide herbicides
- are foliar applied to control grasses
 - are soil applied to control grasses and small-seeded broadleaf weeds
 - are foliar applied and non-selective
 - are soil applied and control broadleaf weeds
20. (3) A perennial weed would most likely be killed if it received a
- systemic herbicide just before flowering
 - contact herbicide just before flowering
 - systemic herbicide during seed fill
 - contact herbicide during seed fill
21. (3) Most cases of weed resistance are to what herbicides?
- ALS inhibitors
 - ACCase inhibitors
 - HPPD inhibitors
 - PPO inhibitors
22. (3) Benzoic acid herbicides
- are primarily soil applied to control grass weeds
 - are primarily soil applied to control broadleaf weeds
 - are primarily foliar applied to control grass weeds
 - are primarily foliar applied to control broadleaf weeds
23. (3) As a mechanical weed control strategy, mowing
- effectively controls perennial weeds
 - is more effective on summer annuals than winter annuals
 - is ineffective for management of biennial weeds
 - can be effective at reducing seed production
24. (3) Herbicide safeners work by
- increasing herbicide metabolism
 - reducing herbicide uptake
 - altering the herbicide site of action
 - reducing herbicide translocation
25. (3) Crop-weed selectivity to this group of herbicides is mediated by differences at the site of action
- ALS inhibitors
 - ACCase inhibitors
 - HPPD inhibitors
 - PPO inhibitors
26. (3) Weed resistance to this group of herbicides does NOT yet exist in Illinois
- HPPD inhibitors
 - triazines
 - PPO inhibitors
 - ACCase inhibitors

27. (3) Liberty Link corn
- was made resistant to PPO inhibitors via genetic engineering for increased herbicide metabolism
 - was made resistant to PPO inhibitors via genetic engineering for an altered SOA
 - was made resistant to glufosinate via selection of a mutagenized population for an altered SOA
 - was made resistant to glufosinate via genetic engineering for increased herbicide metabolism
28. (3) A herbicide with which of the following ionic charges would be most tightly bound to the soil
- 1
 - 2
 - +1
 - +2
29. (3) Which of the following statements is FALSE?
- Triazine resistance is usually spread only by seed, and not by pollen.
 - Biennial and perennial weeds are most likely to evolve resistance.
 - Triazine-resistant biotypes are usually less fit than sensitive biotypes in the absence of herbicide.
 - Repeated use of the same herbicide is the most important cause of weed resistance.
30. (3) Phenoxy-carboxylic acid herbicides
- are primarily soil applied to control grass weeds
 - are primarily soil applied to control broadleaf weeds
 - are primarily foliar applied to control grass weeds
 - are primarily foliar applied to control broadleaf weeds
31. (3) A biological control success story currently taking place in Illinois involves this weed
- Canada thistle
 - purple loosestrife
 - tall waterhemp
 - leafy spurge
32. (3) Imidazolinone herbicides
- are fast acting
 - are commonly used in soybean
 - have only foliar activity
 - control primarily grasses
33. (3) Aryloxyphenoxypropionic acid herbicides
- are primarily soil applied to control grass weeds
 - are primarily soil applied to control broadleaf weeds
 - are primarily foliar applied to control grass weeds
 - are primarily foliar applied to control broadleaf weeds
34. (3) A herbicide that has only soil activity and is rapidly degraded by UV light would be applied
- postemergence
 - preplant
 - preplant-incorporated
 - preemergence
35. (3) Triazine herbicides
- have both foliar and soil activity
 - primarily control broadleaves but also have some grass activity
 - are translocated only in the xylem
 - all of the above

36. (3) The pK_a of a herbicide refers to
- how strongly it is adsorbed to soil
 - how strongly it is adsorbed to the organic fraction of the soil
 - its vapor pressure
 - the pH at which it is half ionized
37. (8) Besides preventative strategies, what are the four general weed control strategies?
38. (3) Give an example of a cultural weed control strategy that could be used to manage weeds in a pasture.
39. (26) For each herbicide or herbicide family, write the letter of the correct site of action. (Some letters may be used more than once or not at all.)
- | | |
|---|-------------------------|
| i. ___ sulfonylureas | a. ALS |
| ii. ___ isoxaben | b. ACCase |
| iii. ___ diphenylethers | c. D1 protein |
| iv. ___ triketones | d. tubulin |
| v. ___ pyrimidinylthiobenzoates | e. glutamine synthetase |
| vi. ___ glufosinate | f. HPPD |
| vii. ___ dinitroanilines | g. cellulose synthase |
| viii. ___ glyphosate | h. PPO |
| ix. ___ N-phenylphthalimides | i. EPSP synthase |
| x. ___ imidazolinones | |
| xi. ___ triazines | |
| xii. ___ cyclohexanediones | |
| xiii. ___ aryloxyphenoxypropionic acids | |

Using the list of herbicide families in question 39, write the appropriate Roman numeral on the blank next to each structure below.

40. (2) ___

42. (2) ___

41. (2) ___

43. (2) ___