







**Question 5**

11) What are the main identifying features of the following species, and describe briefly what situation(s) each species is best suited for.

a) Birdsfoot trefoil?

b) Festulolium?

c) Orchardgrass?

d) Timothy?

e) Kentucky bluegrass?

**Question 6**

a) Upon graduation you have been fortunate to get a position as a grassland molecular ecologist. A farmer has asked your opinion as to whether he/she should plant a new grassland with high or low genetic diversity. In 3-4 sentences, what is your recommendation? Why? (4)

b) What is one method that would produce/generate seed of your recommended level of genetic diversity (i.e. high or low, depending on your recommendation above)? (3)

c) The most commonly planted perennial ryegrass in Ohio is BG34. This is a blend, and not a registered cultivar. What is the significance of its being a blend? (3)

**Question 7** Select the best answer

- a) Overgrazing occurs with:
- low frequency and low intensity grazing
  - low frequency and high intensity grazing
  - high frequency and low intensity grazing
  - high frequency and high intensity grazing
- b) A typical level of soil organic matter in grassland is:
- 1%
  - 3%
  - 10%
  - 30%
- c) NIR is an abbreviation for:
- Nitrogen-imposed release
  - Non-irradiation reflectance
  - Near-Infrared reflectance
  - Nutrients intra-rumeno
- d) RFLP is an abbreviation for:
- release-fragment loss product
  - rapidly functioning labile protein
  - robotically functioning laboratory program
  - restriction fragment length polymorphism
- e) Compared to C3 species, warm-season grasses are:
- more tolerant of dry conditions and low carbon dioxide concentrations
  - less tolerant of dry conditions and low carbon dioxide concentrations
  - more drought tolerant, but less tolerant of high temperatures (30 C)
  - less drought tolerant, but more tolerant of high temperatures (30 C)
- f) Alpha diversity in grassland is that diversity that occurs at a scale of:
- <1 ha
  - 1-10 ha
  - 10-100 ha
  - 100-1000 ha
- g) Shannon's index is a measure of grassland biodiversity influenced by:
- species richness
  - relative abundance of species
  - both of the above
  - none of the above
- h) The most volatile and water soluble nutrient is:
- $\text{NO}_3^-$
  - $\text{SO}_4^{2-}$
  - C
  - $\text{PO}_4^{3-}$
- i) The typical response of forage to applied nitrogen is:
- 1 lb DM/lb N
  - 5 lb DM/lb N
  - 20 lb DM/lb N
  - 50 lb DM/lb N
- j) A fertilizer labeled with the numbers 6-15-40 contains:
- 6% N
  - 6%  $\text{NO}_3^-$
  - 6%  $\text{P}_2\text{O}_5$
  - 15%  $\text{NH}_4^+$

### **Question 8**

The components of a nutrient balance for grassland comprise inputs or losses from the soil pool.

- a) What are two (2) major sources of phosphate in grassland, and typical values for the annual input of P from each source? (4)
  
- b) What are two (2) losses of phosphate from grassland, and typical values for the annual loss of P from each mechanism? (4).
  
- c) What is the most likely result of a positive phosphate balance (i.e. the rate of P input exceeds the rate of P loss)? (2)

### **Question 9**

- a) Define sustainability (2)

Give 4 ways that grasslands are more sustainable compared to other land-use options?

b)

c)

d)

e)

and 4 ways that grasslands are less sustainable than other land-use options

f)

g)

h)

i)

**Question 10**

a) Roots are a vital component of grassland plants, with several essential functions. What are 2 management practices having a significant effect on root growth? - what is the nature of that effect (4)

b) Root growth and decay is probably the major mechanism by which carbon accumulates in grassland. What are 2 other mechanisms by which carbon enters grassland (i.e. that contribute to carbon sequestration in grassland)? (4)

c) What are 2 differences between the roots of grasses and the roots of legumes? (2)

**Question 11**

a) In class Dr Cavendar described 5 ecological regions in Ohio, and the unique natural grasslands (prairies) forming in these regions. What are the 5 ecological regions of Ohio (describe each in 1-2 sentences). (5)

b) Although we did not discuss the implications of these eco-regions for forage production, what implications would you predict for intensively managed grasslands in each of these regions (e.g. what species might be likely in each region, and what level of production might you expect)? (5)

**Question 12**

Describe 5 examples of how information from this course might help you in your future career

a)

b)

c)

d)

e)