GEOB 102
OUR CHANGING ENVIRONMENT - CLIMATE AND ECOSYSTEMS

EXAM FORMAT:

A. Multiple Choice (25 x 1 = 25 points)

B. Short Answers (15 points)
- definitions, including examples
- list attributes or components on major concepts
- compare & contrast related terms (similarities and differences)
- explain relationships between terms (e.g., cause and effect)

C. Diagram Interpretation (15 points)
- explain a diagram (x and y axes, trends, zones on a graph)
- draw/complete a diagram to show relations between axes

HINTS for Part A - Multiple Choice:

Read the questions carefully. Think about the answer before looking at the options.
If you are unsure, use the process of elimination to deduce correct answers.

HINTS for Parts B and C - Short Answers and Interpretations:

Read all questions carefully. Answer the specific question rather than writing everything you remember about the topic! Be concise and use your time wisely.
Identify key words in the question and be sure to define each term in your answer.
Double check to ensure you answer the key components of the question.

Content: Biogeography, Soils and Biomes

Questions will be based on lecture notes.

Supplement your lecture notes using the textbook - **review diagrams discussed in class**. NOTE: We covered most, but not all, of Chapters 20-23 in the textbook. Use your lecture notes to guide which parts of the textbook to review.

REVIEW

Examinable topics covered in lecture:

I. Biogeography

1. Organisms - resources and environmental factors
2. Species distribution - theory of tolerance, bioclimatic frontiers, niche, habitat
3. Dispersal, corridors, barriers
4. Population growth models - geometric versus logistic growth
5. Community composition and life forms; succession and disturbance (e.g., coastal BC)
6. Evolution (propositions, example = peppered moth), genetic variation, speciation
7. Biodiversity - definition, measurement (richness and evenness)
8. Loss of biodiversity - extirpation, extinction, causes of extinction
9. Photosynthesis, respiration, productivity, food chains or webs, energy pyramid

II. Soils

1. Definitions, mineral fraction, organic matter, soil air, soil water
2. Soil solution and plant nutrients
3. External soil properties, soil profile, soil formation factors and processes
4. Soil orders
5. Soil water balance equation, types of soil water in relation to plants
6. Evapotranspiration, water deficits and soil water budget diagram

III. Biomes

1. Review of global circulation determining the distribution of climate classes
1. Energy and water availability influences on the six forest formations and the distribution of biomes in North America.
3. For coastal temperate rain forests, montane forests, savannas, grasslands, and tundra deserts know:
   - Location, Climate and Soils
   - Vegetation Characteristics/Adaptations
   - Disturbance and Human Impacts

To review pictures and facts about biomes go to www.geog.ubc.ca/biomes.

Good luck on your final exams.

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Below are example exam questions. I DO NOT provide answer keys. All answers can be found in your lecture slides. During office hours I will discuss topics and answer specific questions but I will NOT provide answers to these questions.

Short answer and multiple choice questions. For multiple choice questions, select the option that best answers each question. Read each question carefully.

1. Name the four main components of soil (2 points)

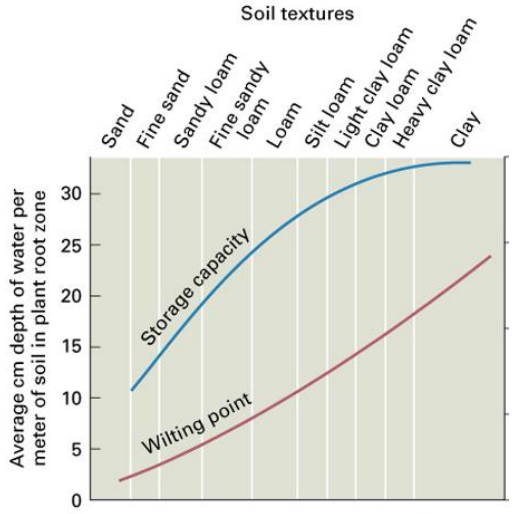
2. Rank these particles from smallest (1) to largest (4) (1 points):
____ silt ____colloid ____gravel _____sand

3. Name the force that allows water to "cling" to soil particles and resist gravity (1 point).
_____

4. Compare and contrast eluviation and illuviation. (3 points)

5. Why is the following definition incorrect?
"Biodiversity is the number of species in an ecosystem" (2 points).

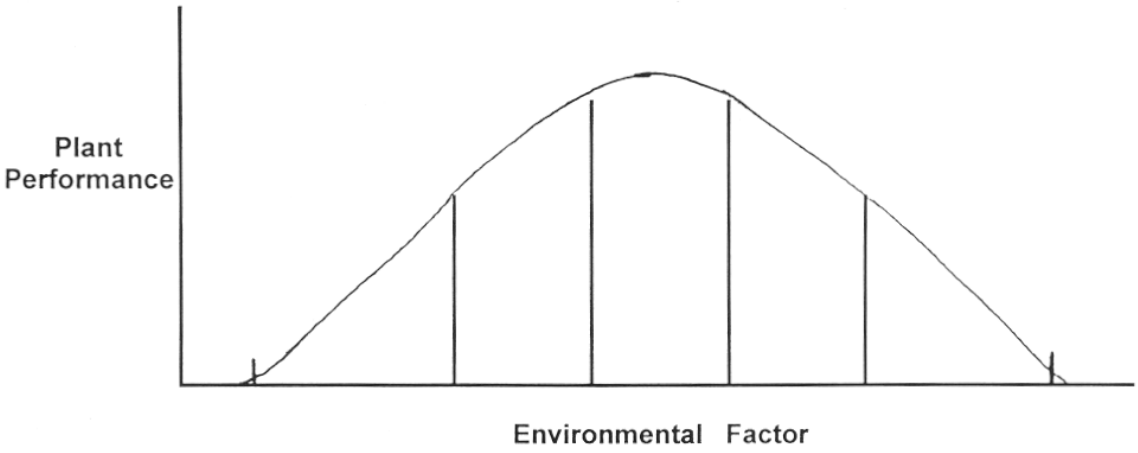
6. Use the following diagram to explain why loams are the ideal texture class for plants. (5 points)



Alternate version of question 6:
Draw a diagram showing how soil texture influences storage capacity, wilting point and water availability to plants. (5 points)

7. Write the equation for photosynthesis and list three fates of carbohydrates in plants (2 points).

8. This diagram represents the range of tolerance of Douglas-fir to temperature. On the diagram, label the optimum level of plant performance and the zone(s) in which Douglas-fir grows but does not reproduce (2 points).



9. Name the four processes by which populations may change in size (2 points).

10. Define carrying capacity (K) (2 points).

11. The colour of a soil indicates (1 point):
    a. particle size of soil minerals
    b. shape of individual soil grains
    c. composition and chemistry of soil
    d. concentration of soil $C0_2$

12. Soil parent material…
    a. includes mineral material or organic material.
    b. includes weathered bedrock.
    c. has been influenced by biotic changes.
    d. a and b only.
    e. b and c only.

13. Which of the following terms does not describe xerophytic plants adapted to drought?
    a. ephemerals
    b. deciduous
    c. phreatophytes
    d. succulents
    e. none of the above

14. The resources plants need to photosynthesize include:
    a. CO_2, H_2O, nutrients, and temperatures near 25°C
    b. CO_2, H_2O, sunlight, and a neutral pH
    c. CO_2, H_2O, nutrients, and sunlight
    d. H_2O, temperatures near 25°C and sunlight
    e. temperatures near 25°C, sunlight and a neutral pH

15. Which of the following statements is true about soil water?
    a. Gravitational water moves more quickly through a platy than prismatic soil.
    b. Soil water is held in soil pores depending on pore size and amount of water.
    c. Soil water is important to plants because it is an important source of nutrients.
    d. Availability of soil water is higher in silty-clays than in loams.
    e. All of the above.

16. Which formation in the forest biome experiences the largest water deficit during the growing season? (1 point)
    a. low-latitude rainforest
    b. mid-latitude deciduous forest
    c. monsoon forest
    d. coastal temperate rainforest

17. Which of the following adaptations evolved in response to fire?
    a. thick bark, serotinous cones
    b. phreatophytes, serotinous cones
    c. fire scars, hemicryptophytes
    d. a and b only
    e. a and c only

18. Which of the following statements accurately describes an annual soil water budget?(1 point)
    a. Potential evapotranspiration represents water availability.
    b. Actual evapotranspiration represents energy availability.
    c. Actual evapotranspiration always exceeds potential evapotranspiration.
    d. Soil water increases when precipitation exceeds potential evapotranspiration.
    e. Soil water deficit increases when precipitation exceeds potential evapotranspiration.

19. Soil water budgets are critical for determining the spatial distribution of the forest biome in North America. As a biogeographer, with which statements do you <u>disagree</u>? (1 point)
    a. In general, forests exist where water deficits are <400 mm per year.
    b. In general, forests do not exist where water deficits are >400 mm per year.
    c. In general, broadleaf forests exist where water deficits are >400 mm per year.
    d. Generally, actual evapotranspiration is >600 mm per year in broadleaf forests.
    e. Generally, actual evapotranspiration is <600 mm per year in needleleaf forests.