Ecology Test – CY Falls 2008-09 (50% = 2 point each)

General Ecology - *Choose the one alternative that best completes the statement or answers the question.*

1) Species of one continent seldom naturally "invade" an ecosystem of other continents or islands because ___
   A) they cannot survive the biotic factors of a different continent or island.
   B) they cannot survive the biotic or abiotic factors of a different continent or island.
   C) they cannot cross the physical barriers that separate continents or islands.
   D) they cannot survive the abiotic factors of a different continent or island.
   E) none of the above

2) Exotic species may experience rapid population increase in their new environment because ____
   A) environmental resistance may be low.
   B) there may be few predators or herbivores that utilize the exotic species in the new environment.
   C) there may be little competition from other species.
   D) there may be no diseases or parasites of the introduced species in its new environment.
   E) all of the above

3) The Peregrine falcon became endangered due to _____
   A) excessive consumption of DDT caused them to produce thin-shelled eggs.
   B) over hunting.
   C) excessive consumption of DDT, which destroyed their digestive system, killing them.
   D) destruction of their habitat.
   E) All of the above led to the low numbers of Peregrine falcons.

4) An example of mutualism would be _____
   A) a tapeworm in the intestine of a horse.
   B) a tick on a dog.
   C) a caterpillar eating a leaf.
   D) mistletoe growing on an oak tree.
   E) a hummingbird getting nectar from a red flower.

5) Light radiation strikes a sandwich of two layers of silicon and dislodges electrons from one layer which are then picked up by the other layer causing production of an electric current. This best describes _____
   A) photovoltaic cells.
   B) active solar heating systems.
   C) power towers.
   D) nuclear fusion.
   E) flat-plate solar collectors.

6) Which statement about carrying capacity is FALSE? _____
   A) It is very difficult to measure or predict.
   B) It applies only to the largest organism in an ecosystem.
   C) It applies to humans.
   D) It is the maximum population of a species that can be indefinitely supported in a habitat.
   E) All of the above statements are true.

14) A population which is growing at the rate of 4.5 percent per year will double in about _____
A) 15 years.
B) 25 years.
C) 35 years.
D) 55 years.
E) 45 years.

15) Two or more factors that interact to cause an effect greater than one would expect from the effects of the two acting separately is called _____
A) synergism.
B) biomagnification.
C) Liebig's Law of Limiting Factors.
D) increased energy use.
E) symbiosis.

16) Humans have caused ecological upsets by _____
A) misunderstanding the role of fire in certain ecosystems.
B) introduction of new species.
C) elimination of natural predators.
D) establishment of monocultures.
E) all of the above

17) "Nitrogen fixation" refers to _____
A) releasing nitrogen to the air.
B) animals releasing nitrogen in their urine.
C) applying fertilizer.
D) repairing broken molecules.
E) converting nitrogen gas to chemical forms which plants can incorporate.

18) Dead plant and animal material and fecal wastes are referred to as _____
A) decomposers.
B) decomposition.
C) humus.
D) detritus.
E) saprophytes.

19) The transitional region between two ecosystems that contain some of the species and characteristics of the two adjacent ecosystems but also contain species unique that area _____
A) ecosystem.
B) population.
C) ecotone.
D) community.
E) species.

20) The greatest loss of biodiversity is caused by _____
A) pollution.
B) competition with introduced species.
C) habitat alteration.
D) hunting.
E) overgrazing by domestic animals.

7) Which of the following species are most likely to experience J curve population change? _____
A) rabbits in an environment where there are multiple predators
B) rabbits in an environment lacking rabbit predators
C) mice in a balanced ecosystem
D) A and B
E) all of the above

8) Animals such as earthworms, millipedes, and termites which feed on dead organic matter, are__
A) carnivores.
B) parasites.
C) herbivores.
D) detritus feeders.
E) none of the above

9) Globally, forests are being cut down faster than they are being regenerated. Reason(s) include__
A) many developing countries encourage converting forests to agricultural food production.
B) 60 percent of the world's population depend on firewood for heating and cooling.
C) wood is a widely used building material in both developed and developing countries.
D) A and B
E) all of the above

10) Passive solar heating includes such features as _____
A) interior brick or stone walls to store and release heat.
B) awnings or landscaping which shade the windows from the sun in summer.
C) heavy drapes to close at night in order to trap the heat inside the building.
D) large south-facing windows to let sunlight into a building.
E) all of the above

11) Approximately what percentage of biomass energy will be passed on to the next energy level in a typical food chain? _____
A) 50 percent
B) 5 percent
C) 10 percent
D) 1 percent
E) 20 percent

12) If natural enemies are removed, herbivore populations will most likely _____
A) remain constant because reproduction always balances deaths.
B) fluctuate in unpredictable ways.
C) migrate to a new location.
D) thrive and increase in number indefinitely.
E) increase, overgraze, and then decline from starvation.

13) A climax ecosystem is _____
A) one in which natural selection and evolution have stopped.
B) one developed by humans.
C) one in which populations of all species are in balance with each other and their environment.
D) one that will exist indefinitely barring change in habitat or climate.
E) C and D

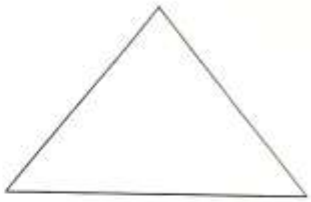
Ecology Test – CY Falls 2008-09 - PART 2 - (50% Points as noted)

Deserts and Grasslands - *Answer each question ON THE ANSWER SHEET. Please be neat - If it is un-readable it is un-gradable. Unless specified you do NOT have to use complete sentences, bulleted answers and phrases that convey the full meaning are OK.* **SHOW ALL WORK or no credit given !!!!!**

I. Food Web (15 total points)

A horned lizard (*Phrynosoma cornutum* , the state reptile of Texas) eats harvester ants. Both king and rattlesnakes are especially fond or horned lizards. Hawks prefer rabbits but will eat snakes if rabbits are not available.

1) Construct a food web pyramid using the species above.



2) Fill in the blanks in chart for each species.
Put in the **missing species** and their jobs

Species	Role	Niche
	Autotroph	
Ant		
	Heterotroph	Secondary consumer
Hawk		

3) Calculate BOTH of the following: (see info box)
i) How many ants must be eaten for 1 hawk to feed itself for a day?
ii) If each trophic level is only 10% efficient in converting biomass to energy; how much energy in Joules does the hawk get from his snake?

Hawk eats 1 snake/day
Snake eats 1 toad/month
Toad eats 30 ants/day
Ant mass = 0.2 g

i) Ants:

ii) Joules of energy obtained by hawk

21) Heavy metals such as lead, mercury, cadmium and chromium are hazardous because _____
A) they are not readily excreted by animals.
B) they are soluble in water and therefore easily absorbed.
C) they never break down.
D) all of the above
E) none of the above

22) Thinning of the ozone layer is most evident above _____
A) South America.
B) Africa.
C) North America.
D) Antarctica.
E) none of the above

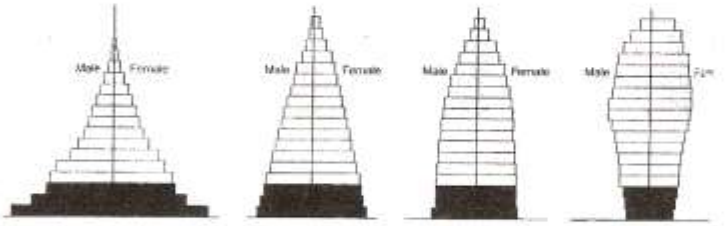
23) Methods of reducing greenhouse gases include _____
A) raising the mileage standards for passenger cars.
B) limiting rainforest destruction and increasing reforestation programs.
C) expanding the world's mass transit systems.
D) increased reliance on alternative energy sources.
E) all of the above

24)

POPULATION DYNAMICS

Ages 0-14 Ages 15-44 Ages 45-85+

7. Label the population pyramids with the following
Zero Growth, Negative Growth, Slow Growth, Rapid Growth

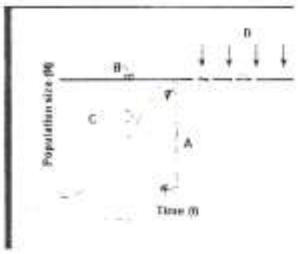


_____ _____ _____ _____

25) Which of the following does/do **NOT** have a gas phase as part of its/their cycle?
A) carbon
B) phosphorus
C) nitrogen
D) nitrogen and phosphorus

V. Carrying Capacity (6 points total)

Define carrying capacity:



The chart above could represent the rabbit population on a 4000 acres nature preserve on the south Texas coastal prairie. If Bo represents the carrying capacity, describe what is happening at positions C and D.

C:

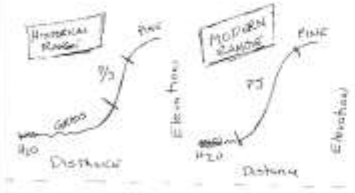
D:

VI. Ecotones and the Role of Fire (5 total points)

Use the following information ***and*** your own knowledge to answer the questions:

Historically much of the great plains and intermountain west burned every 7 years. These burns were low intensity because the built up fuel level/load was small. They moved quickly thru an area due to prevailing winds. Many species especially grass plants and some pine species adapted to this fire cycle. Lack of trees on prairies is due to both periodic fires and the annual water budget.

An ecotone is an area at the edge of 2 biomes or other differing areas. It is an intermediary zone and has characteristics and thus plants and animals of both regions. The pinyon/juniper (PJ) complex of New Mexico and Arizona is considered by many USFS ecologists to be an ecotone. It occupies the mid-slope region in rolling grasslands that are found at high altitudes. The diagrams show the historic PJ and the current PJ in the area around Capitan, NM.



i) What specifically do periodic low intensity fires do for plants and soils in grassland ecosystems:

ii) How and why are the fires in California and other western states that keep getting on the news different from these historic fires?

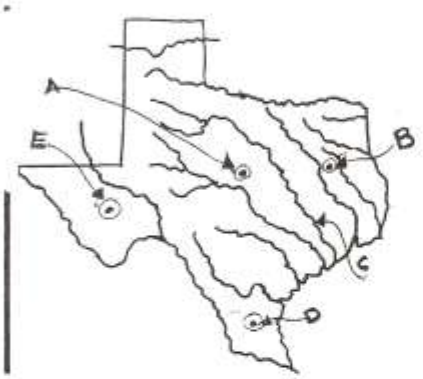
iii) Propose an explanation of the change in the size of the PJ at Capitan, NM

IV. Water Balance (8 points total)

In many arid areas of the central US total precipitation is not the only factor that limits presence of trees. A better measure is water balance or budget, thus average annual water mass balance data is often useful. Use the data below to answer the questions.

Annual Average Water Mass balance for 2 Texas Sites

Site 1 input cm/m^2	Site 1 output cm/m^2		Site 2 input cm/m^2	Site 2 output cm/m^2
Rainfall 55.88	Runoff 15.2		Rainfall 58.2	Runoff 8.3
Snow/ice melt 3.05	Infiltration 30.5		Snow/ice melt 2.9	Infiltration 32.1
	Evaporation 15.4			Evaporation 5.1
	Transpiration 5.7			Transpiration 12.2



i) Calculate the water balance for each site (input – output)

Site 1

Site 2

ii) Match the dat you calculated to the potential location of each site AND explain your reasoning.

Site 1 matches point ____ on the map because

Site 2 matches point ____ on the map because:

iii) Discus the aquifer recharge at each site:

Site 1:

Site 2:

II. Soils (6 total points)
Draw a soil profile for the desert biome and one for the grassland biome. Label the horizons and draw them proportionally. List the distinguishing feature of this soil. An example using the deciduous forest biome is provided.

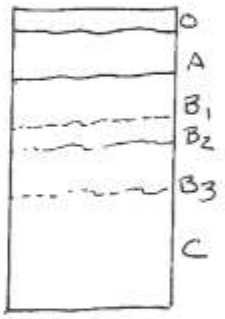
Desert

Distinguishing feature:

Grassland

Distinguishing feature

Forest



Distinguishing feature:
Multiple B layers due to leaching

III. Adaptations (10 points total)

For each species list its most notable adaptation to desert or grassland life:

Kangaroo rat:

Prickly pear Cactus

Bat:

Sideoats gram grass:

Gila monster: