Short Questions:

31. What are the processes of the ecosystem influenced by landscape structure? 2

A landscape is a heterogeneous area composed of several ecosystems. The ecosystems making up a landscape generally form a mosaic of visually distinctive patches. These patches are called landscape elements.

Landscape structure influences processes such as the flow of energy, materials, and species between the ecosystems within a landscape. Landscape ecologists have proposed that landscape structure, especially the size, number, and isolation of habitat patches, can influence the movement of organisms between potentially suitable habitats. The group of subpopulations living on such habitat patches make up a metapopulation.

for Examples;

- The source of water for lakes in a Wisconsin lake district is determined by their positions in the landscape, which in turn determine their hydrologic and chemical responses to drought.

32. Write four reasons which relatively have incomplete fossil record. 2

The fossil record is relatively incomplete for several reasons:

1. Soft tissues are rarely preserved
2. Movement of the earth's crust has obliterated and/or covered many fossils
3. Fossilization takes place only in certain types of habitats and favorable environments
4. Paleontologists have not dug up every place on earth

33. Define Hardy-Weinberg principle. 2

One of the most fundamental concepts in population genetics, the Hardy-Weinberg principle, states that “in a population mating at random in the absence of evolutionary forces, allele frequencies will remain constant.”

For a population in Hardy-Weinberg equilibrium in a situation where there are only two alleles at a particular locus, $p + q = 1.0$. The frequency of genotypes in a population in Hardy-Weinberg equilibrium can be calculated as $(p + q)^2 = (p + q) \times (p + q) = p^2 + 2pq + q^2 = 1.0$.

The conditions necessary to maintain constent allele frequencies in a population are:

(1) random mating,
(2) no mutations,
(3) large population size,
(4) no immigration, and
(5) equal survival and reproductive rates for all genotypes.

34. How nutrient enrichment says the human is altering the aquatic and terrestrial ecosystem.? 3

Nutrient enrichment by humans

Vegetative controls appear to be less important in cold and/or dry environments. Nutrient loss by stream ecosystems is highly pulsed and associated with disturbance by flooding. Nutrient enrichment by humans is altering aquatic and terrestrial ecosystems. Nitrate concentration and export by the earth's major rivers correlate directly with human population density. Human disturbance also increases export of phosphorus from aquatic catchments. Nutrient enrichment appears to be reducing the diversity of plants and fungi in terrestrial ecosystems. Land managers around the world use nutrient loading models to predict and manage the impact of land use on aquatic ecosystems.

35. Define and explain optical foraging theory 3

Optimal foraging theory

Optimal foraging theory attempts to model how organisms feed as an optimizin process.

Evolutionary ecologists predict that if organisms have limited access to energy, natural selection is likely to favor individuals that are more effective at acquiring energy and nutrients. Many animals select food in a way that appears to maximize the rate at which they capture energy.

Plants appear to allocate energy to roots versus shoots in a way that increases their rate of intake of the resources that limit their growth. Plants in environments with abundant nutrients but little light tend to invest more energy in the growth of stems and leaves and less in roots. In environments rich in light but poor in nutrients, plants tend to invest more energy in the growth of roots.

36. Lyell’s Mistake on natural selection. 3

Lyell’s mistake

As a part of his general resistance to direction/ substantial change in geology, Lyell maintained there was no real direction of change in the fossil record either. This was greeted with pretty general astonishment,

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but Lyell claimed the apparent changes were just due to our having bad (misleading) samples…more mammals would soon appear in older formations, etc., as we extend our fossil collections. Within ten years (1840) it was clear that this was completely untenable.