Quiz #6 Key, Spring 2013, all sections

1. Define:

**Logarithmic phase (batch culture)** – The Logarithmic phase of growth, also known as the exponential phase of growth, is that phase during which cells in a batch culture are undergoing fission most rapidly (generation time or doubling time often being only 20 minutes). One cell becomes two, two become four, four become eight, eight become sixteen, etc. etc. It has been estimated that if an *E. coli* population could remain in this phase for 45 hours, they would form a mass the size of the earth (needless to say, this is not possible).

**Exergonic reactions** – Exergonic reactions are chemical reactions that release more energy than was required for their initiation. Catabolic reactions are typically exergonic (which is why chemoheterotrophs can obtain energy from the catabolism of organic compounds).

**Ribozyme** – A ribozyme is an RNA molecule capable of serving as a biochemical catalyst. Like enzymes, ribozymes can speed up chemical reactions, but they are not proteins. The peptidyl transferase molecules responsible for catalyzing the formation of peptide bonds between amino acids at ribosomes are ribozymes, as are the s-RNA molecules associated with spliceosomes and responsible for post-transcriptional modification of RNA molecules within eukaryotic cells.

2. Fastidious/ enriched

3. Binary fission

4. Replicate each ccc-DNA molecule present/ E. coli cells can begin 2$^{nd}$ and 3$^{rd}$ replication cycles before the first one is complete, so can overlap three cycles in time. This significantly increases their reproductive rate.

5. Elongation requires that cells partially degrade their peptidoglycan walls in sections (multiple along the long axis of bacilli or one at the equator of cocci), and then deposite new wall materials in these regions.

6. Staphylococcus

7. Lag/ cell size, dry weight, DNA content and metabolic activity

8. Stationary phase/ carrying capacity

9. Lack of available nutrients, and the buildup of toxic metabolic waste products.

10. Bioenergetics/ metabolism

11. Light/ phosphorylation

12. Enzymes

The etiological agents of whooping cough are identified as *Bordetella pertussis*.