QUESTION 1 (20)

1.1 The correct sequence from the most to the least comprehensive of the taxonomic levels listed: Kingdom, phylum, class, order, family, genus, species

1.2 Land plants no longer required water as a medium for reproduction with the evolution of pollen and seeds

1.2 The body is capable of catabolizing many substances as source of energy. Which of the following would be used as an energy source only after the depletion of other sources? Protein in muscle cells

1.3 Animals require certain amino acids in their diet. An amino acid that is referred to as non-essential would be best described as one that can be made by the animal's body from other substances

1.4 Which sequence of blood flow can be observed in either a reptile or a mammal? Vena cava, right atrium, ventricle, pulmonary circuit

1.5 In Chlamydomonas the adult is haploid, the zygospore survives times of stress, sexual + asexual reproduction occurs

1.6 A cloaca is an anatomical structure found in many non-mammalian vertebrates, which function as a common exit for the digestive, excretory and reproductive system

1.8 When air temperature exceeds their body temperature, jackrabbits living in hot, arid lands will constrict the blood vessels in their large ears

1.9 To leave the digestive tract, a substance must cross a cell membrane. During which stage of food processing does this take place? Absorption

1.10 An example of a connective tissue is the blood

QUESTION 2 (10)

2.1 A type of cell with a membrane-enclosed nucleus and membrane enclosed organelles = Eukaryotic cell

2.2 The fluid outside the thylakoids = Stroma

2.3 An organism that is capable of both heterotrophy and photosynthesis = Mixotroph

2.4 The innermost layer of the cortex in plant roots, a cylinder one cell thick that forms the boundary between the cortex and the vascular cylinder = Endodermis
2.5 The use of living organisms to detoxify and restore polluted and degraded organisms = Bioremediation

2.6 The ovule-producing reproductive organ of a flower, consisting of the stigma, style and ovary = Carpel

2.7 A group of plant-like protists that is most closely related to plants = Charophytes

2.8 The creation of offspring by the fusion of haploid gametes to form a zygote that is diploid = Sexual Reproduction

2.9 The transfer of pollen from an anther to a stigma = Pollination

2.10 The joint evolution of two interacting species, each in response to selection imposed by the other = Coevolution

**QUESTION 3**

List four advantages and four disadvantages of algae. (8)

<table>
<thead>
<tr>
<th>Advantage of algae:</th>
<th>Disadvantages of algae:</th>
</tr>
</thead>
<tbody>
<tr>
<td>a renewable resource</td>
<td>high water use</td>
</tr>
<tr>
<td>not competing with food production</td>
<td>algae growing in water may cause death in aquatic animals due to strangulation</td>
</tr>
<tr>
<td>efficient land use</td>
<td>high cost of algae biodiesel</td>
</tr>
<tr>
<td>algae biodiesel is carbon dioxide neutral</td>
<td>high fertilizer use and the process of deriving biodiesel from algae is expensive and requires constant temperature</td>
</tr>
</tbody>
</table>

**QUESTION 4**

4.1 Compare parenchyma and collenchyma with regards to structure and composition of the cell wall, functions, and positions in plants. (10)

<table>
<thead>
<tr>
<th></th>
<th>Parenchyma cells:</th>
<th>Collenchyma cells:</th>
</tr>
</thead>
</table>
| Structure and composition of cell wall | - Thin and flexible primary walls  
- Most lack secondary walls | - Elongated cells  
- Thicker primary walls  
- Walls are unevenly thickened |
| Functions | - Perform most of the metabolic functions store | - Provide flexible support without restraining growth |
4.2 Name 5 differences between monocotyledous plants and dicotyledous plants. Present your results in a table. (5)
**QUESTION 5**

Distinguish between open and closed circulatory systems and give an example of an animal in which each occurs. Also name the three basic components common to both systems. (9)

Open circulatory system in this system the circulatory fluid bathes the organs directly. In these animals, the circulatory fluid called haemolymph, is also the interstitial fluid that bathes body cells. Contraction of one or more hearts pump the haemolymph through the circulatory vessels interconnected sinuses, spaces surrounding the organs. Arthropods and most molluscs are examples of this system.

Closed circulatory system is the system in which a circulatory fluid called blood is confined to vessels and is distinct from interstitial fluid. One or more hearts pump blood into large vessels that branch into smaller ones that infiltrate the organs. These animals include annelids, cephalopods and all vertebrates.

Common to both: Circulatory fluid/blood, Set of tubes/blood vessels, Muscular pump/heart

**QUESTION 6**

6.1 Distinguish between regulators and conformers in terms of homeostasis. (4)

Regulators maintain factors of the internal environment in a relatively constant state, whereas conformers have internal environments that match the external environment.

6.2 Describe the process of conduction, convection, radiation and evaporation (8)

*See figure 40.10 below*
QUESTION 7
Describe what an apicomplexan is and, using an annotated drawing, explain the two-host life history of *Plasmodium*, which causes malaria. (15)

Apicomplexan: A protist in a clade that includes many species that parasitize animals.

*For life cycle, refer to textbook pg. 660+661 (10th ed)*

QUESTION 8
Name the hormones of the following human glands:

8.1. anterior pituitary gland (4)

*Growth hormone (GH), Prolactin (PRL), Follicle-stimulating hormone (FSH), Luteinizing hormone (LH), Thyroid-stimulating hormone (TSH), Adrenocorticotropic hormone (ACTH)*

8.2. gonads (3)

*Androgens, Estrogens, Progestins*
8.3. adrenal glands (4)

Epinephrine, Norepinephrine, Glucocorticoids, Mineralocorticoids