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

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

1.4 Which of the following is found in seed plants?

1.5 An example of a connective tissue is the blood

1.6 Regeneration, the regrowth of lost body parts, normally follows fragmentation

1.7 Which of the following characteristics of plants is absent in the closest relatives, the charophytes? Alternation of generations

1.8 Which of the following flower parts develops into a fleshy fruit? Ovule

1.1 1.9 In Chlamydomonas the adult is haploid, the zygospore survives times of stress, sexual + asexual reproduction occurs

1.10 The scientific discipline concerned with naming of plants is called taxonomy

QUESTION 2 (10)

2.1 An organism that is capable of both heterotrophy and photosynthesis = 1 Mixotroph

2.2 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

2.3 The use of living organisms to detoxify and restore polluted and degraded ecosystems = Bioremediation

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

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

QUESTION 3

3.1 Describe the binomial system of classification. (6)

The two-part format of the scientific name, commonly called a binomial, was instituted in the 18th century by Carolus Linnaeus. The first part of binomial is genus to which species belongs. The second part, called the specific epithet, is unique for each species within the genus. First letter of the genus is capitalised and the second part with lowercase letter, and both name parts are either underlined or italicised.

3.2 Distinguish between pollination and fertilisation. (6)

Pollination is the transfer of pollen from anther to the stigma of the same or different flower.

Fertilization occurs once when a male gamete of any sexually reproducing organisms combines with female gametes to form a zygote.

For pollination, you can mention the biotic and abiotic pollinating agents, and also that "If pollination is successful, a pollen grain produces a pollen tube, which then grows down into the ovary via the style.

For fertilization, add this to your sentence: the egg (female gamete) and sperm (male gamete) are haploid and they fuse to make a diploid zygote.

Pollination occurs before fertilization. Check the Angiosperm life cycle (textbook pg.702 (10th ed)) to help understand and answer this type of question.

3.3. Name the five characteristics that define land plants. (5)

Alternation of generations, Multicellular, dependent embryos, Walled spores produced in sporangia, Multicellular gametangia, Apical meristems

QUESTION 4

Name the hormones of:

4.1. anterior pituitary gland (6)
Growth hormone (GH), Prolactin (PRL), Follicle-stimulating hormone (FSH), Luteinizing hormone (LH), Thyroid-stimulating hormone (TSH), Adrenocorticotropic hormone (ACTH)

4.2. gonads (3)
Androgens, Estrogens, Progestins

4.3. adrenal glands (4)

Epinephrine, Norepinephrine, Glucocoticoids, Mineralocorticoids

4.4 pineal gland (1)

Melatonin

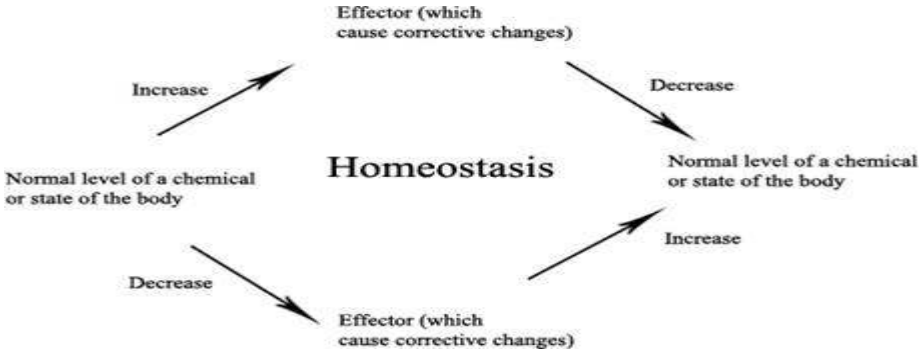
QUESTION 5

5.1 Describe how the carbon dioxide is picked up at the tissues and deposited in the lungs. (6)

In addition to its role in O_2 transport, haemoglobin helps transport CO_2 and assists in buffering the blood-that is, preventing harmful changes in pH. Only about 7% of the CO_2 released by respiring cells is transported in solution in blood plasma. Another 23% binds to the amino ends of the haemoglobin polypeptide chains, and about 70% is transported in the blood in the form of bicarbonate ions ($HC0_3^-$). As shown in Figure 42.30 below, carbon dioxide from respiring cells diffuses into the blood plasma and then into erythrocytes. There the CO_2 reacts with water (assisted by the enzyme carbonic anhydrase) and forms H_2C0_3, which dissociates into H+ and $HC0_3^-$. Most of the H^+ binds to haemoglobin and other proteins, minimizing the change in blood pH. The $HC0_3^-$ diffuses into the plasma. When blood flows through the lungs, the relative partial pressures of CO2 favour the diffusion of CO2 out of the blood. As CO2 diffuses into alveoli, the amount of CO2 in the blood decreases. This decrease shifts the chemical equilibrium in favour of the conversion of HC03- to C02J enabling further net diffusion of CO2 into alveoli.

5.2 Discuss the process of homeostasis. (6)

Homeostasis is the body's attempt to maintain a constant and balanced internal environment which requires persistent monitoring and adjustment as conditions change. Homeostatic regulations is monitored and adjusted by receptor the command centre and effector. The receptor receive information based on internal environment the command center receives and process the information and the effector response to the command centre opposing the stimulus. Organisms maintain steady state regardless of external environment. Mechanism of homeostasis moderate changes in the internal environment.



QUESTION 6

By means of a labelled diagram, describe the life cycle of a fern, clearly distinguishing between the gametophyte and sporophyte generations. (15)

For fern life cycle, refer to textbook pg. 686 (10th ed)

QUESTION 7

Environmental adaptations may result in roots being modified for a variety of functions. Name at least 5 different types of modified roots and their functions. (10)

Modified root:	**Function:**
1. Prop roots	Support tall, top heavy tree
2. Storage roots	Store food and water
3. Strangling Aerial roots	To anchor on other trees
4. Buttress roots	Give architectural support to the trunks of such trees
5. Pneumatophores	They enable the root system to obtain oxygen
6. Contractile roots	Pull the plant a little deeper into the soil
7. Parasitic roots	Penetrate the host plants and withdraw nutrients