1. Explain how the endocrine system aids humans in maintaining homeostasis. Endocrine system regulates the levels of: blood sugar, minerals and electrolytes, blood volume, carbons, fats.

2. Consider the following diagram of the human endocrine system:

   a. Label each number with the appropriate term.
   b. Which numbered structure produces hormones that regulate blood sugar levels? 7
   c. Which numbered structure produces hormones that stimulate egg production? 8
   d. Which numbered structure is directly involved in the “fight or flight” response? 6

3. Explain the differences and similarities between the nervous and endocrine systems.
   - The nervous system uses rapidly propagated electrical “messages”; whereas endocrine system “messages” (hormones) are liberated into the blood to travel much more slowly to the targeted organs.

4. Describe the role the circulatory system plays in the functioning of the endocrine system. It transports hormones throughout the body to target tissues.

5. Consider the following diagram of the endocrine system:

   a. Briefly explain why the hormones bind to the target cell but not the non-target cells? 
      Hormone receptors are only found on target cells
   b. If the hormone released in the diagram is ACTH, where in the human body would the target cells be located? The adrenal cortex to stimulate the release of its hormones.

6. What types of feedback mechanisms are involved in the maintenance of homeostasis?

7. How would a person be affected if their pancreas produced no insulin? What disease would that person have? How could that disease be treated? If they didn’t produce insulin, their blood glucose levels would rise to dangerous levels. The disease is known as diabetes and can be treated by taking insulin and regulating their diet and weight.

8. Matching: From the list below, select the hormone that best fits each of the following descriptions. (Choices may be used once, more than once, or not at all)

   A. FSH  B. LH  C. TSH  D. GH  E. ACTH  F. Thyroxin  G. Calcitonin  H. Cortisol  I. Testosterone  
   K. PTH  L. Oxytocin  N. ADH  O. Adrenaline  P. Aldosterone  Q. Glucagon  R. Insulin  S. Estrogen  T. Progesterone
1. ___N___ Hormone produced by the pituitary that prevents excess water loss
2. ___L___ Stimulates the uterine contractions during childbirth
3. ___D___ Hyper-secretion of this hormone may lead to gigantism
4. ___F, C___ Increased secretions of this hormone would raise metabolic rates during times of emergency
5. ___A___ Stimulates the initial production of sperm inside the testes
6. ___Q, H___ Raises blood sugar levels
7. ___S, W___ Either of the two hormones involved in preparing the uterus for pregnancy
8. ___R___ A person with sugar in their urine is probably not making enough of this hormone
9. ___C___ This hormone is directly involved in a negative feedback cycle with thyroxin
10. ___K___ Raises blood calcium levels
11. ___Q___ Someone who is hypoglycemic might not be producing enough of this hormone
12. ___B___ Stimulates the release of a mature egg from the ovaries during ovulation
13. ___K___ This hormone is directly involved in a negative feedback cycle with calcitonin
14. ___I___ Hormone that directly leads to the development of secondary sex characteristics in males
15. ___P___ This hormone helps prevent water loss by regulating salt re-absorption in the kidneys

9. Define Hormone, target organ. **Hormone:** Chemical substance liberated into the blood, which alters “target cell” metabolism in a specific manner. **Target organ:** Organ responding to a particular hormone in a specific way.

10. Chemically, hormones belong chiefly to which two molecular groups? The STEROIDS and the PROTEINS (AMINO-ACID BASED) MOLECULES.

11. If hormones travel in the bloodstream, why don’t all tissues respond to all hormones? The proper “hormone” receptors must be present on the plasma membrane or within the cells for tissues to respond to hormones.

12. The table below lists the functions of many hormones you have studied. From the keys below, fill in the hormones responsible for each function, and the endocrine glands that produce each hormone. Glands may be used more than once.

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>HORMONE</th>
<th>GLANDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulate the function of another endocrine gland</td>
<td>TSH, FSH, ACTH, LH</td>
<td>Anterior pituitary</td>
</tr>
<tr>
<td>Maintenance of salt/water balance in the extracellular fluid</td>
<td>ADH, Aldosterone</td>
<td>Hypothalamus, Adrenal cortex</td>
</tr>
<tr>
<td>Directly involved in milk production</td>
<td>Prolactin</td>
<td>Anterior pituitary</td>
</tr>
<tr>
<td>Regulates blood calcium levels</td>
<td>Calcitonin, Parahormone</td>
<td>Parathyroid glands</td>
</tr>
<tr>
<td>regulates blood glucose levels; produced by the same “mixed” gland</td>
<td>Glucagon, Insulin</td>
<td>Pancreas</td>
</tr>
<tr>
<td>released in response to stressors</td>
<td>Cortisol, Epinephrine</td>
<td>Adrenal cortex, Adrenal medulla</td>
</tr>
<tr>
<td>drive development of secondary sex characteristics in males</td>
<td>Testosterone</td>
<td>Testes</td>
</tr>
<tr>
<td>directly responsible for regulation of the menstrual cycle</td>
<td>Estrogen, Progesterone</td>
<td>Ovaries</td>
</tr>
</tbody>
</table>

13. Although the pituitary gland is often referred to as the master gland of the body, the hypothalamus exerts some control over the pituitary gland. How does the hypothalamus control both the anterior and posterior pituitary functioning? The hypothalamus produces "releasing factors/hormones", which
controls production and release of anterior pituitary hormones which in turn forms hormones ADH/Oxytocin that are transported to the posterior pituitary and later released on nervous stimulation from the hypothalamus.

14. Indicate whether the release of hormones listed below is stimulated by A another hormone, or B the nervous system.

   B  1. ACTH
   A  2. Estrogens
   B  3. Norepinephrine
   A  4. Thyroxine
   A  5. testosterone
   B  6. TSH, FSH

15. Name the hormones produced in inadequate amounts that directly result in the following conditions.

a) Cushing’s Syndrome - cortisol
b) Tetany; parahormone
c) excessive diuresis (urine excretion) without high blood glucose levels; ADH
d) loss of glucose in the urine; insulin
e) abnormally small stature, normal proportions: growth hormone
f) Low BMR, mental and physical sluggishness; thyroxine
g) demineralization of bones/spontaneous fractures; parahormone