1. Which of the following are inorganic nutrients?
   (1) carbohydrates  (2) fats  (3) proteins  (4) minerals

2. All of the following are true statements about people who follow a vegetarian diet except:
   (1) They obtain most of their vitamins from vegetables.
   (2) They can balance a diet as well as those who eat meat.
   (3) They generally suffer from protein deficiency.
   (4) They consume less fat and more fiber.

3. Among people of different races, there are significant differences in
   (1) the respiratory system  (2) the circulatory system
   (3) the excretory system  (4) none of the organ systems

Directions (4-6): Base your answers to questions 4 through 6 on the chart below and on your knowledge of biology.

<table>
<thead>
<tr>
<th>NUTRIENT</th>
<th>FUNCTION</th>
<th>FOOD SOURCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbohydrates</td>
<td>B energy reserve</td>
<td>bread, sugar</td>
</tr>
<tr>
<td>Fat</td>
<td>A raw materials for muscles</td>
<td>meat, eggs</td>
</tr>
</tbody>
</table>

4. Which of the following nutrients could be most correctly be inserted in space A?
   (1) proteins  (2) minerals  (3) sugars  (4) starches

5. Which function could most correctly be inserted in space B?
   (1) provide quick energy in emergencies
   (2) act as a solvent for reactions
   (3) maintain and repair body tissue
   (4) increase mineral concentration

6. Which of the following food sources could most correctly be inserted in space C?
   (1) bread  (2) meat  (3) butter  (4) water
1. An end product of fat digestion is
   (1) glycerol   (2) maltose
   (3) glucose   (4) an amino acid

8. Excess glucose is stored in the body as
   (1) glycogen   (2) cellulose
   (3) amino acids (4) lipids

9. Most absorption of the end products of digestion into the
    circulatory system in humans occurs
   (1) in the large intestine (2) in the stomach
   (3) in the small intestine (4) in the liver

10. The complete hydrolysis of carbohydrates results directly
    in the production of
    (1) glycogen   (2) urea molecules
    (3) carbon dioxide (4) simple sugars

11. Which activity occurs principally in the large intestine of humans?
    (1) Proteins and starches are completely digested.
    (2) End products of digestion diffuse into the bloodstream.
    (3) Water is absorbed into the bloodstream.
    (4) Bile digests fats and oils.

12. The chemical digestion of which nutrient begins in the mouth?
    (1) fat         (2) sugar
    (3) starch      (4) protein

13. Fingertip projections known as villi are located in the
    (1) large intestine and aid in the completion of digestion
    (2) large intestine and aid in the absorption of water
    (3) stomach and secrete bile
    (4) small intestine and increase the surface area

14. Bile is a secretion produced by the
    (1) pancreas   (2) small intestine
    (3) gall bladder (4) liver
15. Which of the following would not be absorbed properly in a patient with ileostomy?
   (1) glucose  (2) protein
   (3) potassium  (4) uric acid

16. In humans, most fat digestion occurs in the
   (1) mouth and small intestine
   (2) mouth and stomach
   (3) stomach and large intestine
   (4) stomach and small intestine

Directions (17-20): For each hormone given in questions 17 through 20, select the number of the target organ, chosen from the list below, that responds to the presence of the hormone in the bloodstream. Then write the number on the line provided. A number may be used once or not at all.

**Target Organs**
(1) stomach  
(2) duodenum  
(3) pancreas  
(4) gall bladder

17. Gastrin
18. Enterocinin
19. Entergastrone
20. Cholecystokinin

21. In addition to digestible nutrients, human food must contain indigestible material called
   (1) calories  (2) additives
   (3) roughage  (4) saturated fats

22. Among humans, an increase in the rate of respiration and heartbeat results when the blood contains
   (1) too little glucose  (2) too much nitrogenous waste
   (3) too little protein  (4) too much carbon dioxide
23. Rate of breathing in humans is controlled mainly by the
   (1) spinal cord  (2) cerebrum  (3) medulla  (4) cerebellum

24. A disease involving breakdown of the air sacs in the lungs is
   (1) coronary thrombosis  (2) hardening of the arteries
   (3) asthma  (4) emphysema

25. The air sacs in the lungs are called
   (1) alveoli  (2) capillaries
   (3) pulmonary arteries  (4) villi

26. The air which is exhaled during breathing is
   (1) low in water and high in oxygen
   (2) low in water and low in oxygen
   (3) high in water and high in oxygen
   (4) high in water and low in oxygen

Directions (27-30): For each component of human blood in questions 27 through 30, select the number of the function, chosen from the list below that is associated with that component. Then record it on the line next to the statement.

   Functions
   (1) Transport of oxygen
   (2) Blood clotting
   (3) Defense against bacteria
   (4) Transport of nutrients

27. Plasma
   4

28. Red blood cells
   1

29. White blood cells
   3

30. Platelets
   2

31. Blood flowing to the heart is received by a(n)
   (1) ventricle  (2) valve
   (3) atrium  (4) lymph duct
   3
32. Arteriosclerosis is a disease
(1) caused by blockage of the arteries
(2) found in elderly people of all cultures
(3) resulting from a high fat diet common to certain cultures
(4) related to blood cholesterol level

33. All of the following are common sense precautions one should take to prevent household transmission of AIDS except
(1) use protective gloves when exposed to body fluids
(2) use a different toothbrush and nail clippers
(3) avoid kissing someone on the cheek who cut themselves shaving
(4) engage in unprotected sexual activity

34. Sickle-cell anemia is a blood disease found primarily in
(1) asiatic people
(2) black people
(3) indigenous people
(4) white people

35. Which of the following is an autoimmune disease?
(1) ulcerative colitis
(2) cystic fibrosis
(3) Tay-Sachs disease
(4) Cooley's anemia

36. In gout, the kidneys do not excrete uric acid properly. The resulting condition is found in
(1) asiatic people
(2) black people
(3) white people
(4) any group because it is not confined to any one group

37. Which organ in the human body produces urea as a result of protein metabolism?
(1) liver
(2) lungs
(3) pancreas
(4) skin

38. Most carbon dioxide is carried in the plasma in the form of
(1) hydrogen ions
(2) bicarbonate ions
(3) lactic acid
(4) oxyhemoglobin

39. In addition to water, the principal components of urine are
(1) urea and salts
(2) amino acids and fatty acids
(3) ammonia and bile
(4) hydrochloric acid

40. Which activity could produce nitrogenous waste products?
(1) protein metabolism
(2) glucose oxidation
(3) starch hydrolysis
(4) alcoholic fermentation
Directions (41–45): For each statement in questions 41 through 45, select the number of the hormone, chosen from the list below, that is most closely associated with that statement. Then write the number on the line provided. An answer may be used more than once or not at all.

**Hormones**

(1) Adrenalin
(2) TSH
(3) Insulin
(4) Estrogen

41. This hormone directly influences the development of the female secondary sex characteristics.

2. This hormone stimulates activities in the thyroid gland.

3. This hormone promotes the outflow of sugar from the blood into the muscles.

1. This hormone contributes in greatest measure to the regulation of heartbeat, blood sugar levels and blood clotting rates.

2. This hormone is secreted by the pituitary gland.

Directions (46–49): For each glandular function in questions 46 through 49, select the number of the gland tissue, chosen from the list below, which is most closely associated with that function. Then write the number on the line provided.

**Gland Tissue**

(1) Adrenal
(2) Islets of Langerhans
(3) Parathyroid
(4) Pituitary
(5) Thyroid

1. Secretes a hormone which causes the heart to beat more rapidly in an emergency

5. Secretes a hormone which most directly regulates the rate of oxidation in body cells

2. Secretes the hormone glucagon, which stimulates the discharge of glucose into the blood

4. Stimulates the secretion of those hormones which regulate gamete maturation
2. The chief function of a sensory neuron is to
   (1) transmit impulses to effectors (glands and muscles)
   (2) transmit impulses from sense organs to the central nervous system
   (3) relay impulses across synapses
   (4) receive stimuli from the environment

4. Endocrine responses differ from nerve responses in that
   endocrine responses are
   (1) more rapid
   (2) electrical in nature
   (3) carried by neurons
   (4) of longer duration

1. Compared with the response to a nerve impulse, the response
   to a hormone is usually
   (1) longer in duration and more widespread in effect
   (2) longer in duration and less widespread in effect
   (3) shorter in duration and more widespread in effect
   (4) shorter in duration and less widespread in effect

4. Coordination of balance and motor patterns occurs principally in the
   (1) spinal cord
   (2) cerebrum
   (3) medulla
   (4) cerebellum

4. In the situation: receptor -> spinal cord, the type of
   neuron indicated by the -> is a
   (1) motor neuron
   (2) interneuron
   (3) effector neuron
   (4) sensory neuron

1. The somatic nervous system contains nerves that run from the
   central nervous system to the
   (1) muscles of the skeleton
   (2) heart
   (3) smooth muscles of the gastrointestinal tract
   (4) endocrine glands

4. Which is not a major function of cartilage tissues in a human adult?
   (1) giving pliable support to body structures
   (2) cushioning joint areas
   (3) adding flexibility to joints
   (4) providing skeletal levers
457. Which contains the greatest amount of skeletal muscle tissue?
(1) cerebrum  (2) small intestine  
(3) kidney    (4) foot

58. Spina bifida is a congenital condition which confines people to wheelchairs. It results from a deformity in the
(1) digestive system  (2) circulatory system  
(3) excretory system  (4) musculoskeletal system

59. Dwarfism is a condition caused by the pituitary gland in
(1) asiatic people  (2) black people  
(3) white people  (4) any group because it is not confined to any one group

60. Bones of the body are joined together by
(1) ligaments  (2) cartilage  
(3) tendons  (4) smooth muscle