1. The following are true:
   a. Digestion breaks down food so that it can be absorbed into the body.
   b. In absorption the food molecules move across the epithelial cells lining the GI tract and into the interstitial space from where they then go to the blood and lymph.
   c. By the use of various feedback mechanisms the GI tract is also a major controller of how many nutrients it will absorb.
   d. a, b and c
   e. a and b only.

2. The stomach secretes
   a. HCl
   b. pepsin
   c. mucus
   d. gastrin
   e. all of the above

3. Regarding the pancreas:
   a. It secretes insulin into the small intestine to break down and absorb sugars.
   b. It secretes enzymes for each of the three food groups.
   c. It also secretes bicarbonate to neutralize HCl from the stomach.
   d. b and c only.
   e. a, b and c

4. The following is true of bile
   a. It is secreted by the liver
   b. It is stored in the gall bladder
   c. The bile salts are amphipathic and help emulsify fat droplets.
   d. All of the above.
   e. a and b only.

5. The following enzymes break down protein. Which ones are secreted by the pancreas?
   a. Pepsin
   b. Trypsin
   c. Chymotrypsin
   d. b and c
   e. a, b and c

6. The two nerve networks in the intestinal wall are:
   a. The myenteric and the submucous.
   b. The pancreatic and the myenteric.
   c. American Online and Prodigy.

7. The following is true of CCK
   a. It is released from the duodenum.
   b. Its release can be stimulated by fatty acids.
c. CCK stimulates release of fat digesting enzymes from the pancreas.
d. All of the above

8. Regarding HCl release in the stomach:
a. Its release is caused by pepsinogen released from the chief cells.
b. Its release is caused by gastrin and nerve stimulation.
c. It helps dissolve particulate matter.
d. a and c
e. b and c

9. Regarding motility of the small intestine:
a. It involves pacemaker cells in the longitudinal smooth muscle.
b. The movement called segmentation mixes up chyme.
c. After segmentation the undigested food is moved forward into the large intestine.
d. All of the above.
e. None of the above.

10. The following is true of the contents of the colon:
a. Feces contains about 500 ml of water and 1000 ml of solids.
b. The solids are mainly undigested protein.
c. Chyme enters the colon through the ileocecal sphincter.
d. In the colon, sodium is moved into the colon and potassium is actively absorbed.

11. Glycogen is an example of a(n)
simple carbohydrate.
complex carbohydrate.
triglyceride.
amino acid.
polypeptide.

12. Which of the following releases the mucus that lines the stomach?
Chief cells
Gastric cells
Parietal cells
Mucoid cells
Goblet cells

13. Gastrin is most properly considered
an autocrine agent.
a paracrine agent.
a hormone.
a neurotransmitter.
an afferent pathway.

14. Which of the following is (are) not released by the pancreas?
Bicarbonate ions.
Proteases.
Lipases.
Amylase.
All of the above are released by the pancreas.

15. The breakdown of fats in the small intestine requires which of the following?
   Amylase alone.
   Bile salts and amylase.
   Lipases alone.
   Lipases and bile salts.
   Bile salts alone.

16. The liver is involved in all of the following processes except
   the digestion of proteins.
   the digestion of fats.
   the storage of carbohydrates.
   the conversion of carbohydrates into fats.
   the deactivation of toxic compounds.

17. In humans, most energy is stored for later use in the form of
   glucose.
   glycogen.
   proteins.
   fats.
   ATP.

18. The mechanical and chemical receptors that control digestive activity are located:
   in the glandular tissue that lines the organ lumen.
   in the walls of the tract organs.
   in the pons and medulla.
   only in the esophagus because this is the only part of the tract that needs to change to
   accommodate food passage

19. The function of the hepatic portal circulation is to:
   carry toxins to the venous system for disposal through the urinary tract.
   collect absorbed nutrients for metabolic processing or storage.
   distribute hormones.
   return glucose to the general circulation when blood sugar is low.

20. When we ingest large molecules such as lipids, carbohydrates, and proteins, they
    must undergo catabolic reactions whereby enzymes split these molecules. This series
    of reactions is called:
    absorption.
    secretion.
    chemical digestion.
mechanical digestion.

21. The sheets of peritoneal membrane that hold the digestive tract in place are called:
mesenteries.
lamina propria.
serosal lining.
mucosal lining.

22. From the esophagus to the anal canal, the walls of every organ of the alimentary canal are made up of the same four basic layers. Arrange them in order from the lumen.
muscularis externa, serosa, mucosa, and submucosa
serosa, mucosa, submucosa, and muscularis externa
submucosa, serosa, muscularis externa, and mucosa
mucosa, submucosa, muscularis externa, and serosa

23. The epithelial membrane called the mucosa:
absorbs mucus, digestive enzymes, and hormones.
absorbs the end products of digestion into the lymphatic system.
fights infectious disease.
contains the lamina propria.

24. The absorptive effectiveness of the small intestine is enhanced by increasing the surface area of the mucosal lining. Which of the following accomplish this task?
plicae circulares and intestinal villi
the vast array of digestive enzymes
Brunner's glands
the rugae

25. Select the statement that is true concerning primary teeth.
There are 27 primary teeth, and the molars are permanent.
There are 24 primary teeth, and no new primary teeth appear after 13 months.
There are 20 primary teeth, and by 24 months of age most children have all 20.
There are 32 primary teeth, and most children lose these teeth due to decay because they are never very strong.

26. Which of the following is true concerning the number and type of permanent teeth?
There are 32 permanent teeth, and the wisdom teeth are the last to emerge.
There are 27 permanent teeth, and the first molars are usually the last to emerge.
The number of permanent teeth is always equal to the number of primary teeth.
The number of upper permanent teeth is not equal to the number of lower permanent teeth.

27. Which of the following is not true of saliva?
cleanses the mouth
contains enzymes that begin the breakdown of proteins
moistens food and aids in compacting of the bolus
dissolves food chemicals so they can be tasted

28. The solutes contained in saliva include:
only salts and minerals.
only proteases and amylase.
mucin, lysozyme, electrolytes, salts, and minerals.
electrolytes, digestive enzyme, mucin, lysozyme, wastes, and IgA.

29. In addition to storage and mechanical breakdown of food, the stomach:
initiates protein digestion and denatures proteins.
is the first site where absorption takes place.
is the only place where fats are completely digested.
is the first site where chemical digestion of starch takes place.

30. Chyme is created in the:
mouth.
stomach.
esophagus.
small intestine.

31. Hydrochloric acid is secreted by which of the secretory cells of the stomach?
chief cells
parietal cells
serous cells
mucous neck cells

32. Gastrin, histamine, endorphins, serotonin, cholecystokinin, and somatostatin are
hormones that are released directly into the lamina propria. Which of the following cell
types synthesize and secrete these products?
enteroendocrine cells
parietal cells
zymogenic cells
mucous neck cells

33. There are three phases of gastric secretion. The cephalic phase occurs:
before food enters the stomach and is triggered by aroma, sight, or thought.
immediately after food enters the stomach, preparing the small intestine for the influx of
a variety of nutrients.
at the end of a large meal, and the juices secreted are powerful and remain in the GI tract for a long period of time.
when the meal is excessively high in acids and neutralization is required.

34. Gastrin is a digestive hormone that is responsible for the stimulation of acid secretions in the stomach. These secretions are stimulated by the presence of:
starches and complex carbohydrates.
protein and peptide fragments.
simple carbohydrates and alcohols.
fatty acids.

35. Pepsinogen, a digestive enzyme, is secreted by the:
   chief cells of the stomach.
   parietal cells of the duodenum.
   Brunner's glands.
   goblet cells of the small intestine.

36. The ducts that deliver bile and pancreatic juice from the liver and pancreas, respectively, unite to form the:
   portal vein.
   pancreatic acini.
   bile canaliculus.
   hepatopancreatic ampulla.

37. The enzymatic breakdown of any type of food molecule is called ________.
   diffusion.
   active transport.
   hydrolysis.
   denatured.

38. Hepatocytes do not:
   produce digestive enzymes.
   process nutrients.
   store fat-soluble vitamins.
   detoxify.

39. Chief cells:
   occur in the intestine.
   produce HCl.
   are found in the basal regions of the gastric glands.
   produce mucin.

40. The ________ contains lobules with sinusoids (lined with macrophages) that lead to a central venous structure.
   liver
   spleen
   pancreas
   stomach

41. The terminal portion of the small intestine is known as the:
   duodenum.
   ileum.
   jejunum.
42. The dental formula for an adult is 2-1-2-3. What does the 1 stand for?
incisor tooth
molar tooth
premolar tooth
canine tooth

43. _______ is/are not important as a stimulus in the gastric phase of gastric secretion.
Distension
Carbohydrates
Peptides
Low acidity

44. The function of the goblet cells is to:
absorb nutrients from digested food and store them for future use.
produce mucus that protects parts of the digestive organs from the effects of powerful enzymes needed for food digestion.
secrete buffers in order to keep the pH of the digestive tract close to neutral.
provide protection against invading bacteria and other disease-causing organisms that enter the digestive tract in food.

45. Under normal conditions, the gastric mucosa pours out as much as:
10 liters of gastric juice per hour.
1 pint of gastric juice following each meal.
2 to 3 liters of gastric juice per day.
6 liters of gastric juice when the meal is unusually heavy in fats.

46. Nervous control of gastric secretion is provided by:
somatic neurons in the spinal cord.
the vagus nerve and enteric plexus.
the rubrospinal tracts.
the reticulospinal and vestibulospinal tracts.

47. Which of the following are types of papillae on the tongue that contain taste buds?
fungiform and circumvallate
palatine and circumvallate
circumvallate and filiform
fungiform, circumvallate, and filiform

48. Which of the following enzymes is specific for proteins?
dextrinase
amylase
trypsin
lipase
49. A fluid secreted into the small intestine during digestion that contains cholesterol, emulsification agents, and phospholipids is:
   - bile.
   - pancreatic juice.
   - intestinal juice.
   - gastric juice.

50. The layer of the digestive tube that contains blood vessels, lymphatic nodes, and a rich supply of elastic fibers is the:
   - mucosa.
   - submucosa.
   - muscularis externa.
   - serosa.

51. Tooth structure includes:
   - the dentin, which is the hardest substance in the body.
   - a root covered with enamel.
   - a thin periodontal ligament that holds the tooth in place.
   - pulp, an avascular connective tissue filling the hollow cavity of the tooth.

52. Chemical digestion in the small intestine involves:
   - a significant amount of enzyme secretion by the intestinal mucosa.
   - cholecystokinin (CCK), an intestinal hormone responsible for gallbladder contraction.
   - secretions from the spleen that contain all enzymes necessary for complete digestion.
   - bile salts that help emulsify carbohydrates so that they can be easily digested by enzymatic action.

53. The ingestion of a meal high in fat content would cause which of the following to occur? Severe indigestion would occur, caused by the lack of sufficient digestive enzymes. This type of food would cause secretion of gastrin to cease, causing digestive upset. Bile would be released from the gallbladder to emulsify the fat in the duodenum. The acid secretions from the stomach would be sufficient to digest this food.

54. Hormones that inhibit gastric secretion include:
   - ACh.
   - secretin.
   - gastrin.
   - histamine.

55. Which of these is not part of the splanchnic circulation?
   - hepatic portal vein
   - inferior vena cava
   - superior mesenteric artery
   - celiac artery
ALSO: Think about these:
If the release of secretin by the small intestine was blocked, what would be the effects on the contents of the intestine, and why? (Answer on next page)
(If secretin was not released, there would be no feedback to slow down the rate of stomach emptying and its secretion of acid, and there would be no signal for the release of bicarbonate from the liver and pancreas. The result would be that the chyme moving into the small intestine would be highly acidic and would stay acidic. In addition, chyme would move into the SI at a greater than normal rate.)