Section 1
Answer questions 1 – 40 on the scan sheet.

1. The homeostatic **value** of a particular controlled variable in the body is known as its ___________.
   a. balance point
   b. set point
   c. equilibrium point
   d. saturation point
   e. breaking point

2. Which part of a control system monitors a controlled variable such as temperature or pressure or pH?
   a. The trigger
   b. The receptor
   c. The control center
   d. The amplifier
   e. The effector

3. Rapidly jumping out of bed causes a drop in blood pressure. Stretch receptors in the arteries sense this pressure decrease, and convey the information to the medulla (a brain center). The medulla assesses the drop in pressure and (via nerves to the heart) increases heart rate. The increase in heart rate restores blood pressure back to the normal level. In this negative-feedback control system, which of the following would be termed the **receptor or sensor**?
   a. the arterial stretch receptors
   b. the medulla
   c. the heart
   d. the blood pressure itself
   e. the arteries

4. Which of the following is an example of a positive feedback loop?
   a. In a pregnant female, the hormone oxytocin causes uterine contractions, which causes the secretion of more oxytocin, which increase the strength of uterine contractions.
   b. An increase in the blood sugar level causes the secretion of insulin, which lowers the blood sugar level.
   c. An increase in body temperature causes the production of sweat, which lowers body temperature.
   d. An increase in blood pressure causes an increase in urine production, which lowers blood pressure.
   e. An increase in carbon dioxide (CO₂) levels in the body causes an increase in the breathing rate, which lowers the CO₂ levels in the body.
5. The hypersecretion of a hormone over a long period of time will cause changes in the sensitivity of target cells through the decrease in the number of receptors. This would be an example of ______________.
   a. negative feedback
   b. down-regulation
   c. amplification
   d. gene transcription
   e. a hormonal stimulation

6. The enzyme that is responsible for creating the second messenger cAMP (cyclic AMP) is called:
   a. protein kinase.
   b. adenylyl cyclase.
   c. enterokinase.
   d. phospholipase.
   e. calcitonin.

7. Which of the following endocrine glands is located most inferiorly in the body?
   a. the thyroid
   b. the posterior pituitary gland
   c. the adrenal gland
   d. the hypothalamus
   e. the anterior pituitary gland

8. The location where all hormones have an effect is called a ____________.
   a. nerve
   b. gland
   c. source
   d. target
   e. lumen

9. Which of the following hormones is hydrophilic?
   a. aldosterone
   b. testosterone
   c. thyroid hormone (T₄/thyroxine)
   d. progesterone
   e. glucagon

10. Suppose 1 molecule of hormone X activated activated 10 adenylate cyclase molecules, each adenylate cyclase made 1,000 cAMP molecules, and each cAMP activated 1,000 protein kinase molecules. This would be an example of ______________.
    a. negative feedback
    b. amplification
    c. up-regulation
    d. a gene transcription
    e. hypersecretion

11. The adrenal glands are:
    a. on top of the kidneys
    b. composed mostly of follicles
    c. organized in an outer layer of smooth muscle and an inner portion of connective tissue
    d. divided into an anterior half and a posterior half
    e. responsible for the secretion of oxytocin and antidiuretic hormone (ADH)
12. The hormone T₃ has 3 atoms of __________ as part of its molecular structure.
   a. iron (Fe)
   b. iodine (I)
   c. sodium (Na)
   d. potassium (K)
   e. lead (Pb)

13. Thyroid hormone will cause an increase in ____________.
   a. blood calcium (Ca²⁺) levels
   b. blood potassium levels
   c. aldosterone secretion from the adrenal glands
   d. metabolic rate
   e. urine volume

14. The hormone aldosterone will increase the blood ____________.
   a. glucose levels
   b. fatty acid levels
   c. pressure
   d. a and c
   e. b and c

15. The superficial layer of the adrenal cortex is called the ____________.
   a. zona duodenum
   b. zona reticularis
   c. zona medulla
   d. zona fasciculata
   e. zona glomerulosa

16. The hormones secreted from the anterior pituitary are stimulated by hormones from the ____________.
   a. anterior pituitary
   b. cerebral cortex
   c. medulla oblongata
   d. adrenal medulla
   e. hypothalamus

17. Estrogen secreted by the ovaries can inhibit the secretion of _______________ from the anterior pituitary.
   a. FSH
   b. ACTH
   c. TSH
   d. a and b
   e. b and c

18. Chyme:
   a. is a longitudinal fold of the stomach lining.
   b. is the secretion of the stomach that protects the lining from HCl.
   c. is a mixture of food and gastric secretions.
   d. is a gastric hormone that is secreted in response to the presence of carbohydrates.
   e. is none of the above.
19. Which of the following best describes the type of motility observed in the stomach?
   a. segmentation
   b. diffusion
   c. peristalsis
   d. active transport
   e. conduction

20. Which of the following is NOT an accessory organ of the digestive system?
   a. teeth
   b. liver
   c. pancreas
   d. gallbladder
   e. jejunum

21. The visceral peritoneum:
   a. secretes peritoneal fluid into the abdominal cavity.
   b. is the location of nerves that control the contraction of the muscularis.
   c. is one of the four layers that comprise the wall of the alimentary canal.
   d. is also known as the serosa.
   e. is all of the above.

22. Chemoreceptors of the digestive system:
   a. are found in the brain.
   b. are part of the muscularis layer of the alimentary canal.
   c. detect changes in the composition of the contents of the alimentary canal lumen.
   d. a and b
   e. b and c

23. Which of the following is secreted in the mouth to bind food together so that it’s easier to swallow?
   a. mucin
   b. salivary amylase
   c. lysozyme
   d. H₂O
   e. none of the above

24. Which of the following correctly lists the layers of the small intestinal wall from the superficial (luminal) to the deepest?
   a. submucosa → mucosa → muscularis → serosa
   b. serosa → mucosa → submucosa → muscularis
   c. mucosa → submucosa → muscularis → serosa
   d. serosa → muscularis → mucosa → submucosa
   e. muscularis → serosa → mucosa → submucosa

25. Mucus cells of the stomach secrete:
   a. pepsin
   b. pepsinogen
   c. HCl
   d. HCO₃⁻
   e. gastrin
26. The cells that secrete pepsinogen are:
   a. chief cells.
   b. parietal cells.
   c. enteroendocrine cells.
   d. hepatocytes.
   e. acinar cells.

27. Which of the following is **NOT** involved in the digestion of proteins?
   a. pepsin
   b. salivary amylase
   c. chief cells
   d. gastrin
   e. acidic denaturation

28. The chemical digestion of proteins is **completed/finished** in the ____________.
   a. mouth
   b. stomach
   c. pancreas
   d. small intestine
   e. large intestine

29. Which of the following hormones is secreted when the pH of the stomach increases above 2.0?
   a. gastrin
   b. pepsin
   c. insulin
   d. secretin
   e. CCK

30. Acidic chyme in the stomach is neutralized in the small intestine by ____________.
   a. bicarbonate (HCO$_3^-$)
   b. saliva
   c. pancreatic proteases
   d. bile
   e. HCl

31. Regarding carbohydrate-digesting enzymes, which of the following statements is **FALSE**?
   a. Amylase is secreted directly into the mouth.
   b. Amylase is synthesized in the pancreas.
   c. They are most active in a neutral to basic pH.
   d. Most of the chemical digestion of carbohydrates occurs in the stomach.
   e. Carbohydrate digestion is completed by brush-border enzymes of the small intestine

32. Secretion of bicarbonate (HCO$_3^-$) from the pancreas is stimulated by the hormone ________.  
   a. gastrin
   b. secretin
   c. cholecystokinin (CCK)
   d. glucagon
   e. insulin
33. The storage of bile between meals is in the _____________.
   a. stomach
   b. liver
   c. gallbladder
   d. pancreas
   e. small intestine

34. Regarding bile, which of the following statements is **FALSE**?
   a. It is synthesized by cells in the liver.
   b. It decreases the time necessary for lipid digestion.
   c. It is only effective when delivered into the alimentary canal.
   d. It is secreted into the stomach.
   e. Its presence in the alimentary canal is dependent upon hormones secreted from the small intestine.

35. Which of the following does **NOT** occur during the cephalic phase of digestion?
   a. Increased flow of saliva.
   b. Increased secretion of gastric acid and pepsinogen.
   c. Relaxation of the sphincter of Oddi
   d. Increased parasympathetic stimulation to the stomach.
   e. Increased bicarbonate (HCO$_3^-$) production in the pancreas.

36. The large folds of the small intestine which will disappear upon distension (stretching) are called:
   a. plicae circulares (circular folds).
   b. rugae.
   c. microvilli.
   d. gastric pits.
   e. big folds.

37. The ____________ cell membrane of small intestinal absorptive cells contains small folds called _____________.
   a. basal, villi
   b. basal, microvilli
   c. apical, villi
   d. apical, microvilli
   e. none of the above

38. Activation of pancreatic proteases occurs in the lumen of the ______________.
   a. stomach
   b. small intestine
   c. pancreatic duct
   d. common bile duct
   e. large intestine

39. Gluconeogenesis:
   a. will increase the glucose levels in the blood.
   b. is stimulated by insulin.
   c. occurs when glucose levels are too high.
   d. is the process where a molecule of glycogen is broken down into many glucose molecules.
   e. all of the above
40. Which of the following is NOT a correct statement regarding glucagon?
   a. Glucagon promotes glucose release out of liver cells (hepatocytes).
   b. Hypersecretion of glucagon promotes hyperglycemia.
   c. Glucagon is secreted from alpha (α) cells of the pancreas.
   d. Glucagon causes gluconeogenesis in the liver.
   e. An inability of the pancreas to secrete glucagon causes Type I diabetes mellitus.

Section 2
Answer questions 41 – 55 on the scan sheet using A = increase, B = not change, or C = decrease
The cause is described before the blank and the effect is described after the blank in all questions.

41. A decrease in the secretion of follicle stimulating hormone from the pituitary gland will _______ the secretion of testosterone from the testes.

42. The secretion of releasing hormones from the hypothalamus will ______ the secretion of stimulating hormones from the anterior pituitary.

43. A rise in the circulating (blood) levels of thyroid hormone (thyroxine/T4) will ______ the secretion of thyrotropin releasing hormone (TRH) from the hypothalamus.

44. A period of long term stress will ______ the secretion of cortisol from the adrenal glands.

45. The secretion of catecholamines from the adrenal medulla will ______ the heart rate.

46. An increase in the secretion of thyrotropin releasing hormone (TRH) from the hypothalamus ______ the secretion of antidiuretic hormone (ADH/vasopressin).

47. Thinking of food will ______ the secretion of pancreatic juice in the pancreas.

48. An increase in the secretion of pepsinogen into the stomach will ______ the chemical digestion of triglycerides in the stomach.

49. The addition of bicarbonate ions (HCO₃⁻) into the small intestine will ______ the pH of the chyme.

50. Mixing chyme with bile will ______ the size of the fat droplets.

51. A stimulation of the Sympathetic Nervous System will ______ the rate of saliva secretion.

52. The secretion of the hormone gastrin will ______ the contraction of the stomach muscularis.

53. The secretion of cholecystokinin (CCK) will ______ the diameter of the sphincter of Oddi.

54. After eating a meal, the secretion of insulin from the pancreas will ______ the blood glucose concentration.

55. The secretion of glucagon between meals will ______ the amount of glycogen stored in the liver.
56. Insulin secretion from the pancreas will _______ the rate of glycogenesis in the liver.