

## Sample Questions for Final Exam

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- 1. Which of the following does not belong to four major categories of tissues?**
  - A. Muscle tissue
  - B. Connective tissue
  - C. Nervous tissue
  - D. Epithelial tissue
  - E. Sensory tissue
- 2. Tendons and ligaments are classified as:**
  - A. Adipose tissue
  - B. Loose connective tissue
  - C. Cartilage
  - D. Fibrous connective tissue
  - E. Epithelial tissue
- 3. Which of the following is not an example of negative feedback mechanism?**
  - A. Feedback regulation of  $T_3$  and  $T_4$  hormone secretion from the thyroid gland
  - B. Regulation of blood levels of LH, FSH, and GnRH by testosterone
  - C. Effects of high estrogen level on ovulation due to proliferation of granulosa cells
  - D. Effects of high estrogen and progesterone levels from corpus luteum on GnRH production
  - E. Effects of low estrogen level on hypothalamus and anterior pituitary
- 4. A structural component of a human sperm cell that contains enzymes to help the sperm penetrate the egg is called:**
  - A. Acrosome
  - B. Epididymis
  - C. Prostaglandins
  - D. Blastula
  - E. Cortical granules
- 5. Which of the following statements is true for both oogenesis and spermatogenesis?**
  - A. True diploids come from primordial germ cells
  - B. Unequal cytokinesis in meiotic divisions result in formation of polar bodies
  - C. Testosterone exerts a negative feedback on hypothalamus and anterior pituitary
  - D. Lutenizing hormone binds to its cognate receptor on thecal cells to convert cholesterol to testosterone
  - E. Follicle stimulating hormone binds to its cognate receptor on Sertoli cells to convert testosterone to dihydrotestosterone
- 6. What is the primary function of zona pellucida?**
  - A. Protection of primary oocytes
  - B. Conversion of cholesterol to testosterone upon binding of lutenizing hormone
  - C. Conversion of testosterone to estrongen upon binding of follicle stimulation hormone
  - D. Induction of lutenizing hormone surge during the follicular phase of menstrual cycle
  - E. Secretion of estrogen and progesterone to prevent new follicle development
- 7. A pool of mammalian cells with defective glucagon receptors has been isolated. Sequencing of the receptor gene revealed that the G protein binding domain has been mutated and rendered nonfunctional. What could be the most direct consequence of this mutation?**
  - A. Inability to bind glucagons
  - B. Inability to activate adenylyl cyclase
  - C. Inability to bind cholera toxin
  - D. Inability to induce receptor dimerization
  - E. Inability to phosphorylate the target protein

8. **What is the correct order in which G protein coupled receptor systems are activated?**
- Hormone – Receptor – Protein kinase A – Adenyl cyclase – G protein – Cellular response
  - Hormone – Receptor – G protein – Adenyl cyclase – Protein kinase A – Cellular response
  - Hormone – Receptor – G protein – Protein kinase A – Adenyl cyclase – Cellular response
  - Hormone – Receptor – Adenyl cyclase – G protein – Protein kinase A – Cellular response
  - Hormone – Receptor – Adenyl cyclase – Protein kinase A – G protein – Cellular response
9. **Which of the following is an example of a single pass transmembrane receptor without an enzymatic activity that associates with signal transduction components?**
- Growth hormone receptor
  - Glucagon receptor
  - Insulin receptor
  - Epidermal growth factor receptor (EGFR)
  - Ion channel-linked receptor

For questions 8 to 12, select from A through E. Any letter may be used more than once or not at all.

10. **Primordial germ cell in embryo**

11. **Oogonium**

12. **Primary oocyte**

13. **Secondary oocyte**

14. **Ovum**

- Direct result of lutenizing hormone surge
- Ovary-specific stem cell
- Arrested in meiosis I
- Maturation triggered by entry of sperm
- Undifferentiated cells

15. **Cells that are responsible for converting testosterone to dihydrotestosterone in the male reproductive system are called:**

- Sertoli cells
- Leydig cells
- Granulosa cells
- Thecal cells
- Blastocyst

For questions 14 to 17, select from A through E. Any letter may be used more than once or not at all.

16. **First trimester**

17. **Second trimester**

18. **Third trimester**

19. **Labor**

- Decline of human chorionic gonadotropin (hCG) level and deterioration of corpus luteum
- Oxytocin from posterior pituitary stimulates placenta to make prostaglandins
- Placenta secretes hCG and makes estrogen and progesterone
- Continued rapid growth and activity of fetus, followed by expansion of uterus
- Embryo moves down the oviduct

20. **Mifepristone, more commonly referred to as RU-486, is a synthetic steroid compound used as a female contraceptive. This drug works as a competitive antagonist at the progesterone receptor. Which of the following statements is TRUE about the mechanism by which RU-486 works?**

- Inducing a response by binding to the progesterone receptor
- Inhibiting progesterone binding to its cognate receptor
- Inhibiting chorionic somatomammotropin response
- Inducing a response by competitively binding to prolactin receptor on the mammary gland
- Inhibiting a response by competitively binding to prolactin receptor on the mammary gland

- 21. Which of the following is not considered a negative feedback system?**
- Effect of estrogen and progesterone from corpus luteum on hypothalamus during first trimester
  - Effect of estrogen and progesterone from corpus luteum on mammary gland during first trimester
  - Low level of estrogen produced by granulosa cells during follicle development
  - Effect of testosterone produced by Leydig cells on anterior pituitary
  - Effect of inhibin produced by Sertoli cells on hypothalamus
- 22. During pregnancy, the anterior pituitary secretes \_\_\_\_\_, which targets \_\_\_\_\_ to exert positive feedback.**
- estrogen / placenta
  - human chorionic gonadotropin (hCG) / corpus luteum
  - prolactin / mammary gland
  - progesterone / mammary gland
  - chorionic somatomammotropin (CS) / mammary gland
- 23. The most direct consequence on amphibian development upon removal of the gray crescent would be...**
- Inability to develop from the 2-cell stage to the 4-cell stage
  - Inability to develop from the 4-cell stage to the 8-cell stage
  - Inability to form blastocoel
  - Inability to form dorsal structures
  - Inability to form ventral structures
- 24. During early mammalian development, \_\_\_\_\_ secretes enzymes that allow the blastocyst to penetrate the uterine lining.**
- Inner cell mass
  - Cadherins
  - Epiblast
  - Trophoblast
  - Hypoblast
- 25. The key difference between mammalian and amphibian zygote with respect to the cell divisions is...**
- Mammalian zygotes have a defined plane of division while amphibian zygotes do not (random cleavage)
  - Amphibian zygotes have a defined plane of division while mammalian zygotes do not (random cleavage)
  - Amphibian zygotes undergo an 8-cell stage while mammalian zygotes do not
  - Mammalian zygotes undergo an 8-cell stage while amphibian zygotes do not
  - Mammalian zygotes have the gray crescent while amphibian zygotes do not
- 26. Gastrulation refers to a process during which the morphology of the embryo is dramatically restructured by cell migration. The end result of gastrulation is \_\_\_\_\_. The step that immediately follows gastrulation is called \_\_\_\_\_.**
- Implantation of blastocyst / differentiation
  - Compaction at the 8-cell stage / implantation of blastocyst
  - Compaction at the 8-cell stage / organogenesis
  - Formation of a blastomere / gastrulation
  - Formation of a three-layered embryo / organogenesis
- 27. During gastrulation of mammalian developmental stages, inward movement of cells from the epiblast occurs at the structure known as \_\_\_\_\_.**
- Chorion
  - Blastocoel
  - Primitive streak
  - Yolk sac
  - Blastoderm

28. **Transplantation of tissue from the zone of polarizing activity (ZPA) in the anterior margin of a chick embryo limb bud results in**
- A. Formation of posterior structures
  - B. Formation of anterior structures
  - C. Abortion of embryo development
  - D. Loss of polarized zygote
  - E. Loss of compaction at the 8-cell stage
29. **Inside your stomach, breakdown of proteins is mediated primarily by \_\_\_\_\_ .**
- A. Pepsinogen
  - B. Pepsin
  - C. HCl
  - D. Lipase
  - E. Amylase
30. **Which of the following enzyme is not released into the small intestine?**
- A. Lipase
  - B. Trypsin
  - C. Pepsin
  - D. Pancreatic amylase
  - E. Nuclease
31. **Which of the following is an incorrect pairing of a digestive enzyme and its substrate?**
- A. Pepsin / protein
  - B. Pepsinogen / pepsinogen
  - C. Trypsin / protein
  - D. Carboxypeptidase / carbohydrates
  - E. Amylase / polysaccharides
32. **Microvilli, cells present in the small intestine lining, are an example of \_\_\_\_\_ .**
- A. Simple squamous cells
  - B. Columnar epithelial cells
  - C. Cuboidal epithelial cells
  - D. Stratified squamous cells
  - E. Stratified columnar epithelial cells
33. **Which of the following is an incorrect pairing of a digestive hormone and its site of production?**
- A. Cholecystokinin / Duodenum wall
  - B. Gastrin / Stomach wall
  - C. Gastrin / Duodenum wall
  - D. Secretin / Duodenum wall
  - E. Motilin / Duodenum wall
34. **Regulation of digestion mediated by hormones secreted by walls of stomach and duodenum is an example of \_\_\_\_\_ system.**
- A. Autocrine
  - B. Endocrine
  - C. Paracrine
  - D. Exocrine
  - E. Synaptic
35. **Many drugs are designed to release its active ingredients inside the small intestine because...**
- A. Acidic condition inside the small intestine allows breakdown of tablets into smaller molecules
  - B. Only the small intestine contains enzymes to break down tablets into smaller molecules
  - C. Water absorption is the most efficient inside the small intestine
  - D. Only two layers of epithelial cells need to be crossed for drugs to get to the circulatory system
  - E. Lymphatic system is easily accessible through the villi

**36. Which of the following is not true about bile?**

- A. It is stored in gall bladder before being released into the duodenum.
- B. It is produced in liver.
- C. It is responsible for breakdown of fat into emulsified fat droplets.
- D. Its release into small intestine is regulated by cholecystokinin (CCK).
- E. Its release into small intestine is regulated by secretin.

**37. Which of the following structural components is shared by both arteries and capillaries?**

- A. Connective tissue
- B. Smooth muscle
- C. Basement membrane
- D. Endothelium
- E. Interstitial fluid

**38. Which of the following is not true about the lymphatic system?**

- A. It helps maintain the volume and protein concentration of the blood.
- B. It helps defend body against infection.
- C. It transports fats from digestive tract to circulatory system.
- D. Lymph composition is similar to that of interstitial fluid.
- E. Lymph drains directly into the excretory system.

For questions 36 to 41, select from A through E. Any letter could be used more than once or not at all.

**39. Neutrophils**

**40. Monocytes**

**41. Lymphocytes**

**42. Erythrocytes**

**43. Platelets**

**44. Basophils**

- A. Phagocytic cells that engulf bacteria and cell debris
- B. Inhibits blood clotting
- C. Promotes blood clotting
- D. Lack nuclei and mitochondria, but contain hemoglobin
- E. Contains immune cells

**45. Which of the following statements best describes the graph that shows the relationship between oxygen partial pressure and oxygen saturation of hemoglobin?**

- A. At a partial pressure typical inside the lung, hemoglobin is mostly saturated with CO<sub>2</sub>.
- B. At a partial pressure typical in the vicinity of tissues at rest, hemoglobin is mostly saturated with O<sub>2</sub>.
- C. At a partial pressure typical inside the lung, hemoglobin is mostly (over 90%) saturated with O<sub>2</sub>.
- D. At a partial pressure typical in tissues during exercise, hemoglobin is mostly saturated with O<sub>2</sub>.
- E. At a partial pressure typical in the vicinity of tissues at rest, hemoglobin is mostly saturated with CO<sub>2</sub>.

**46. Which of the following statements about the Bohr shift is false?**

- A. A drop in pH in the vicinity of active tissues is due to CO<sub>2</sub> (from respiration) converting into carbonic acid.
- B. The reaction CO<sub>2</sub> + H<sub>2</sub>O → H<sub>2</sub>CO<sub>3</sub> is catalyzed by carbonic hydratase.
- C. Hemoglobin is capable of releasing more O<sub>2</sub> at lower pH.
- D. The O<sub>2</sub> dissociation curve shifts toward the right as a result of lower pH.
- E. Bohr shift can be observed even from a pH shift of 0.2.

For questions 38 to 41, select from A through D. Any letter could be used more than once or not at all.

**47. Partial pressure of O<sub>2</sub> ~ 160 mm Hg / Partial pressure of CO<sub>2</sub> ~ 0.2 mm Hg**

**48. Partial pressure of O<sub>2</sub> ~ 40 mm Hg / Partial pressure of CO<sub>2</sub> ~ 45 mm Hg**

**49. Partial pressure of O<sub>2</sub> ~ 100 mm Hg / Partial pressure of CO<sub>2</sub> ~ 40 mm Hg**

**50. Partial pressure of O<sub>2</sub> < 40 mm Hg / Partial pressure of CO<sub>2</sub> > 45 mm Hg**

- A. Tissue cells
- B. Blood leaving tissue (systemic) capillaries
- C. Inhaled air
- D. Blood entering tissue (systemic) capillaries

**Answer Key**

1	E	26	E
2	D	27	C
3	C	28	A
4	A	29	B
5	A	30	C
6	A	31	D
7	B	32	B
8	B	33	C
9	A	34	C
10	E	35	D
11	B	36	E
12	C	37	D
13	A	38	E
14	D	39	A
15	A	40	A
16	C	41	E
17	A	42	D
18	D	43	C
19	B	44	B
20	B	45	C
21	B	46	B
22	C	47	C
23	D	48	B
24	D	49	D
25	B	50	A