

臺北醫學大學 九十二學年度第一學期 期中考試 (試) 命題紙

系級	科目	授課教師	考試日期	學號	姓名
牙一	普通生物學	楊良友	92年1月15日第 節		
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Instructor: Dr. Liang-Yo Yang

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MULTIPLE CHOICE. There are two parts in this exam. Part I contains 45 multiple choice questions with 2 points each. Part II contains 10 multiple choice questions with 1.5 points each. Choose the **ONE AND ONLY ONE** alternative that best completes the statement or answers the question. **Please write down your answer in the Table provided on the last page (page 10) of this exam.** Please remember to write down your student ID and name at least on pages 1 and 10. I wish you all do well in the final exam. Have a great Chinese New Year and enjoy your winter break.

Part I: 45 multiple choice questions. Each question is worth 2 points.

- 1) Which of the following tissues lines the kidney ducts?  
A) smooth muscle B) connective C) epithelial D) adipose E) nervous
- 2) Which of the following fibers is responsible for the resistant property of tendons?  
A) collagenous fibers B) reticular fibers C) fibrin fibers D) elastin fibers  
E) spindle fibers
- 3) What do fibroblasts secrete?  
A) calcium phosphate for bone  
B) fats  
C) proteins for connective fibers  
D) chondrin  
E) interstitial fluids
- 4) Which of the following traits is characteristic of all types of muscle tissue?  
A) striated banding pattern seen under the microscope  
B) cells that contain actin and myosin  
C) a response that can be consciously controlled  
D) cells that lengthen when appropriately stimulated  
E) intercalated discs that allow cells to communicate
- 5) Which choice could be used as a theoretical example of convergence between humans and aquatic animals?  
A) a diver using an air tank to sustain a longer dive time  
B) an aquatic mammal nursing its young  
C) a speed swimmer wearing a wet suit to reduce friction while in the water  
D) the appearance of hair on a whale

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- E) the aquatic mammal having eyes centered on the front of the head
- 6) Regardless of their size, the one thing that is common to all animals is
- the use of positive and negative feedback cycles to regulate body water content.
  - an external body surface that is dry.
  - a basic body plan that resembles a two-layered sac.
  - the use of homeostatic mechanisms to control their internal environment.
  - having cells surrounded by an aqueous medium.
- 7) What is the common functional significance of the many cells making up such seemingly different structures as the lining of the air sacs in the lungs and the wavy lining of the human intestine?
- lowered basal metabolic rate due to cooperation between cells
  - increased exchange surface provided by their membranes
  - greater numbers of cell organelles contained within their cytoplasm
  - greater protection due to increased cellular mass
  - increased oxygen demand from their metabolic activity
- 8) Why must multicellular organisms keep their cells awash in an "internal pond"?
- This phenomenon only occurs in aquatic organisms because terrestrial organisms have adapted to life in dry environments.
  - The cells of multicellular organisms tend to lose water because of osmosis.
  - The cells of multicellular organisms tend to accumulate wastes, a consequence of diffusion.
  - All cells need an aqueous medium for the exchange of nutrients, gases, and wastes.
  - Negative feedback will only operate in interstitial fluids.
- 9) Which example best describes a homeostatic control system?
- The blood pressure increases in response to an increase in blood volume.
  - Motility in the digestive tract increases following a meal.
  - The core body temperature of a runner is allowed to gradually rise from 37degreeC to 45degreeC.
  - The kidneys excrete salt into the urine when dietary salt levels rise.
  - A blood cell shrinks when placed in a solution of salt and water.
- 10) Which of the following is an example of positive feedback?
- An increase in blood sugar concentration increases the amount of the hormone that stores sugar as glycogen.
  - An increase in calcium concentration increases the amount of the hormone that stores calcium in bone.

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C) An infant's suckling at the mother's breast increases the amount of the hormone that induces the release of milk from the mammary glands.

D) A decrease in calcium concentration increases the amount of the hormone that releases calcium from bone.

E) A decrease in blood sugar concentration increases the amount of the hormone that converts glycogen to glucose.

11) Consider a husband and wife sharing a bed, with each one having an electric blanket. Their controls become switched. When the husband feels cold, he turns up the control. This warms up his spouse, who turns down her control. This chills the husband, who turns up his control even more. The process continues. For both the wife and the husband, this would be an example of  
 A) positive feedback. B) homeostasis. C) integrated control. D) regulated change. E) negative feedback.

12) Which statement about standard metabolic rate (SMR) and basal metabolic rate (BMR) is correct?  
 A) The measurement of both BMR and SMR is temperature dependent.  
 B) Human females actually have a higher BMR and a lower SMR than males.  
 C) SMR is a measure of metabolic rate in endotherms and BMR is a measure of metabolic rate in ectotherms.  
 D) SMR measures energy use during exercise and BMR is measured at rest.  
 E) Both SMR and BMR are measured in a resting, fasting, nonstressed state.

13) Which of the following characteristics of blood best explains its classification as connective tissue?  
 A) It contains more than one type of cell.  
 B) It is found within all the organs of the body.  
 C) Its cells are widely dispersed and surrounded by a fluid.  
 D) It is contained in vessels that "connect" different parts of an organism's body.  
 E) Its cells can move from place to place.

14) Which is the most significant single factor in preventing you from being able to run for a full 24 hours without stopping?  
 A) the circadian rhythm of the sleep-wake cycle  
 B) the basal metabolic rate exceeding the amount of ATP available  
 C) the type of muscle fibers  
 D) the lack of sustainable levels of cellular respiration  
 E) the changes in blood pressure that accompany extended periods of exercise

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- 15) The blood-brain barrier
- A) is formed by tight junctions.
  - B) uses chemical signals to communicate with the spinal cord.
  - C) tightly regulates the intracellular environment of the CNS.
  - D) is formed by oligodendrocytes.
  - E) provides support to the brain tissue.
- 16) A squirrel chewing the insulation off an electrical wire is analogous to
- A) the nodes of Ranvier in the PNS.
  - B) demyelination of the nervous system.
  - C) the deterioration of the brain-blood barrier.
  - D) the depolarization of the unmyelinated axons.
  - E) Schwann cells failing to myelinate axons of the CNA.
- 17) Which of the following statements is false?
- A) All cells have a membrane potential.
  - B) Astrocytes can communicate with nerve cells.
  - C) Squid axons are a model system for nerve conductance.
  - D) Gray matter is the site of neuronal integration.
  - E) The outside of a cell is negative with respect to the inside of a cell.
- 18) Neurons at rest are not at the equilibrium potential for  $K^+$  because the cell membrane is
- A) not permeable to  $K^+$ .
  - B) only permeable to  $K^+$ .
  - C) only permeable to  $Na^+$ .
  - D) slightly permeable to  $Na^+$ .
  - E) not permeable to  $Na^+$ .
- 19) If an otherwise normal nerve cell were made permeable to large negative ions, what would happen?
- A) The membrane potential would become positive.
  - B) The  $Na^+/K^+$  pump would not function.
  - C) Potassium would not leave the resting cell.
  - D) The membrane potential would not form.
  - E) Sodium would not enter the resting cell.
- 20) A toxin that binds specifically to the voltage-gated sodium channels of axons would
- A) block all sodium movement.
  - B) ultimately block sodium and potassium movement.
  - C) not work on the giant squid axon.
  - D) block repolarization.
  - E) prevent the axon from reaching the threshold potential.

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- 21) After an action potential, how is the resting potential restored?  
 A) by the opening of voltage-sensitive potassium channels and the closing of sodium activation gates  
 B) by the refractory period in which the membrane is hyperpolarized  
 C) by the delay in the action of the sodium-potassium pump  
 D) by an increase in the membrane's permeability to potassium and chloride ions  
 E) by the opening of sodium activation gates
- 22) In the sequence of permeability changes that depolarizes and then repolarizes the membrane of a neuron during an action potential, which of the following changes occurs first?  
 A) Potassium gates close.  
 B) Sodium gates open.  
 C) Potassium gates open.  
 D) The Na<sup>+</sup>-K<sup>+</sup> pump shuts down.  
 E) The Na<sup>+</sup>-K<sup>+</sup> pump is activated.
- 23) All of the following statements about transmission along neurons are correct except:  
 A) The intensity of a stimulus is related to the frequency of the action potential.  
 B) Once initiated, local depolarizations stimulate a propagation of serial action potentials down the axon.  
 C) The rate of transmission of a nerve impulse is directly related to the diameter of the axon.  
 D) A stimulus that affects the membrane's permeability to ions can either depolarize or hyperpolarize the membrane.  
 E) The resting potential is maintained by differential ion permeabilities and the sodium-potassium pump.
- 24) Action potentials are normally carried in one direction from the axon hillock to the axon terminals. By using an electronic probe, you experimentally depolarize the middle of the axon to threshold. What do you expect?  
 A) No action potential will be initiated.  
 B) An action potential will be initiated, but it will die out before it reaches the axon terminal.  
 C) An action potential will be initiated and proceed back toward the axon hillock.  
 D) Two action potentials will be initiated, one going toward the axon terminal and one going back toward the hillock.  
 E) An action potential will be initiated and proceed in the normal direction toward the axon terminal.
- 25) Saltatory conduction is a term applied to conduction of impulses  
 A) along the postsynaptic membrane from dendrite to axon hillock.

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- B) in two directions at the same time.  
 C) from one neuron to another.  
 D) across electrical synapses.  
 E) along myelinated nerve fibers.
- 26) Which animal movement could be used to represent impulse conductance along a myelinated axon?  
 A) a frog leaping between lily pads  
 B) an amoeba extending pseudopodia  
 C) an earthworm moving along the surface of the ground  
 D) a moth moving toward a light  
 E) a person out on a power-walk
- 27) Synaptic vesicles discharge their contents by exocytosis at the  
 A) axon hillock. B) dendrite. C) nodes of Ranvier. D) presynaptic membrane.  
 E) postsynaptic membrane.
- 28) Which of the following offers the best description of neural transmission across a mammalian synaptic gap?  
 A) Neural impulses cause the release of chemicals that diffuse across the gap.  
 B) The calcium within the axons and dendrites of nerves adjacent to a synapse acts as the neurotransmitter.  
 C) Neural impulses travel across the gap as electrical currents.  
 D) Neural impulses involve the flow of  $K^+$  and  $Na^+$  across the gap.  
 E) Neural impulses travel across the gap in both directions.
- 29) Given the steps shown below, which of the following is the correct sequence for transmission at a chemical synapse?  
 1. neurotransmitter binds with receptor  
 2. sodium ions rush into neuron's cytoplasm  
 3. action potential depolarizes the presynaptic membrane  
 4. ion channel opens to allow particular ion to enter cell  
 5. synaptic vesicles release neurotransmitter into the synaptic cleft  
 A) 4, 3, 1, 2, 5 B) 5, 1, 2, 4, 3 C) 1, 2, 3, 4, 5 D) 3, 2, 5, 1, 4 E) 2, 3, 5, 4, 1
- 30) An EPSP facilitates depolarization of the postsynaptic membrane by  
 A) insulating the hillock region of the axon.  
 B) allowing  $Cl^-$  to enter the cell.  
 C) stimulating the  $Na^+-K^+$  pump.

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D) increasing the permeability of the membrane to K<sup>+</sup>.

E) increasing the permeability of the membrane to Na<sup>+</sup>.

31) All of the following statements about hormones are correct except:

A) They are produced by endocrine glands.

B) They elicit specific biological responses from target cells.

C) They are used to communicate between different organisms.

D) They are modified amino acids, peptides, or steroid molecules.

E) They are carried by the circulatory system.

32) Hormones are able to control homeostasis because

A) they are not produced by exocrine glands.

B) they are subject to negative feedback.

C) they are present at low concentrations.

D) they are steroids.

E) they may be found in the lymphatic system.

33) Substance X is secreted by one cell, travels a short distance through interstitial fluid, and produces an effect in a cell immediately adjacent to the original secreting cell. All of the following terms might fit this substance except

A) neurotransmitter. B) prostaglandin. C) pheromone. D) growth factor.

E) nitric oxide.

34) Only certain cells in the body are target cells for the steroid hormone aldosterone. Which of the following is the best explanation for why these are the only cells that respond to this hormone?

A) Only target cells are exposed to aldosterone.

B) Nontarget cells convert aldosterone to a hormone to which they do respond.

C) Nontarget cells destroy aldosterone before it can produce its effect.

D) Only target cells contain receptors for aldosterone.

E) Aldosterone is unable to enter nontarget cells.

35) A varying response to a common chemical messenger is possible because

A) the hormone is chemically altered in different ways as it travels through different branches of the circulatory system.

B) each cell knows how it fits into the body's master plan.

C) the circulatory system regulates responses to hormones by routing the hormones to specific targets.

D) various target cells have different genes.

E) various target cells differ in their receptors to the same hormone.

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- 36) What is the main target organ of ADH?  
 A) bladder B) anterior pituitary C) kidney D) posterior pituitary  
 E) adrenal gland
- 37) Which hormone is not a steroid?  
 A) estrogen B) androgen C) testosterone D) cortisone E) insulin
- 38) Oxytocin and ADH are produced by the  
 A) adrenal cortex.  
 B) hypothalamus and stored in the neurohypophysis.  
 C) gonads.  
 D) adenohypophysis and stored in the kidneys.  
 E) thymus and stored in the thyroid.
- 39) All of the following statements about endocrine glands are correct except:  
 A) The adrenal medulla produces "fight-or-flight" responses.  
 B) The thyroid participates in blood calcium regulation.  
 C) The pancreas helps to regulate blood sugar concentration.  
 D) The parathyroids regulate metabolic rate.  
 E) The pituitary participates in the regulation of the gonads.
- 40) The hormones secreted by the adrenal cortex are  
 A) inorganic ions. B) proteins. C) polypeptides. D) steroids. E) amino acids.
- 41) Which of the following hormone sequences is correct?  
 A) GnRH → FSH → ovaries  
 B) CRH → LH → testes  
 C) GnRH → FSH → LH → pineal gland  
 D) LH → FSH → adrenal glands  
 E) CRH → ACTH → FSH → thyroid gland
- 42) Which of the following endocrine structures is (are) not controlled by a tropic hormone from the anterior pituitary?  
 A) pancreatic islet cells B) thyroid gland C) ovaries D) testes E) adrenal cortex
- 43) Hormones from the hypothalamus affect the release of all of the following except  
 A) growth hormone. B) adrenocorticotrophic hormone. C) oxytocin.  
 D) thyroid-stimulating hormone. E) prolactin.



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- 44) Tropic hormones from the anterior pituitary directly affect the release of which of the following?  
 A) calcitonin B) parathyroid hormone C) epinephrine D) thyroxine  
 E) glucagon
- 45) Which of the following pairs of hormones do not have antagonistic effects?  
 A) thyroid-releasing hormone and T3 and T4  
 B) insulin and glucagon  
 C) aldosterone and atrial natriuretic factor  
 D) follicle-stimulating hormone and luteinizing hormone  
 E) parathyroid hormone and calcitonin

Part II: 10 multiple choice questions. Each question is worth 1.5 points.

- 46) If we wish to preserve natural ecosystems, we should do all we can to preserve their (1) biological diversity (2) climate (3) bear (4) predator..... ( )
- 47) In a controlled experiment in a coastal ecosystem, an investigator removed a key predator (Pilaster). Finally, the number of species in that ecosystem (1) increase (2) decrease (3) no change (4) increase and then decrease..... ( )
- 48) (1) predation (2) coevolution (3) cooperation (4) chemical defense is able to reduce competition in natural communities and increase biodiversity..... ( )
- 49) Species richness on islands is a dynamic equilibrium between colonization and (1) extinct (2) predation (3) competition (4) habitat..... ( )
- 50) Exotic species often cause great damage to local environment due to the lack of their (1) habitat (2) prey (3) niche (4) predator..... ( )
- 51) One of the most serious environmental problems in the future is the loss of (1) biodiversity (2) deer (3) fish (4) pine tree..... ( )
- 52) E. O. Wilson has calculated that as much as (1) 1% (2) 50% (3) 5% (4) 25% of the world's species may be lost during the next 50 years..... ( )
- 53) There is an intensive investigation of (1) soil (2) organisms (3) oil (4) water for new drugs

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to fight cancer and other diseases, or as sources of antibiotics..... ( )

54) There are about (1) 40% (2) 2% (3) 15% (4) 5% of freshwater fish species extinct in the last fifty years..... ( )

55) All the organisms that live together in a place are called a (1) population (2) community (3) ecosystem (4) biosphere.....( )

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55					