

第 25 届全国华文独中数理学识比赛 (2008)
生物学科

1. 下列何种因素会导致蛋白质变性?

Which of the following factors can result in the denaturation of a protein?

- (a) 高温 heat
- (b) 改变 pH 值 changes in pH
- (c) 破坏氢键的化学物质 chemicals that destroy hydrogen bonds
- (d) 改变盐浓度 changes in salt concentration
- (e) 以上皆对 all of the above

2. 当一个酶(酵素)催化化学反应时

When an enzyme catalyzes a reaction,

- (a) 它会降低反应激活能 (activation energy) it lowers the activation energy of the reaction
- (b) 它会提高反应激活能 it raises the activation energy of the reaction
- (c) 它会转变为产物 it becomes a product
- (d) 它会成为反应物 it acts as a reactant
- (e) a 和 d 都正确 both a and d

3. 当光反应时下列何种产物会产生?

Which of the following are produced during the light reactions

- (a) 葡萄糖, ADP, NADP⁺ glucose, ADP, NADP⁺
- (b) 葡萄糖, ADP, NADP⁺, CO₂ glucose, ADP, NADP⁺, CO₂
- (c) ADP, NADP⁺, O₂
- (d) ATP, NADPH, O₂
- (e) ATP, NADPH, CO₂

4. 当一个基因表现产生细胞中之物质时，下列何者为正确流程？

Which of the following sequences best describe the flow of information that takes place when a gene directs the synthesis of a cellular component?

- (a) RNA→DNA→RNA→蛋白质 RNA → DNA → RNA → protein
 - (b) DNA→RNA→蛋白质 DNA → RNA → protein
 - (c) 蛋白质→RNA→DNA protein → RNA → DNA
 - (d) DNA→氨基酸→RNA→蛋白质 DNA → amino acid → RNA → protein
 - (e) DNA→tRNA→mRNA→蛋白质 DNA → tRNA → mRNA → protein
5. 从一个生物的基因组中收集 DNA 片段，利用重组 DNA 科技将它插入寄主生物基因体中(一个寄主基因组插入一个 DNA 片段)，并保存在其中称为？

A collection of DNA fragments that is obtained from the genome of one organism, inserted by recombinant DNA techniques into the genome of a host organism (one fragment per host genome), and maintained there is called a

- (a) 搜集 DNA DNA collection
 - (b) 基因组库 genome library
 - (c) DNA 档案 DNA file
 - (d) 基因库 gene bank
 - (e) 运载体电池 vector battery
6. 在化石证据中显示
- The fossil evidence shows that
- (a) 演化是由巨大的骤变跃进产生 evolution occurred in huge leaps and bounds
 - (b) 演化是由逐步和持续累积小变化而产生 a gradual, steady accumulation of small change occurred in evolution lineages.
 - (c) 多种原核生物产生现今地球上的五个生物界的生命 several kinds of prokaryotic cells lead to the five kingdoms of life on Earth today.
 - (d) 在第一个海洋形成之前，第一个生命快速形成 the first life forms arose shortly before the first oceans formed
 - (e) a 和 d 皆正确 both a and d

7. 组成生物世界等级式(hierarchical levels)架构中, 下列何者是由最小组成排列至最大?

Structure in the living world is organized at hierarchical levels. Which of the following choices lists several of these from least inclusive to most inclusive?

- (a) 细胞, 分子, 器官, 系统, 组织, 生物个体 cell, molecule, organ, organ system, tissue, organism
- (b) 分子, 细胞, 组织, 器官, 系统, 生物个体 molecule, cell, tissue, organ, organ system, organism
- (c) 分子, 细胞, 器官, 系统, 组织, 生物个体 molecule, cell, organ, organ system, tissue, organism
- (d) 细胞, 分子, 组织, 器官, 系统, 生物个体 cell, molecule, tissue, organ, organ system, organism
- (e) 分子, 细胞, 组织, 系统, 器官, 生物个体 molecule, cell, tissue, organ system, organ, organism

8. 人类唾液除下列何项外, 均具备之功能

Human saliva performs all of the following functions *except*

- (a) 润滑食物 lubricating food
- (b) 中和食物酸性 neutralizing food acids
- (c) 控制细菌种群数 controlling bacterial populations
- (d) 水解淀粉成为葡萄糖 hydrolyzing starch to glucose
- (e) 水解蛋白质成为肽 hydrolyzing proteins to polypeptides

9. 空气转换之界面必需是潮湿才有功效, 因为

A gas exchange surface must be wet to function because

- (a) 血液主要由水组成 blood is mostly water
- (b) 细胞间液主要由水组成 interstitial fluid is mostly water
- (c) 生物需要水 life requires water
- (d) 气态氧无法跨越细胞膜 gaseous oxygen cannot cross a cellular membrane
- (e) 主动运输需要水 active transport requires water

10. 下列何者不是鱼鳃的特性?

Which of the following is *not* a characteristic of fish gills?

- (a) 代表身体表面之延伸 they represent extensions of the body surface.
- (b) 具有薄的上皮层 they have a thin epithelium.
- (c) 具有大的表面积 they have a huge surface area.
- (d) 缺乏血液供应 they have a poor blood supply.
- (e) 血流和水流出现逆流交换 they exhibit a countercurrent flow of blood and water.

11. 下列何者非电子心脏起搏器之功能?

Which of the following is *not* a capability of the heart pacemaker?

- (a) 惊恐景象后之反应 responding to a frightening sight
- (b) 增加心跳 increasing the heartbeat
- (c) 减缓心跳 slowing the heartbeat
- (d) 开始心跳 initiating the heartbeat
- (e) 收缩 contraction

12. 除下列何项外, 血液蛋白质均具备之功能

Blood proteins are involved in all of the following activities *except*

- (a) 抵抗感染 fighting infection
- (b) 维持渗透压 maintaining osmotic balance
- (c) 维持 pH 值 maintaining pH
- (d) 维持盐度 maintaining salinity
- (e) 血液凝固 blood clotting

13. 炎症反应最主要功能是?

The major result of the inflammatory response is to

- (a) 开始产生抗体 initiate the production of antibodies
- (b) 消毒和清洁受伤组织 disinfect and clean damaged tissues
- (c) 开始产生细胞免疫反应 initiate cell-mediate immune responses
- (d) 开始产生体液免疫反应 initiate humoral-mediate immune responses
- (e) 开始产生杀手细胞 initiate the production of killer cells

14. 下列何种免疫反应对人类而言是缺点?

Which type of immune response is always disadvantageous to a person?

- (a) 细胞免疫 cell-mediated
- (b) 发炎反应 inflammatory
- (c) 体液免疫 humoral-mediated
- (d) 自体免疫 autoimmune
- (e) 所有免疫反应都是有益的 all immune responses are advantageous

15. 大白鲨为内热(恒温, endothermic)动物, 因为?

The great white shark is endothermic because

- (a) 所有鲨鱼皆为内热动物 all sharks are endothermic
- (b) 只吃内热动物 it eats only endotherms
- (c) 具备热逆流交换系统以减少热量散失 it has a countercurrent heat exchanger that minimizes the loss of heat
- (d) 皮肤下具备一层厚的绝缘层 it has a thick layer of insulation just under its skin
- (e) 是肌肉非常发达的鱼类 it is a very muscular fish

16. 在人类肾小球产生过滤压力下, 下列何者不会由血液进入鲍氏囊?

During pressure filtration in the glomerulus, which of the following does *not* enter Bowman's capsule from the bloodstream?

- (a) 水 water
- (b) 离子 ions
- (c) 糖 sugar
- (d) 血浆蛋白 plasma proteins
- (e) 氨基酸 amino acids

17. 下列何选项不是人类内分泌腺或激素与代谢调节反应间的正确配对?

Which of the following choices does *not* pair an endocrine gland or hormone with an aspect of metabolism that it regulates?

- (a) 副甲状腺----血液中钙浓度 parathyroid ---- blood calcium levels
- (b) 胰岛----血液中葡萄糖浓度 pancreas ---- blood glucose levels
- (c) 胰岛素----血液中蔗糖浓度 insulin ---- blood sucrose levels
- (d) 生乳素----血液中钾浓度 prolactin ---- blood potassium levels
- (e) 卵巢----女性的性特征 ovary ---- female sexual characteristics

18. 女性人类卵巢的周期开始于？

In human female, the ovarian cycle begins when

- (a) 当动情素达最高量 the level of estrogen reach their maximum
- (b) 增加下丘脑释放 FSH 和 LH the hypothalamus increases its release of FSH and LH
- (c) 下丘脑刺激脑垂腺释放 FSH 和 LH the hypothalamus stimulates the pituitary to increase its output of FSH and LH
- (d) 当黄体孕激素的释放量骤降 the levels of progesterone drop precipitously
- (e) 当 FSH 和 LH 的浓度骤降 the levels of FSH and LH drop precipitously

19. 下列人类腺体中何者能控制基本血糖浓度？

Which gland exerts primary control over the concentration of sugar in the blood?

- (a) 肝脏 liver
- (b) 脑垂腺 pituitary
- (c) 松果体 pineal
- (d) 胰岛 pancreas
- (e) 副甲状腺 parathyroid

20. 人类囊胚泡何时会于子宫壁着床？

When does the human blastocyst implant in the wall of the uterus?

- (a) 受精后数小时 within a few hours of fertilization
- (b) 怀孕后约一天 about a day after conception
- (c) 怀孕后约一星期 about a week after conception
- (d) 原肠胚形成后约一小时 about an hour after gastrulation
- (e) 原肠胚形成后约一天 about a day after gastrulation

21. 神经是

A nerve is

- (a) 神经元 a neuron
- (b) 神经系统中具功能的单位 the functional unit of the nervous system
- (c) 中枢神经系统的一部份 a part of the central nervous system
- (d) 成束的感觉纤维和运动树突 a bundle of sensory fibers and motor dendrites
- (e) 结缔组织中成束的轴突和/或树突 a bundle of axons and/or dendrites wrapped in connective tissue

22. 下列何者会造成交感神经系统的活化?

Which of the following effects could result from activation of the sympathetic nervous system?

- (a) 血压的下降 decreased blood pressure
- (b) 心跳速率的下降 decreased heart rate
- (c) 消化速率的降低 decreased rate of digestion
- (d) 支气管的收缩 constriction of the bronchi
- (e) 呼吸速率的减缓 decreased rate of breathing

23. 下列有关复睛的组成, 何者不正确?

Which of the statements is *not* true of all compound eyes?

- (a) 复眼的成分有许多眼角膜 Compound eyes have many corneas.
- (b) 复眼是非常精准的移动探测器 Compound eyes are extremely accurate motion detectors.
- (c) 复眼会形成镶嵌性的影像 Compound eyes form mosaic images.
- (d) 复眼会形成模糊不清的影像 Compound eyes create fuzzy images.
- (e) 复眼不能提供彩色视觉 Compound eyes cannot provide colour vision.

24. 肌肉最主要的功能为?

The primary function of muscles is to

- (a) 燃烧食物中的分子 burn food molecules
- (b) 将化学能量转变为动能 convert chemical energy to mechanical energy
- (c) 将骨骼维持在一起 hold the skeleton together
- (d) 产生体热以维持生理平衡 generate body heat to maintain homeostasis
- (e) 以上皆对 all of the above

25. 下列何者的过程是在有丝分裂的分裂间期中产生?

Which of the following processes occur(s) during interphase of mitosis?

- (a) 星体的长成 growth of the aster
- (b) 染色体的复制 duplication of the chromosomes
- (c) 细胞生长 cell growth
- (d) 以上皆对 all of the above
- (e) 只有 2 和 3 both b and c

26. 下列何者在生态学组织中包含非生命因素的概念?

Which of the following conceptual levels of ecologic organization incorporates abiotic factors?

- (a) 群落 community
- (b) 生态系统 ecosystem
- (c) 种群 population
- (d) 物种 species
- (e) 共生 symbiosis

27. 影响热带森林垂直构型的竞争因素为?

The vertical structure of the tropical forest is due to the intense competition for

- (a) 湿气 moisture
- (b) 氮气 nitrogen
- (c) 二氧化碳 carbon dioxide
- (d) 无机矿物 minerals
- (e) 阳光 light

28. 下列何种环境问题是由人类种群增加而造成的?

Which of the following environmental problems is associated with human population increase?

- (a) 自然生境地的破坏 destruction of natural habitat
- (b) 物种的消失 species extinction
- (c) 空气污染 air pollution
- (d) 地球暖化 global warming
- (e) 以上皆是 all of the above

29. 食物链的组成中包含: 浮游植物→浮游动物→鱼→渔夫→鲨鱼, 其中渔夫为?

In a food chain consisting of phytoplankton → zooplankton → fish → fishermen → sharks, the fishermen are

- (a) 初级消费者 primary consumers
- (b) 次级消费者 secondary consumers
- (c) 三级消费者 tertiary consumers
- (d) 初级生产者 primary producers
- (e) 次级生产者 secondary producers

30. 真菌是

The fungi

- (a) 与细菌相似, 因为真菌的组织为原生细胞组成 are similar to bacteria because fungal organisms are composed of prokaryotic cells
- (b) 与细菌相似, 因为透过胞外消化而获取养分 are similar to bacteria because fungi use extracellular digestion to obtain their nutrients
- (c) 与绿色植物相似, 因为会产生叶绿素 are similar to green plants because fungi produce chlorophyll
- (d) 不同于动物领域的成员, 因为它是自养生物 differ from members of the animal kingdom because fungi are autotrophic
- (e) 与绿色植物相似, 因为真菌细胞有一层纤维细胞壁所围绕 are similar to green plants because fungal cells are surrounded by a cellulosic cell wall

答案:

1	e
2	a
3	d
4	b
5	b
6	b
7	b
8	e
9	d
10	d
11	a
12	d
13	b
14	d
15	c
16	d
17	d
18	c
19	d
20	c
21	e
22	c
23	e
24	b
25	e
26	b
27	e
28	e
29	c
30	b