运动生理学 Exercise Physiology

单选题 Single Answer ( 共20题)

第1题 (分值：10分)

某人使用弹力带进行极短时间（每次拉伸少于2秒钟）的股后肌群拉伸练习，重复拉伸8次为一组。此人在使用哪种柔韧性训练技巧？

An individual is using a resistance band to perform very short-duration (less than 2 seconds per stretch) hamstring stretches in sets of eight repetitions. What flexibility-training technique is this person using?

A：弹震式拉伸 Ballistic stretching

B：动态拉伸 Dynamic stretching

C：本体感受神经肌肉易化术 Proprioceptive neuromuscular facilitation

D：主动式隔离拉伸 Active isolated stretching

第2题 (分值：10分)

哪种激素在身体活动中能扩张呼吸道，并能降低消化能力和膀胱排空？

What hormone dilates the respiratory passages and reduces digestive activity and bladder emptying during physical activity?

A：胰岛素 Insulin

B：去甲肾上腺素 Norepinephrine

C：肾上腺素 Epinephrine

D：皮质醇 Cortisol

第3题 (分值：10分)

下列哪一种宏量营养素储存的能量可通过无氧氧化产生三磷酸腺苷（ATP）？

What is the only macronutrient whose stored energy generates adenosine triphosphate (ATP) anaerobically?

A：蛋白质 Protein

B：脂肪 Fat

C：胆固醇 Cholesterol

D：碳水化合物 Carbohydrate

第4题 (分值：10分)

下列哪一项是规律抗阻运动特有的身体适应体现？

Which of the following is an adaptation specifically seen with regular weightbearing exercise?

A：呼吸容量变大 Increase in respiratory capacity

B：心输出量的泵血效率提高 Improved cardiac output efficiency

C：骨密度变大 Increase in bone density

D：瘦体重增加 Improved lean body mass

第5题 (分值：10分)

人体内哪种缓释激素能刺激机体从脂肪组织中动员游离脂肪酸，在肝脏中动员葡萄糖合成并降低葡萄糖在细胞中的利用率？

Which slow-acting hormone stimulates the mobilization of free fatty acids from adipose tissue, mobilizes glucose synthesis in the liver, and decreases the rate of glucose utilization in the cells?

A：生长激素 Growth hormone

B：胰高血糖素 Glucagon

C：胰岛素 Insulin

D：皮质醇 Cortisol

第6题 (分值：10分)

在运动的哪个阶段，储备的磷酸原耗尽，残存的乳酸从血液中清除，并且代谢率下降？

At what stage of an exercise bout are phosphagen stores being replenished, remaining lactate being removed from the blood, and the metabolic rate decreasing?

A：运动刚开始时 Immediately after the commencement of exercise

B：身体达到稳态状态时 As the body approaches steady state

C：在稳态式训练过程中 During steady-state training

D：运动训练结束后 After the cessation of exercise

第7题 (分值：10分)

在客户出现一般性适用症候群的哪个阶段，可观察到肌肉体积（大小）与力量逐渐增大？

During what phase of the general adaptation syndrome will a client see progressive increases in muscle size and strength?

A：休克期 Shock phase

B：适应期 Adaptation phase

C：警觉反应期 Alarm phase

D：衰竭期 Exhaustion phase

第8题 (分值：10分)

心输出量的定义为：心脏每次搏动泵出的血液量。

Cardiac output is defined as the amount of blood pumped during each heartbeat.

A：正确 True

B：错误 False

第9题 (分值：10分)

窦房结有时称为心脏的起搏点，位于心脏的那个腔室内？

The sinoatrial node (SA node), which is sometimes called the pacemaker of the heart, is located in which chamber of the heart?

A：右心房 Right atrium

B：右心室 Right ventricle

C：左心房 Left atrium

D：左心室 Left ventricle

第10题 (分值：10分)

在稳态式运动过程中，不属于机体维持血容量的方式为哪一项？

Which of the following is NOT a method the body uses to preserve blood volume during steady-state exercise?

A：提高心率值 Increasing heart rate

B：提高心搏量 Increasing stroke volume

C：增强非工作肌的血管收缩作用 Increasing vasoconstriction in non-working muscles

D：释放血管加压素和醛固酮 Releasing vasopressin and aldosterone

第11题 (分值：10分)

低强度运动是减肥的最佳运动方式，因为与高强度运动相比，低强度运动燃烧的脂肪比例更高。

Low-intensity exercise is the best way to lose weight because it burns a higher percentage of fat than exercise at a higher intensity.

A：正确 True

B：错误 False

第12题 (分值：10分)

无论在炎热还是寒冷环境中，按照身体丢失体液量补液都是一种重要的适用原则。

Replacing body fluid as it is lost is an important guideline to follow whether exercising in the heat or in the cold.

A：正确 True

B：错误 False

第13题 (分值：10分)

人体摄取营养素中， \_\_\_\_\_\_\_\_只有非常少的一部分用于能量供给。

Very little of the \_\_\_\_\_\_\_\_\_ a person consumes is used for energy production.

A：脂肪 Fat

B：碳水化合物 Carbohydrate

C：蛋白质 Protein

D：纤维素 Fiber

第14题 (分值：10分)

下列哪种物质能促进甘油三酯的分解从而协助维持血糖水平？

Which hormone promotes triglyceride breakdown to aid in maintaining blood glucose?

A：血管加压素 Vasopressin

B：皮质醇 Cortisol

C：去甲肾上腺素 Norepinephrine

D：雌激素 Estrogen

第15题 (分值：10分)

运动者达到第二通气阈（VT2）后，潮气量开始下降。

Tidal volume decreases after an exerciser crosses the second ventilatory threshold (VT2).

A：正确 True

B：错误 False

第16题 (分值：10分)

因长期进行心血管运动引起血容量增加，主要益处是什么？

What is the primary advantage of the increase in blood volume that results from chronic cardiorespiratory exercise?

A：心脏压力降低 Decreased cardiac stress

B：最大摄氧量增大 Improved VO2max

C：工作肌肉的输氧量增大 Enhanced oxygen delivery to working muscles

D：减少心脏的工作空间减小 Reduced work environment for the heart

第17题 (分值：10分)

规律进行身体活动的益处不包括？

Which of the following is NOT a benefit of regular physical activity?

A：降低焦虑和忧郁状况 Decreased anxiety and depression

B：改善血脂状况 Improved lipid profile

C：改善血糖控制状况 Improved glucose control

D：增加心血管的舒张压 Increased diastolic blood pressure

第18题 (分值：10分)

下列不属于高原病主要症状的一项是？

Which of the following is NOT one of the primary symptoms of altitude sickness?

A：气短 Shortness of breath

B：多汗 Profuse sweating

C：头痛 Headache

D：恶心 Nausea

第19题 (分值：10分)

对于10秒以内竭尽全力的运动项目，主要的供能系统是？

Which of the primary energy systems supplies enough energy for no more than 10 seconds of all-out exertion?

A：磷酸原系统 Phosphagen system

B：无氧糖酵解 Anaerobic glycolysis

C：有氧糖酵解 Aerobic glycolysis

D：β氧化 Beta oxidation

第20题 (分值：10分)

运动时体温调节机制的主要方式是哪一项？

Which mechanism of thermoregulation is the major contributor during exercise?

A：对流 Convection

B：辐射 Radiation

C：蒸发 Evaporation

D：排泄 Excretion

1试题解析： 正确答案 D.主动式隔离拉伸 Check Your Answer D. Active isolated stretching 主动式隔离拉伸与传统的拉伸训练方式较为相似。它不是在某个阻力点拉伸后维持15-30秒，而是拉伸时间绝不超过2秒钟，然后释放拉力，身体部位回复至起始姿势，这种拉伸一般重复数次。 Active isolated stretching follows a design similar to a traditional strength-training workout. Instead of holding stretches for 15 to 30 seconds at a point of resistance (i.e., mild discomfort), stretches are never held for more than two seconds. The stretch is then released, the body segment returned to the starting position, and the stretch is repeated for several repetitions.

2试题解析： 正确答案 C.肾上腺素 Check Your Answer C. Epinephrine 肾上腺素不仅对心血管系统和代谢系统会产生作用，还能够扩张呼吸道以促进气体进出肺部；另外，肾上腺素在运动过程中还能减少消化活动与膀胱排空。 In addition to its effects on the cardiovascular and metabolic systems, epinephrine dilates the respiratory passages to aid in moving air into and out of the lungs, and reduces digestive activity and bladder emptying during exercise.

3试题解析： 正确答案 D.碳水化合物 Check Your Answer D. Carbohydrate 碳水化合物是代谢产生三磷酸腺苷（ATP）的主要食物来源，而ATP则是所有细胞活动必需的化合物。很重要的一点是，碳水化合物是唯一能通过无氧氧化产生ATP的宏量营养素。这一点在最大强度下运动时具有重要的意义，此时有氧代谢产生的能量不足以满足人体的能量需求，需要通过无氧途径迅速释放额外能量。 Carbohydrate serves as the major food fuel for the metabolic production of adenosine triphosphate (ATP), which is a chemical compound required for all cellular work. Importantly, carbohydrate is the only macronutrient whose stored energy generates ATP anaerobically. This is crucial during maximal exercise that requires rapid energy release above levels supplied by aerobic metabolism.

4试题解析： 正确答案 C.骨密度变大 Check Your Answer C. Increase in bone density SAID原则这一概念是指：只要运动方案逐渐对被训练的系统循序渐进地进行超负荷训练，那么身体对于施加的挑战就会产生特异性的适应。研究表明，负重训练能提高骨密度，骨密度的提升是预防骨质疏松（尤其是女性）的关键因素。 The concept of the SAID principle is that the body will adapt to the specific challenges imposed upon it, as long as the program progressively overloads the system being trained. Studies have shown that weightbearing exercise promotes improved bone density, which is a key factor in the prevention of osteoporosis, particularly in women.

5试题解析： 正确答案 D.皮质醇 Check Your Answer D. Cortisol 皮质醇是肾上腺皮质释放的一种糖皮质激素， 能刺激机体从脂肪组织中动员游离脂肪酸（FFA），在肝脏中动员葡萄糖合成（糖异生）并降低葡萄糖在细胞中的利用率。皮质醇属于作用缓慢的激素，但它却能够允许肾上腺素和胰高血糖素等作用快速的激素调控血液中葡萄糖的含量并动用游离脂肪酸。 Cortisol is a glucocorticoid released from the adrenal cortex that stimulates free fatty acid (FFA) mobilization from adipose tissue, mobilizes glucose synthesis in the liver (i.e., gluconeogenesis), and decreases the rate of glucose utilization by the cells. Its effect is slow, however, allowing other fast-acting hormones such as epinephrine and glucagon to primarily deal with glucose and FFA mobilization.

6试题解析： 正确答案 D.运动训练结束后 Check Your Answer D. After the cessation of exercise 运动结束后（运动后过量氧耗-EPOC）产生的能量用于补充耗尽的磷酸原，从而将血液中尚未清除的乳酸清除出去，并帮助身体恢复至稳态（如体温调节和组织再合成）。随着体温恢复正常，代谢速度也会相应恢复正常。 The energy produced after the cessation of exercise (excess postexercise oxygen consumption – EPOC) is used to replenish the depleted phosphagens, to eliminate accumulated lactate if it has not already been cleared from the blood, and to restore other homeostatic conditions (e.g., thermoregulation and tissue resynthesis). As the body returns to normal temperature, the metabolic rate will return to normal.

7试题解析： 正确答案 B.适应期 Check Your Answer B. Adaptation phase 适应期，别称抵抗期，通常从第4周起至第6周，在此期间大肌群都会产生适应性（生化、机械和结构性适应）。这一期的特点是肌肉体积与力量逐渐增大。 The adaptation phase, or resistance phase, generally begins around weeks four through six and represents major muscular adaptations (biochemical, mechanical, and structural). This phase is characterized by progressive increases in muscle size and strength

8试题解析： 正确答案 B.错误 Check Your Answer B. False 心脏每次搏动泵出的血液量叫做心搏量，别名每搏输出量。心输出量是心搏量与心率的乘积，因此其定义为心脏每分钟的泵血量。 The amount of blood pumped during each heartbeat is called the stroke volume. Cardiac output is the product of stroke volume and heart rate, and therefore is defined as the amount of blood pumped per minute.

9试题解析： 正确答案 A.右心房 Check Your Answer A. Right atrium 窦房结位于右心房的后壁，而房室结则位于右心房心内膜下。 The SA node is located on the posterior wall of the right atrium, while the atrioventricular node (AV node) is located on the floor of that same chamber.

10试题解析： 正确答案 B.提高心搏量 Check Your Answer B. Increasing stroke volume 机体维持血容量时，机体会发生以下变化: The following changes take place to preserve blood volume:  在稳态式运动过程中心率会逐渐增大，从而维持心输出量并对因体液丢失引起的心搏量降低进行补偿 A progressive increase in heart rate at steady-state exercise to maintain cardiac output and offset the small decrease in stroke volume associated with the fluid loss  非运动部位进一步通过血管收缩作用对血压进行代偿，从而维持血压和外周血管阻力 A compensation in blood pressure via further vasocontriction in the non-exercising regions to maintain peripheral resistance and blood pressure  释放抗利尿激素或血管加压素与醛固酮，从而减少体内的水、钠流失。 A release of hormones—antidiuretic hormone, or vasopressin, and aldosterone—to help reduce water and sodium losses from the body

11试题解析： 正确答案 B.错误 Check Your Answer B. False 在高强度运动中，燃烧的总热量比低强度运动要高，但来自于脂肪的热量比例并不是更高；而在低强度运动中，来自于脂肪的热量比例更高，但燃烧的总热量不及高强度训练。所以，先不管热量的来源，燃烧的总热量才是减肥/减重的决定因素，记住这一点很重要。 During high-intensity exercise, the total number of calories burned is much higher than during low-intensity exercise, which negates the higher percentage coming from fat. During low-intensity bouts, a higher percentage of calories is coming from fat, but the total number of fat calories is less than during high-intensity workouts. It is important to remember that the total number of calories burned is what determines weight loss, regardless of the source of those calories.

12试题解析： 正确答案 A.正确 Check Your Answer A. True 按照身体丢失体液量补液都是一种重要的原则，无论在炎热还是寒冷环境中运动。 在寒冷个环境中运动时体液不会像炎热环境中丢失的那么显著。然而，在寒冷空气中运动时，大量的水分会经呼吸从体内流失。 Replacing body fluids as they are lost is important when exercising in either the heat or the cold. In the cold, fluid loss may not be as obvious as when exercising in the heat. However, when exercising in cold air, large amounts of water are lost from the body during respiration.

13试题解析： 正确答案 C.蛋白质 Check Your Answer C. Protein 在三种宏量营养素中，除非在限制热量摄入的极端状况下，一般来说蛋白质很少用于能量供给。蛋白质主要用于生长发育、组织修护或排出体外。 Of the three macronutrients, relatively little protein is used for energy production except in extreme cases of caloric restriction. Protein is principally used in the growth and repair of tissue or is excreted.

14试题解析： 正确答案 B.皮质醇 Check Your Answer B. Cortisol 皮质醇属于糖皮质激素，在长时间训练运动中能促进蛋白质和甘油三酯的分解，从而在维持血糖稳定方面起着重要作用。 同时，皮质醇还是一种压力激素，当机体无论是因运动过度还是组织重建不充分而承受压力过大时，皮质醇水平就会上升。 Cortisol is a glucocorticoid and plays a major role in maintaining blood glucose during prolonged exercise by promoting protein and triglyceride breakdown. Cortisol is also a major stress hormone and is elevated when the body is under too much stress, either from too much exercise or inadequate regeneration.

15试题解析： 正确答案 A.正确 Check Your Answer A. True 在亚极量（达到VT2之前）运动项目中，通气量与耗氧量和二氧化碳的生成量呈线性正比关系，主要是通过增加潮气量（即每次呼吸吸入和呼出的气体体积）来实现的。在更高强度或近最大运动强度时，呼吸频率显著增大，每分通气量的增大与耗氧量的增加不成比例。潮气量随着呼吸频率的增大而降低。 During submaximal exercise (before reaching VT2), ventilation increases linearly with oxygen consumption and carbon dioxide production. This occurs primarily through an increase in tidal volume (i.e., the volume of air inhaled and exhaled per breath). At higher or near-maximal intensities, the frequency of breathing becomes more pronounced and minute ventilation rises disproportionately to the increases in oxygen consumption. Tidal volume decreases as breathing rate increases.

16试题解析： 正确答案 C.工作肌肉的输氧量增大 Check Your Answer C. Enhanced oxygen delivery to working muscles 血容量增加直接导致血液粘稠度降低，而血液黏稠度降低对于身体运动表现的益处是能够增强活动骨骼肌的供氧能力。这是因为血液在血管（包括毛细血管）中能更加顺畅的流动。其他三个选项都与心脏的大小和容积有关。 A physical-performance advantage of reduced blood viscosity, which is direct result of the increased blood volume, is that it enhances oxygen delivery to the active skeletal muscles, because the blood flows more easily through the vessels, including the capillaries. The other three choices are associated with increases in heart size and volume.

17试题解析： 正确答案 D.增加心血管的舒张压 Check Your Answer D. Increased diastolic blood pressure 规律运动的一些益处包括：提高心血管功能、降低心血管的收缩压和舒张压，减轻体重和脂肪量，改善血脂状况，改善血糖控制状况，降低焦虑和忧郁状况，提升健康和幸福（康乐）感，降低某些癌症（如结肠癌、乳腺癌和前列腺癌）的发病率并降低骨质疏松的发病率。 Some of the benefits of regular exercise include improved cardiovascular function, lowered systolic and diastolic blood pressure, decreased body weight and fat mass, improved lipid profile, improved glucose control, decreased anxiety and depression, enhanced feelings of well-being, decreased incidence of several cancers (e.g., colon, breast, prostate), and decreased incidence of osteoporosis.

18试题解析： 正确答案 B.多汗 Check Your Answer B. Profuse sweating 虽然气短、头痛和恶心 (伴头晕目眩) 都属于高原病的症状，但多汗属于热衰竭（中暑）的症状。 While shortness of breath, headache, and nausea (along with lightheadedness) are all symptoms of altitude sickness, profuse sweating is one of the primary symptoms of heat exhaustion.

19试题解析： 正确答案 A.磷酸原系统 Check Your Answer A. Phosphagen system 人体肌肉组织中ATP（三磷酸腺苷）和磷酸肌酸（CP）的储量都很小，因此用于肌肉收缩活动所需的能量非常有限。在竭尽全力的运动项目中，如果没有ATP的持续性再合成，可能磷酸原系统只能提供大约10秒钟的能量。 The total amount of ATP and creatine phosphate (CP) stored in muscle is very small, and thus the amount of energy available for muscular contraction is extremely limited. There is probably enough energy available from the phosphagen system for only about 10 seconds of all-out exertion, if there were not continual resynthesis of ATP.

20试题解析： 正确答案 C.蒸发 Check Your Answer C. Evaporation 安静状态下，体温调节20%是通过体表汗液蒸发，而运动时则占到80%。 Though evaporation accounts for only 20% of thermoregulation while at rest, it accounts for approximately 80% of thermoregulation during exercise.