

ACSM-CEP® - Quiz Questions with Answers

Domain I: Patient Assessment

Domain I: Patient Assessment

1.

Which of the following is **true** of sulfur dioxide?

Sulfur dioxide tends to irritate the upper respiratory tract

Inhaled sulfur dioxide leads to dangerous bronchodilation

In appropriate amounts, sulfur dioxide can decrease airway resistance

When sulfur dioxide is inhaled in cold, dry air, asthmatics experience fewer symptoms than when it is inhaled in warm, wet air

Correct answer: Sulfur dioxide tends to irritate the upper respiratory tract

Typically, sulfur dioxide will affect the upper respiratory tract, rather than other parts of the pulmonary system. For this reason, sulfur dioxide exposure is often very dangerous for asthmatics.

Inhaled sulfur dioxide leads to bronchoconstriction and tends to increase airway resistance. Cold, dry environments often lead to faster bronchospasms in asthmatics when sulfur dioxide is present.

2.

Which of the following definitions **best** describes "dyspnea"?

Shortness of breath

Loss of consciousness

Swelling

Abnormally fast heart rate

Correct answer: Shortness of breath

Specifically, dyspnea is the awareness of one's own, abnormal breathing pattern. However, many clinicians will use the term to describe shortness of breath.

Loss of consciousness describes syncope. Swelling is often referred to as edema. Abnormally fast heart rate describes tachycardia.

3.

A CEP is working with a client who is in her third trimester of pregnancy. Which of the following findings would be considered normal?

Increased heart rate and blood pressure

Decreased respiration rate

Decreased resting metabolic rate (RMR)

Blood volume increased by 10%

Correct answer: Increased heart rate and blood pressure

The mother's heart is typically working harder during the third trimester of pregnancy, largely due to increased blood volume.

Respiration rate increases during the third trimester. RMR increases during the third trimester. Blood volume increases by 50% during the third trimester.

4.

Which of the following **best** describes the female athlete triad?

Menstrual problems, low energy levels, low bone mineral density

High energy levels, eumenorrhea, excellent bone health

Eating disorder, eumenorrhea, osteoporosis

A female who plays three different sports throughout the year

Correct answer: Menstrual problems, low energy levels, low bone mineral density

The female athlete triad is often caused by a combination of overstraining for sport and undereating. The female athlete triad can lead to broken bones and long-term health issues.

High energy levels, eumenorrhea, and excellent bone health describes the opposite of the female athlete triad. Eating disorders and osteoporosis may be related to the female athlete triad, but are not part of the definition. The number of sports a female plays has nothing to do with the female athlete triad.

5.

Which of the following is an important consideration regarding exercise during pregnancy?

Fetal health is not affected even by strenuous exercise during pregnancy

Women should not exercise at all during pregnancy due to the potential health risks for the baby

Exercise during pregnancy increases the chances of cesarean delivery

Exercise during pregnancy can increase the chances of the mother developing gestational diabetes

Correct answer: Fetal health is not affected even by strenuous exercise during pregnancy

While moderate exercise is recommended, pregnant women can even perform intense exercise without risking the health of their babies.

Exercise poses no risk to the baby during pregnancy and, in fact, affords many benefits to both mother and child. Exercise during pregnancy reduces the chances of cesarean delivery. Exercise during pregnancy reduces the chances of the mother developing gestational diabetes.

6.

Which of the following tissues are considered the "central components" of the immune system?

The thymus and bone marrow

The spleen and tonsils

The skin and lymphatic tissues

The brain and spinal cord

Correct answer: The thymus and bone marrow

The thymus gland and the bone marrow are often considered the "central components" of the immune system, as these structures produce most of the immune cells of the body.

The spleen, tonsils, skin, and lymphatic tissues are considered "peripheral components" of the immune system. The brain and spinal cord are not generally considered to be part of the immune system.

7.

Which of the following is **true** regarding Sickle Cell Disease?

Patients with Sickle Cell Disease have better protection against malaria

Patients with Sickle Cell Disease tend to function better at high altitudes

While it can lead to discomfort, Sickle Cell Disease is not life-threatening

Moderate to high intensity exercise programs seem to benefit patients with Sickle Cell Disease more than low-intensity programs

Correct answer: Patients with Sickle Cell Disease have better protection against malaria

The condition is found primarily in those of sub-Saharan or Central American ancestry, and other areas where malaria is prevalent.

Patients with Sickle Cell Disease tend to struggle at high altitudes. Sickle Cell Disease is a life-threatening condition, especially when the patient is exercising or participating in a sport. Patients with Sickle Cell Disease should be prescribed low intensity exercise to avoid complications.

8.

Which of the following is **true** regarding preparticipation health screenings?

Screenings should serve to limit referring patients to health care providers unless absolutely necessary, as this can create a barrier to exercise

The primary purpose of preparticipation health screenings is to determine how serious the person is about committing to an exercise program

Preparticipation screenings need to be updated in order to encourage more referrals to physicians prior to starting exercise

The use of a preparticipation exercise screening form essentially replaces the clinical judgement of the CEP

Correct answer: Screenings should serve to limit referring patients to health care providers unless absolutely necessary, as this can create a barrier to exercise

In the past, health screenings have led to excessive referrals which have frustrated clients and sometimes caused them financial issues. Health screenings should provide a quick way to assess whether or not a patient needs further testing or whether they can safely initiate exercise.

The primary purpose of a screening is to ensure that the person is at low risk for injury and to decide whether a physician should evaluate said person prior to her beginning exercise. Preparticipation screenings do not need to encourage more referrals, but should only cause CEPs to make referrals when the patient is at risk for injury due to exercise and needs clearance. The CEP should always use sound judgement, and no screening tool can serve as a replacement for this judgement.

9.

Which of the following is **true** regarding genetics and exercise?

Genetics seems to influence roughly half of the body's training response to both endurance exercise and resistance exercise

Genetics seems to play no role in the body's response to cardiovascular exercise, but may have some effect on the response to resistance training

Genetics seems to play no role in the body's response to resistance training exercise, but may have some effect on the response to cardiovascular exercise

Genetics seems to be the most important factor when predicting how well a client will respond to exercise of any kind

Correct answer: Genetics seems to influence roughly half of the body's training response to both endurance exercise and resistance exercise

Genetics influences roughly 50% of the body's response to cardiovascular exercise and about 47% of the body's response to resistance training.

Genetics appears to influence both resistance training and cardiovascular exercise responses in roughly equal ways. While genetics is important in predicting how well a patient will respond to exercise, it is far from the only important factor. The CEP needs to consider environment, disease processes, and many other factors.

10.

Which of the following is **true** regarding muscle protein synthesis in middle-aged adults?

Both aerobic exercise and resistance training can stimulate muscle protein synthesis in middle-aged adults

Only resistance training can stimulate muscle protein synthesis in middle-aged adults

Only aerobic training can stimulate muscle protein synthesis in middle-aged adults

By midlife, testosterone levels are too low in most individuals for any muscle protein synthesis to take place

Correct answer: Both aerobic exercise and resistance training can stimulate muscle protein synthesis in middle-aged adults

Regardless of the type of exercise, middle-aged individuals can encourage muscle protein synthesis during this time of life by increasing their activity.

While resistance training may provide better results in terms of muscle protein synthesis, cardiovascular exercise is effective as well. Testosterone levels often begin to fall during this time of life, but this does not mean that hypertrophy of both type I and type II fibers is impossible for this age group.

11.

Which of the following options **best** describes the process of protein turnover?

Muscle protein is broken down, then synthesis of muscle occurs

When a person eats an excess of dietary protein, some of it is converted into fat

As amino acids begin to form a protein, the protein structure slowly "turns over" on itself

When a person eats an excess of dietary protein, some of it is converted into carbohydrates

Correct answer: Muscle protein is broken down, then synthesis of muscle occurs

After resistance training exercise, both muscle breakdown and synthesis occur. This feedback loop involving breakdown and buildup is known as protein turnover. As a person begins to increase their training frequency, protein synthesis surpasses protein breakdown. This, in turn, leads to muscle hypertrophy.

12.

Regarding preparticipation health screenings and diagnosed pulmonary disease, which of the following is **true**?

The ACSM recommends that patients with known pulmonary disease do not need to be referred for medical clearance prior to beginning exercise

The ACSM recommends that all patients with known pulmonary disease be referred for medical clearance prior to beginning exercise

Patients with COPD who currently smoke have a low likelihood of cardiovascular events

In general, pulmonary diseases increase the risk of adverse cardiac events while exercising

Correct answer: The ACSM recommends that patients with known pulmonary disease do not need to be referred for medical clearance prior to beginning exercise

As of 2015, the ACSM has updated their guidance to reflect that patients with known pulmonary disease do not need to be automatically referred to a medical provider prior to initiating exercise.

Patients with COPD who currently smoke or formerly smoked are at risk for cardiovascular events. In general, pulmonary diseases do not increase the risk of adverse cardiac events during or after exercise.

13.

A client who holds a stretch for 30 seconds in a position of mild discomfort is said to be performing which of the following types of stretching?

Static stretching

Dynamic stretching

Ballistic stretching

PNF stretching

Correct answer: Static stretching

Static stretching is a safe form of flexibility training that can lead to increased range of motion. Generally, static stretching is not appropriate for a warm up, but can be included in an exercise session alongside resistance training and cardiovascular exercise modes.

Dynamic stretching refers to movements where the stretch is not held for long (if at all) and the movements are performed through a full range of motion, such as walking while gently pulling one's knees toward one's chest in an alternating manner. Ballistic stretching includes short bursts of stretch performed through a partial range of motion. Ballistic stretching is inappropriate for most clients. PNF stretching is a specialized form of flexibility training that utilizes reflexes in the tendons and muscles of the body.

14.

Which of the following is **true** of type I muscle fibers?

Type I muscle fibers are known as "slow-twitch" fibers and they are slow to fatigue

Type I muscle fibers are only found around the heart

Type I muscle fiber cross sectional area tends to decrease as we age

Type I muscle fibers produce "explosive" movements and tend to fatigue quickly

Correct answer: Type I muscle fibers are known as "slow-twitch" fibers and they are slow to fatigue

Type I muscle fibers are smaller, higher endurance fibers, as compared to type II fibers.

Cardiac muscle is found around the heart. Type I muscle fiber cross sectional area seems to remain consistent throughout the life cycle (from 20 years old to 90 years old). Type II fibers produce explosive movements.

15.

Which of the following is **true** regarding cancer staging?

Stage 4 indicates that the cancer has spread to far away parts of the body

Stage 0 indicates that cancer is present and the tumor is of a moderate size

Stage 3 cancer has not yet spread to adjacent tissues

Stage 1 indicates that there is no cancer detected yet, but there are potentially precancerous cells present

Correct answer: Stage 4 indicates that the cancer has spread to far away parts of the body

Stage 4 cancer is the most serious stage of cancer and indicates that metastasis has taken place in even distant systems and tissues.

Stage 0 indicates that there are abnormal cells present, but no cancer has been detected as of yet. Stage 3 cancer indicates that the cancer has spread to adjacent tissues. Stage 1 cancer indicates that cancer is present, but that the tumor is small.

16.

Which of the following is a characteristic of a "nonresponder to exercise"?

A patient who is unable to improve her mile time by more than three seconds after four months of dedicated, specific, progressive cardiovascular training

A patient who increases his bench press by 30 pounds in two months of training

A patient whose VO₂max decreases after five weeks of training

A patient who demonstrates improved cardiovascular endurance after three months of training, but reports that he dislikes his exercise sessions more each time

Correct answer: A patient who is unable to improve her mile time by more than three seconds after four months of dedicated, specific, progressive cardiovascular training

Nonresponders to exercise are those that demonstrate very little improvement in endurance or strength, even with proper exercise prescription and consistent training.

A patient who increases his bench press by 30 pounds in two months of training is a responder to exercise. A patient whose VO₂max decreases after five weeks of training is a negative responder to exercise. A patient who demonstrates improved cardiovascular endurance, but begins to dislike his exercise sessions is a responder to exercise, but may need to participate in some motivational interviewing or have his exercise program changed.

17.

Which of the following is **true** of Raynaud's disease?

Patients with Raynaud's disease can learn, through biofeedback techniques, how to increase the temperature of their extremities

Symptoms in patients with Raynaud's disease are typically brought on by exposure to hot air

Raynaud's disease is primarily a disease of the pulmonary system

Raynaud's disease is three times more common in men than in women

Correct answer: Patients with Raynaud's disease can learn, through biofeedback techniques, how to increase the temperature of their extremities

Both biofeedback and classical conditioning techniques have been successfully used to improve temperature control in the digits of patients with Raynaud's disease.

Symptoms of Raynaud's disease are usually brought on by exposure to cold air or by touching a cold object. Raynaud's disease is primarily a disease of the cardiovascular system. Raynaud's disease is almost five times more prevalent in women than in men.

18.

Which of the following is **true** regarding bone health and bone mineral density (BMD) in men and women?

Weight bearing exercise and high impact exercise can increase bone strength in both men and women

Most of the research on exercise and bone health has been conducted on male subjects

Bone strength is inversely related to muscle mass in both men and women

Men and women tend to have equal BMD on average

Correct answer: Weight bearing exercise and high impact exercise can increase bone strength in both men and women

It is important that the CEP includes bone-strengthening exercise for all clients throughout the life cycle. Increased bone strength can help to prevent osteoporosis and reduce the risk of fractures.

Most of the research on exercise and bone health has been conducted on women. Bone strength is positively associated with muscle mass. Women tend to have lower BMD than men, on average.

19.

Which of the following is **true** regarding menopause?

Menopause typically occurs when a woman is in her 50s

Smoking has no effect on menopause

Lead exposure throughout a woman's life can increase menopause age by up to 2 years

Menopause can only occur due to natural ovarian aging

Correct answer: Menopause typically occurs when a woman is in her 50s

The average age of menopause is around 50 and many women report the end of menses by the age of 55.

Smoking tends to lower the age at which women experience menopause by 1 year. Lead exposure can decrease menopause age by as many as 1.2 years. Menopause can occur due to natural aging or as a result of surgical removal of the ovaries.

20.

Which of the following is **false** regarding anti-obesity drugs?

There are no side effects associated with the drug orlistat

Anti-obesity drugs are known as anorectics

There are currently four drugs approved for the treatment of chronic obesity

Lorcaserin can cause cardiovascular and cognitive issues in patients

Correct answer: There are no side effects associated with the drug orlistat

Orlistat can cause flatulence, oily stools, and other gastrointestinal issues.

Another name for anti-obesity drugs is anorectics. There are more drugs approved for the short-term treatment of obesity, but only four approved for long-term treatment. Lorcaserin can cause an irregular heart beat, as well as cognitive issues.

21.

Which of the following is **not** associated with long periods of sedentary time and insufficient physical activity?

Hypotension

Obesity

Increased waist circumference measurement

Type II diabetes mellitus

Correct answer: Hypotension

Hypotension is low blood pressure. Hypotension is not associated with long periods of sedentary activity and insufficient physical activity. In fact, high blood pressure, or hypertension, is associated with these issues.

Other potential effects of sedentary behavior and lack of activity include obesity, increased waist circumference, type II diabetes, metabolic disease, and all-cause mortality.

22.

Which of the following is an example of a secondary airborne pollutant?

Ozone

Carbon monoxide

Sulfur oxides

Nitrogen oxides

Correct answer: Ozone

Because ozone forms when it interacts with another compound, it is considered a secondary pollutant.

Carbon monoxide, sulfur oxides, and nitrogen oxides are all considered primary pollutants, as they are produced directly from a pollution source.

23.

Which of the following is a risk factor for type II diabetes mellitus?

Diagnosed hypertension

High levels of HDL cholesterol

Maintaining a vegetarian diet

Age greater than 30 years old

Correct answer: Diagnosed hypertension

Those with comorbidities such as hypertension are at higher risk of developing type II diabetes mellitus.

Low levels of HDL cholesterol present a risk factor for the development of type II DM. A vegetarian diet is not associated with a higher risk of developing type II DM. Those aged 45 years or older are at risk of developing type II DM.

24.

A client mentions to her CEP that she is worried about her 12-year-old son's weight. He doesn't like to play sports and rarely participates in physical activities. However, she is concerned that he may be injured if he enters into a formal exercise program.

How should the CEP respond?

"Supervised and appropriately scaled exercise and physical activity are very safe for adolescents. There is good evidence to show that young people who have low levels of fitness and muscle strength may have a higher risk of disease in adulthood. Therefore, the earlier you can get your child into a supervised exercise program, the better."

"You're right to worry about the risks of exercise for adolescents. Your son should wait to start exercising until he is at least 18 years old and should focus solely on improving his diet for the time being."

"Cardiorespiratory exercise is very safe for adolescents, but resistance training can stunt growth in adolescents."

"Your son could participate in flexibility exercise or yoga classes, but you're right to keep him from participating in resistance training and cardiorespiratory exercise. These modes of exercise are dangerous for adolescents."

Correct answer: "Supervised and appropriately scaled exercise and physical activity are very safe for adolescents. There is good evidence to show that young people who have low levels of fitness and muscle strength may have a higher risk of disease in adulthood. Therefore, the earlier you can get your child into a supervised exercise program, the better."

Even young children can safely participate in exercise programs consisting of flexibility, cardiorespiratory, and resistance training modes, as long as the programs are supervised and appropriately designed for their developmental level. There are few risks to exercise for this population, and the benefits far outweigh any risks that do apply.

25.

A cancer of which of the following tissues would be considered a "hematological cancer"?

Bone marrow

Epithelial tissue

Muscle tissue

Cartilage

Correct answer: Bone marrow

Hematological cancers are those cancers that form in tissues that create blood cells.

Cancers forming in epithelial tissues are known as carcinomas. Cancers forming in connective tissue, such as muscle tissue, are broadly known as sarcomas. Cancers forming in cartilage are known as chondrosarcomas.

26.

Which of the following patients could be diagnosed with rheumatoid arthritis?

A male patient who reports morning stiffness that lasts for 2 hours before improving and has experienced bilateral swelling in the wrists, elbows, and knees for 7 weeks

A female patient who experiences swelling in her right knee every morning that gets better as she moves around throughout the day

A male patient who experiences stiffness in his hands after working for a full day at his job as a transcriptionist

A female patient who experiences stiffness in her right foot and hand at least three days a week for more than 4 hours at a time

Correct answer: A male patient who reports morning stiffness that lasts for 2 hours before improving and has experienced bilateral swelling in the wrists, elbows, and knees for 7 weeks

To receive a diagnosis of rheumatoid arthritis, the patient must present with at least four of the following criteria:

- *Joint stiffness that presents in the morning and lasts for 1 hour or more*
 - *Arthritis of at least three joint areas (possible joints include the MCPs, MTPs, wrists, elbows, knees, ankles, PIPs) that has been present for 6 weeks or longer*
 - *Arthritis of the hands that has been present for 6 weeks or longer*
 - *Bilateral arthritis*
 - *Presence of rheumatoid nodules*
 - *Presence of abnormal serum rheumatoid factor*
 - *Changes seen on radiograph that are indicative of rheumatoid arthritis*
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27.

Which of the following is **true** regarding cardiorespiratory ability in girls and boys during adolescence?

Boys tend to have higher cardiac output than girls in adolescence

Girls tend to have more muscle mass than boys in adolescence

Girls tend to have a higher concentration of hemoglobin than boys in adolescence

Both girls and boys tend to experience worse exercise economy as they transition from childhood to adolescence

Correct answer: Boys tend to have higher cardiac output than girls in adolescence

In this stage of development, boys often have higher cardiac output than girls.

Boys tend to have more muscle mass than girls in adolescence. Boys tend to have a higher concentration of hemoglobin than girls in adolescence. Both girls and boys tend to experience better exercise economy as they transition from childhood to adolescence.

28.

Which of the following is **true** of postmenopausal women?

Postmenopausal women tend to have decreased size and cross-sectional area of type II muscle fibers compared to type I muscle fibers

Postmenopausal women tend to have increased size and cross-sectional area of type II muscle fibers compared to type I muscle fibers

Estrogen replacement therapy for postmenopausal women has no effect on muscle strength

Postmenopausal women tend to lose lean mass and fat mass in equal proportion

Correct answer: Postmenopausal women tend to have decreased size and cross-sectional area of type II muscle fibers compared to type I muscle fibers

Type two muscle fibers are responsible for power and strength. When these fibers begin to decrease in size, a corresponding loss in strength is often noted in this patient population.

Estrogen replacement therapy for postmenopausal women can improve strength by as much as 5% as compared to postmenopausal women who do not receive the treatment. Postmenopausal women tend to lose lean mass and gain fat mass.

29.

Which of the following is **true** regarding grip strength and aging?

Grip strength can increase until age 30 in many individuals

Grip strength usually begins to decline after age 18

Grip strength increases until age 13, then is maintained for the rest of one's life

Grip strength is not usually measured in most fitness assessments, as it is not applicable to daily life, aging, or health

Correct answer: Grip strength can increase until age 30 in many individuals

Grip strength is an important component of health and is included in most fitness assessments, where applicable. According to research, grip strength (along with some other muscle groups) tends to increase until one turns 30. This is in contrast to most muscle groups of the body, where peak strength is achieved in adolescence and remains the same until roughly the age of 40.

30.

Which of the following is **true** regarding very low calorie diets?

Very low calorie diets are often associated with bariatric clinics or hospitals

Very low calorie diets typically force patients to consume 1500 to 1800 calories a day

An average very low calorie diet will last for 3 to 4 years

Very low calorie diets usually emphasize carbohydrate calories over protein and fat

Correct answer: Very low calorie diets are often associated with bariatric clinics or hospitals

Because patients on very low calorie diets need close monitoring, the programs are generally conducted through medical facilities.

Very low calorie diets typically force patients to consume 500 to 800 calories a day, max. An average very low calorie diet typically lasts for 12 to 26 weeks. Very low calorie diets usually emphasize protein calories over fats and carbohydrates.

31.

A CEP is working with a collegiate runner who just finished an all-out sprint to end her session. She is very out of breath and has trouble speaking for a few seconds after finishing the sprint. Within a minute, she is speaking and breathing much more comfortably.

How should the CEP interpret this finding?

The athlete is demonstrating appropriate levels of fatigue and dyspnea based on the athletic effort she just put forth. The CEP should not be concerned.

The athlete has dyspnea, which is indicative of lung disease. She should be referred to her doctor for further testing.

The athlete is likely to experience a heart attack any minute. Emergency services should be called immediately.

The athlete is displaying signs of orthostatic hypotension. The CEP should not be worried, but should take note of this finding.

Correct answer: The athlete is demonstrating appropriate levels of fatigue and dyspnea based on the athletic effort she just put forth. The CEP should not be concerned.

Shortness of breath, or dyspnea, is concerning when clients are working at very low levels of exertion. For an athlete completing an all-out effort sprint, it is completely normal to see dyspnea.

There is no need to refer this client out or contact emergency services. Orthostatic hypotension refers to a drop in blood pressure that does not correct quickly when a person changes position (such as going from sitting to standing).

32.

Which of the following is **true** regarding osteoporosis?

Women typically experience osteoporosis earlier than men

Serious side effects from bisphosphonates are very common

Vitamin D supplements have no effect on bone health

People with osteoporosis should avoid weight-bearing exercise

Correct answer: Women typically experience osteoporosis earlier than men

When women go through menopause in their 50s, osteoporosis usually begins. Men don't typically experience osteoporosis until their 70s.

Serious side effects from bisphosphonates are rare. Vitamin D supplements seem to be a good complementary treatment for osteoporosis and to improve bone health in general. People with osteoporosis benefit from appropriate weight-bearing exercise.

33.

At what age do the epiphyseal growth plates typically fuse in males?

Between ages 14 and 19

Between ages 12 and 16

Between ages 20 and 30

Between ages 2 and 5

Correct answer: Between ages 14 and 19

Boys' epiphyseal plates tend to fuse in adolescence, between the ages of 14 and 19.

Girls' epiphyseal plates fuse between ages 12 and 16. Bones continue to harden between the ages of 20 and 30, but the epiphyseal plates have long since fused. Bones are still forming between ages 2 and 5.

34.

Which of the following statements regarding COPD is **false**?

COPD has a direct healthcare cost of about 10 million dollars in the U.S.

COPD is correlated with smoking and exposure to tobacco smoke

COPD is the third most common cause of death in the United States

COPD affects more than 200 million people around the world

Correct answer: COPD has a direct healthcare cost of about 10 million dollars in the U.S.

The direct healthcare cost for COPD in the U.S. is over 32 billion dollars.

While there are some COPD patients who have never smoked, and some smokers who never develop COPD, smoking remains a major risk factor for the development of COPD. COPD trails only heart disease and cancer in terms of causes of death in the United States. COPD affects tons of countries around the world and accounts for a significant portion of the global burden of disease.

35.

Which of the following is **true** of ozone?

Ozone is typically created through the reaction between UV radiation and car exhaust

Ozone levels are usually higher in the winter months as compared to the summer months

Ozone levels are usually highest in the early morning hours

While more research is needed, early findings suggest that ozone exposure has no effect on exercise performance

Correct answer: Ozone is typically created through the reaction between UV radiation and car exhaust

Ozone makes up a large percentage of smog and is produced when UV light encounters vehicular exhaust.

Ozone levels tend to be higher in the summer months as compared to the winter months. Ozone levels are often highest in the early to mid afternoon hours. Ozone seems to negatively affect exercise performance in a variety of ways.

36.

Which of the following is **true** of nitrogen dioxide exposure and exercise?

Healthy adults tend to experience few adverse effects during submaximal exercise when exposed to low levels of nitrogen dioxide for a short period

Nitrogen dioxide has not been researched very heavily, as it seems to be relatively harmless to humans

Nitrogen dioxide tends to irritate the lower respiratory tract

There is a vast amount of research outlining the detrimental effects of nitrogen dioxide exposure when patients exercise near their VO₂max

Correct answer: Healthy adults tend to experience few adverse effects during submaximal exercise when exposed to low levels of nitrogen dioxide for a short period

Interestingly, nitrogen dioxide, when exposure is brief and at low levels, does not seem to impair submaximal exercise capacity in healthy adults.

Nitrogen dioxide is generally considered to be very harmful to humans, especially at high levels, so much attention has been paid to the compound in the research field. Nitrogen dioxide tends to irritate the upper respiratory tract. Little attention has been paid to the effects of nitrogen dioxide exposure in patients exercising at or near their VO₂max.

37.

What are the **most** common beneficial effects prednisone has on the body?

Decreases pain, reduces swelling, helps with inflammation

Prevents clotting and reduces the chance of developing a pulmonary embolism

Suppresses and/or relieves cough symptoms

Lowers cholesterol levels

Correct answer: Decreases pain, reduces swelling, helps with inflammation

Prednisone is a corticosteroid. Corticosteroids are typically prescribed to help treat inflammatory conditions.

Anticoagulant medications prevent clotting. Antitussives suppress and/or relieve coughs. Antilipemic agents lower cholesterol levels.

38.

Which of the following would **not** be found on a typical health history form?

Non-exercise related hobbies

Family history

Surgical history

Current medications

Correct answer: Non-exercise related hobbies

Although it's important to get to know a client and develop rapport, a typical health history form will generally stick to information about the person's physical habits and past medical history.

Family history is an important component of every health history form. Surgical history can provide a wealth of data about contraindications and potential modifications for exercise. Current medications will allow the CEP to be aware of any abnormal patient responses to exercise or testing.

39.

Which of the following statements about adolescence and puberty is **true**?

Puberty is usually completed by the time a person turns 17, while adolescence can often extend until a person is 21 years old

Puberty is usually completed by the time a person turns 21, while adolescence typically ends around age 17

Puberty and adolescence are completely synonymous terms

The stages of adolescence are divided into seven stages, termed Salter-Harris stages

Correct answer: Puberty is usually completed by the time a person turns 17, while adolescence can often extend until a person is 21 years old

While there is some variation, puberty is generally complete by the age of 17. Adolescence, on the other hand, often ends in a person's 20s.

Puberty is defined as the development of sexual maturity, while adolescence is described as the time period from puberty to adulthood. The stages of adolescence are divided into five Tanner stages.

40.

Which of the following is **true** of the "bladder void count" method of determining hydration status?

Patients who void at least 6 times a day are usually adequately hydrated

Patients who void less than 5 times a day are sufficiently hydrated

Patients who have pale urine when they void are considered dehydrated

Patients who have dark urine when they void are considered sufficiently hydrated

Correct answer: Patients who void at least 6 times a day are usually adequately hydrated

While this method has not been validated, it is an easy and quick way to measure hydration status.

Patients who void less than 5 times a day are likely dehydrated, according to this measurement technique. This method does not account for urine color. In general, however, dark urine tends to indicate dehydration, while pale urine indicates adequate hydration.

41.

Based only on the information given, which of the following patients is **not** at risk for developing atherosclerotic cardiovascular disease?

A 35-year-old male

A 60-year-old woman

A man with a BMI of 38 kg/m²

A current cigarette smoker

Correct answer: A 35-year-old male

As far as age is concerned, men must be 45 years or older to receive a positive risk factor for atherosclerotic CVD.

Women must be 55 years or older to receive a risk factor for atherosclerotic CVD. A BMI greater than 30 kg/m² is a risk factor for atherosclerotic CVD. Current cigarette smoking is a risk factor for atherosclerotic CVD.

42.

Regarding the protective health effects of cardiorespiratory endurance seen in middle age and later years, which of the following statements is correct?

The protective effects of cardiorespiratory fitness that a person achieves in midlife can last for as much as 20 years

The protective effects of cardiorespiratory fitness that a person achieves in midlife do not last beyond middle age

If the person was sedentary for most of their life up until middle age, no protective effects can be achieved through cardiorespiratory exercise

Only very vigorous, daily cardiorespiratory exercise can provide protective cardiorespiratory benefits for those in midlife

Correct answer: The protective effects of cardiorespiratory fitness that a person achieves in midlife can last for as much as 20 years

The healthy steps a person takes in middle age can continue to benefit them for as much as 20 years later. It doesn't take very intense or vigorous exercise to achieve this result, rather, the person can walk or jog and realize the protective health effects in question.

43.

Which of the following is **not** a type of nucleotide?

Tanine

Cytosine

Thymine

Adenine

Correct answer: Tanine

The only four nucleotides in existence are cytosine, thymine, adenine, and guanine.

Each of the nucleotides is arranged in a specific way, which then leads to the formation of amino acids. Amino acids are then turned into proteins. These proteins are then modified to perform a specific purpose.

44.

Which of the following **best** describes the difference between lumbar neurogenic claudication and vascular claudication in the lower extremities?

Neurogenic claudication causes pain in the legs due to irritation of the lumbar nerves, while vascular claudication is caused by insufficient blood flow to the legs

Both neurogenic claudication and vascular claudication improve with lumbar flexion

Neurogenic claudication causes pain in the legs due to insufficient blood flow to the legs, while vascular claudication is caused by irritation of the lumbar nerves

Neurogenic claudication is just a different term for vascular claudication. The terms can be used interchangeably.

Correct answer: Neurogenic claudication causes pain in the legs due to irritation of the lumbar nerves, while vascular claudication is caused by insufficient blood flow to the legs

There are a few tests/questions that can indicate whether a person has neurogenic claudication or vascular claudication. If the pain gets better due to the patient flexing forward, and worse when she extends backwards, it's more likely to be neurogenic in origin. If the pain gets worse at a consistent level of physical activity, the patient is more likely to be suffering from vascular claudication.

These are two distinct conditions that require two very different approaches to treatment.

45.

Which of the following patients would meet the criteria for a diagnosis of metabolic syndrome, according to the International Diabetes Federation?

A male patient with central obesity, diagnosed hypertension, and HDL levels below 40 mg/dL

A female patient with a waist circumference of 75 cm, a triglyceride level of 130 mg/dL, and blood pressure of 116/70 mm Hg

A male patient with blood pressure of 160/90 mm Hg, normal BMI, and a triglyceride level of 140 mg/dL

A female patient with a waist circumference of 90 cm, central obesity, and resting heart rate of 80 BPM

Correct answer: A male patient with central obesity, diagnosed hypertension, and HDL levels below 40 mg/dL

The criteria for a diagnosis of metabolic syndrome, as indicated by the International Diabetes Federation, are as follows:

- *Central obesity (waist circumference measurement ≥ 94 cm in men and ≥ 80 cm in women) in addition to any two of the following criteria listed below.*
 - *Triglyceride levels ≥ 150 mg/dL*
 - *HDL levels less than 40 mg/dL in men or less than 50 mg/dL in women*
 - *Blood pressure $\geq 130/85$ mm Hg or a diagnosis of hypertension*
 - *FPG ≥ 100 mg/dL or a diagnosis of type II DM*
-

46.

Which of the following is **true** regarding cholesterol?

Total cholesterol should be kept below 200 mg/dL

A triglyceride level of 400 mg/dL is considered normal

Optimal LDL values are above 160 mg/dL

50 mg/dL is considered high for HDL levels

Correct answer: Total cholesterol should be kept below 200 mg/dL

This is the desirable level for total cholesterol.

A triglyceride level of 400 is considered high. Optimal LDL values are below 100. Greater than or equal to 60 is considered high for HDL levels.

47.

Which of the following is **true** regarding cardiorespiratory fitness in adults?

VO2max peaks in late adolescence and can be maintained until roughly age 29 or 30

Starting at age 50, VO2max begins to decrease steadily each year

VO2max tends to increase significantly in one's 30s, as long as the individual maintains a rigorous training schedule

We can accurately and reliably predict VO2max using mathematical equations based on submaximal exercise

Correct answer: VO2max peaks in late adolescence and can be maintained until roughly age 29 or 30

Especially for those who trained their cardiovascular system during adolescence, VO2max can be maintained in young adulthood.

Starting at age 30, VO2max begins to decline steadily each year. VO2max tends to decrease by roughly 1% each year starting at age 30. We have tried many times, but we have yet to develop an accurate and reliable method for predicting VO2max from submaximal exercise.

48.

Which of the following options is **true** regarding heart rate?

Normal resting heart rate is between 60 and 100 beats per minute

Manual heart rates should always be palpated and taken using the examiner's thumb

The heart rate measured by an ECG machine is always extremely accurate

Heart rates lower than 50 beats per minute are always a sign of serious pathology

Correct answer: Normal resting heart rate is between 60 and 100 beats per minute

Between 60 and 100 beats per minute is an average range that covers most healthy individuals. However, a patient can be very healthy and have a heart rate that falls slightly outside of this range.

A heart rate measurement should never be taken with the examiner's thumb, as the pulse within the thumb can lead to an inaccurate heart rate assessment. The heart rate measured by an ECG machine is not always accurate, which means that examiners should always know multiple methods for calculating and obtaining a patient's heart rate. Heart rates lower than 50 beats per minute may be due to adaptations to exercise, in which case the finding would not indicate pathology.

49.

Clients diagnosed with hypertension should avoid which of the following during resistance exercise?

The Valsalva maneuver

Isotonic exercise

The use of resistance bands

Bodyweight exercises

Correct answer: The Valsalva maneuver

The Valsalva maneuver is a technique used when lifters are moving extremely heavy weights. For powerlifting or sports requiring extreme effort, the Valsalva maneuver may be necessary. However, those with hypertension should avoid the maneuver, as it can lead to huge spikes in blood pressure and associated dizziness.

Isotonic exercise is an appropriate choice for those with hypertension. Resistance bands are appropriate to use with clients who have hypertension. Bodyweight exercises are a great choice for individuals with hypertension.

50.

If a patient reports a positive Painful Arc Sign when lifting her arm, what is the **most** likely diagnosis?

Rotator cuff impingement

Systemic disease causing referred pain to the shoulder

A humeral fracture

A triceps brachii strain

Correct answer: Rotator cuff impingement

A cluster of tests is typically used to diagnose rotator cuff impingement. The Painful Arc Sign is one of the quickest and easiest tests to include for a preliminary diagnosis of rotator cuff impingement.

Systemic disease causing referred pain to the shoulder typically results in pain that cannot be relieved by position change and pain at night. A humeral fracture is unlikely to elicit a positive Painful Arc Sign. A triceps brachii strain is unlikely to elicit a positive Painful Arc Sign.

51.

Which of the following statements is **correct** regarding body composition in older adults (65+)?

Older women tend to have more fat mass and less fat-free mass compared to men at the same age

Both weight and body fat tend to increase in older adults

Older men tend to have more fat mass and less fat-free mass compared to older women

Loss of muscle mass occurs at a faster rate than loss of muscle strength in the older population

Correct answer: Older women tend to have more fat mass and less fat-free mass compared to men at the same age

Throughout the lifecycle, women tend to have slightly higher levels of fat mass than men; this is no different in old age.

Weight usually stabilizes in old age, while body fat increases. Loss of muscle strength occurs faster than loss of muscle mass; this is known as dynapenia.

52.

A person with a blood pressure of 162/70 mm Hg falls into which of the following blood pressure categories?

Stage 2 hypertension

Stage 1 hypertension

Normal blood pressure

Prehypertension

Correct answer: Stage 2 hypertension

A systolic blood pressure ≥ 160 and/or a diastolic blood pressure ≥ 100 places a patient in the category of stage 2 hypertension.

Stage 1 hypertension is defined by a systolic blood pressure of 140-159 and/or a diastolic blood pressure of 90-99. Normal blood pressure is defined by a systolic blood pressure of less than 120 and a diastolic blood pressure of less than 80.

Prehypertension is defined by a systolic blood pressure of 120-139 and/or a diastolic blood pressure of 80-89.

53.

Which of the following is **true** of estrogen replacement therapy for postmenopausal women?

Estrogen replacement therapy increases the risk of cancer, heart issues, blood clots, and cerebrovascular events

For most patients, the benefits of estrogen replacement therapy outweigh the risks

Estrogen replacement therapy can reduce the menopausal effects on body composition and bone mineral density, but it does little to reverse the insulin resistance that occurs after menopause

Exercise is not an effective alternative to estrogen replacement therapy for postmenopausal patients

Correct answer: Estrogen replacement therapy increases the risk of cancer, heart issues, blood clots, and cerebrovascular events

While the treatment has many benefits, it increases the chances of a postmenopausal woman developing breast cancer, heart/vascular issues, and other problems.

For most patients, the risks of estrogen replacement therapy outweigh the benefits. Estrogen replacement therapy effectively addresses the menopausal changes associated with insulin resistance, body composition, and bone mineral density. Exercise is an effective alternative to estrogen replacement therapy.

54.

Which of the following is **not** a step in the central dogma of genetics?

Adaptation

DNA and the genetic code

Transcription

Translation

Correct answer: Adaptation

The four steps involved in the central dogma include DNA and the genetic code, transcription, translation, and postranslational modification.

DNA and the genetic code are the foundational elements of the central dogma. DNA is then transcribed into mRNA. Next, mRNA is then translated into amino acids. After translation, amino acids (which then combine to become proteins) will go through multiple modifications to fit a specific purpose.

55.

Which of the following would place a client with cardiovascular disease at moderate risk for exercise participation?

The patient experiences angina when exercising at an intensity of 7 or more METs

The patient demonstrates ventricular dysrhythmias when recovering from exercise

The patient has a functional capacity of at least 7 METs

The patient has an ejection fraction at rest of less than 40%

Correct answer: The patient experiences angina when exercising at an intensity of 7 or more METs

If a patient experiences angina or other cardiovascular symptoms at this level of intensity, he is considered moderate risk.

A patient who demonstrates ventricular dysrhythmias when recovering from exercise is considered to be high risk for exercise participation. A patient with a functional capacity of at least 7 METs would fall into the low risk category for exercise participation. A patient with an ejection fraction at rest of less than 40% would be considered high risk for exercise participation.

56.

Which of the following **best** describes primary amenorrhea?

No menstrual cycle occurs by 16 years of age in females

Menses begins, then stops for three consecutive cycles

A woman develops diabetes while pregnant

A woman stops menstruating in her 50s

Correct answer: No menstrual cycle occurs by 16 years of age in females

Females should begin to menstruate by the time they reach 15 or 16 at the latest. If this does not happen, the woman is said to have primary amenorrhea.

Menses beginning, then stopping for three consecutive cycles describes secondary amenorrhea. A woman developing diabetes while pregnant describes gestational diabetes. A woman no longer menstruating in her 50s describes menopause.

57.

Which of the following definitions **best** describes "phenotype"?

Characteristics of a living being that are related to said being's genome and the surrounding environment

A particular piece of DNA that is considered a unit of heredity

The unique DNA pattern of an individual person

A difference in a specific nucleic acid in a distinct location

Correct answer: Characteristics of a living being that are related to said being's genome and the surrounding environment

Phenotypes related to exercise include characteristics such as cardiovascular endurance, resting pulse, and other, similar measures.

A gene is a piece of DNA related to heredity. Genotype is the unique DNA pattern of an individual person. Ploymorphism is a difference in a specific nucleic acid in a distinct location.

58.

Which of the following is **true** of insulin resistance and old age (65+)?

Insulin resistance tends to stay the same or decrease in old age

Insulin resistance tends to stay the same or increase in old age

The development of type I diabetes is very common in the ninth decade of life

Insulin resistance always increases in old age

Correct answer: Insulin resistance tends to stay the same or decrease in old age

Interestingly, older adults will often demonstrate a decrease in insulin resistance to near the level of the typical younger adult. This usually occurs in or near the ninth decade of life. There have been a few major studies that have shown stable levels, as well as decreased levels of insulin resistance in this period of life.

59.

A client with asthma asks her CEP when the best time to take her morning walk would be. She loves to walk outside, but is nervous about exposure to environmental toxins. Which of the following is the **best** advice for this client?

This client should take her walks early in the morning, before the morning commute

This client should take her walks in the early afternoon, between the morning and evening commutes

This client should take short walks during the evening commute to increase her exposure to pollutants and acclimate herself to said irritants

This client should avoid walking outside altogether and opt for treadmill exercise

Correct answer: This client should take her walks early in the morning, before the morning commute

Walking early in the morning, before the morning commute, will reduce her exposure to vehicular pollutants and her exposure to ozone, which is higher in the afternoon.

Walks in the early afternoon will increase her exposure to ozone. While there is some evidence that our bodies can adapt to stressful environments, patients with diseases should avoid potential heavy exposure to toxins, unless they are working closely with their physician and have been advised to do so. If the client enjoys walking outside, she should be able to do so, and should pick a time when her system will be stressed as little as possible by environmental pollutants.

60.

Which of the following is **true** regarding lymphedema and exercise?

Resistance training might be helpful in improving lymph function in patients with affected limbs

Lymphedema is an absolute contraindication for exercise

Immediate moderate-to-high intensity exercise seems to lead to the best results for patients with lymphedema

Compression garments should never be worn during exercise

Correct answer: Resistance training might be helpful in improving lymph function in patients with affected limbs

For patients with decreased lymph function due to cancer treatment, resistance training seems to provide a means of improving this measure.

Exercise is not contraindicated in patients with decreased lymphatic function or with lymphedema. Early on, low-to-moderate intensity exercise is the most appropriate choice for patients with lymphedema. If the patient is instructed by their physician to wear the compression garment during exercise, they should do so.

61.

Which of the following is a **true** statement regarding cancer?

Cancers found in connective tissue are known as sarcomas

Cancers found in epithelial cells are known as basilomas

The five year survival rate for breast cancer is below 20%

Lung cancer is typically diagnosed in people under the age of 35

Correct answer: Cancers found in connective tissue are known as sarcomas

Bone and soft tissue cancers are known as sarcomas.

Cancers found in epithelial cells are known as carcinomas. The five year survival rate for breast cancer is nearly 90%. Lung cancer is typically diagnosed in older people (the mean age is 70 years old).

62.

Which of the following hypothetical patients is **most** likely to be dehydrated?

A patient with dark urine, who feels thirsty, and has recently lost weight

A patient with pale urine, who is thirsty, and has maintained his weight over the last few days

A patient with golden-yellow urine, who is thirsty, and has lost one pound over the past two days

A patient with dark urine, who isn't thirsty, and has lost one pound over the past two days

Correct answer: A patient with dark urine, who feels thirsty, and has recently lost weight

Dark urine, weight loss, and thirst, when combined, represent a high likelihood of dehydration.

Pale urine is an acceptable color and is not usually indicative of dehydration. Golden-yellow urine is an acceptable color of urine and is not usually indicative of dehydration. Absence of thirst does not necessarily indicate that the patient isn't dehydrated, but when a patient is thirsty, with dark urine, and has lost weight, they are much more likely to be dehydrated.

63.

Which of the following is **not** a risk factor for the development of hypertension?

High potassium diet

Aging

Obesity

Stress

Correct answer: High potassium diet

A high sodium diet may increase the chances that a patient will develop hypertension, but a high potassium diet may actually have the opposite effect.

Aging is the primary risk factor for developing hypertension. Obesity is strongly correlated with hypertension. Stress is often cited as a risk factor for hypertension.

64.

What are the primary methods our body uses to keep our internal temperature consistent in cold environments?

Vasoconstriction and thermogenesis

Vasoconstriction and sweating

Vasodilation and sweating

Vasodilation and shivering

Correct answer: Vasoconstriction and thermogenesis

By reducing blood flow to the skin, our bodies maintain our internal temperature in cold environments. Our bodies also use thermogenesis techniques, such as shivering, to keep us warm when we are exposed to cold temperatures.

Sweating is not an appropriate response to a cold environment. Vasodilation lowers our internal temperature and is not an appropriate bodily response to cold exposure.

65.

Which of the following is **true** regarding older adults and hot environments?

Older adults often have a delayed sweating response and a reduced sweating capability

During exercise in hot environments, older individuals have an easier time than younger people in increasing blood flow to the skin

Increased thirst in older adults often negates any dehydration that may occur during exercise

The cardiovascular systems of older adults become stressed in the heat as a result of their high stroke volume

Correct answer: Older adults often have a delayed sweating response and a reduced sweating capability

Studies have demonstrated that older adults tend to have impaired sweating responses when exposed to the heat.

When exercising in hot environments, most older adults have difficulty in increasing blood flow to the skin. Decreased thirst in older adults contributes to higher rates of dehydration. The cardiovascular systems of older adults become more stressed in the heat as a result of lower stroke volume.

66.

Which of the following is **true** regarding strokes?

A stroke occurs when blood flow to a part of the brain is blocked

Strokes occur most commonly in people under the age of 50

Most strokes are hemorrhagic rather than ischemic

There are no known risk factors for strokes

Correct answer: A stroke occurs when blood flow to a part of the brain is blocked

Strokes are devastating events that occur when blood is unable to get to a certain part of the brain. When this happens, the brain tissue can become damaged or the patient can die if the issue isn't corrected in time.

Strokes occur most commonly in those over the age of 65. Almost 87% of strokes are ischemic. Risk factors for strokes include hypertension, inactivity, and smoking.

67.

Which of the following statements is **false** regarding intermittent claudication?

People with diabetes are at lower risk of developing this condition

After stopping exercise, the symptoms usually resolve within a few minutes

The pain is often described as a "cramp"

The condition is the result of an inadequate blood supply and is brought on by exercise

Correct answer: People with diabetes are at lower risk of developing this condition

People with diabetes are at significantly higher risk of developing intermittent claudication.

After stopping exercise, the symptoms of intermittent claudication usually clear up within two minutes. Most people will describe the pain from intermittent claudication as a "cramping" sensation. Intermittent claudication is the result of inadequate blood supply to the legs and is often associated with atherosclerosis.

68.

Which of the following regarding exercise and menopause is **true**?

Exercise is an effective alternative to estrogen replacement therapy for postmenopausal women

Resistance training offers no benefits to postmenopausal women

Exercise has an adverse effect on bone mineral density in postmenopausal women

Endurance exercise in postmenopausal women often leads to a small amount of weight gain

Correct answer: Exercise is an effective alternative to estrogen replacement therapy for postmenopausal women

Estrogen replacement therapy comes with some serious adverse health effects such as cancer and cardiovascular disease. Exercise provides all of the benefits of estrogen replacement therapy, with very few downsides.

Resistance training can improve body composition and insulin resistance in postmenopausal women. Exercise seems to improve both spinal and femoral neck BMD in postmenopausal women. Endurance exercise in postmenopausal women often leads to about a 2.2-pound loss of body weight.

69.

Which of the following **best** describes sedentary behavior?

Any activity in which the person expends 1.5 METS or less in energy

Walking uphill while taking frequent breaks

Performing push-ups while watching a TV show

Jumping rope at an intense pace for 30 minutes

Correct answer: Any activity in which the person expends 1.5 METS or less in energy

Sedentary behavior might include watching TV in a seated position, driving to work, or reading a magazine in a recliner.

Walking uphill while taking breaks is an example of active behavior. Performing pushups while watching TV is active behavior. Jumping rope is an example of active behavior.

70.

A CEP is working with a client who is a 16-year-old female cross-country runner. The client off-handedly mentions one day that she hasn't had her period in over a year. The client is not worried by this fact, as most of the girls on her cross-country team have the same issue.

How should the CEP respond?

"Missing periods for that long could be a sign of a more serious problem caused by overtraining and undereating. We need to talk to your parents and get your doctor involved as quickly as possible."

"You're right. Most female athletes have the same problem, and it will correct itself once you stop competing."

"I'm calling an ambulance right now. This is a medical emergency and you need to be evaluated right away."

"As long as you still feel OK overall, losing your period for a year or two while you compete is nothing to worry about."

Correct answer: "Missing periods for that long could be a sign of a more serious problem caused by overtraining and undereating. We need to talk to your parents and get your doctor involved as quickly as possible."

By answering the client this way, the CEP conveys the importance of getting this issue resolved, while not causing unnecessary worry or underplaying the symptoms. Furthermore, the CEP rightfully includes the client's parents in the solution, as the client is a minor.

Secondary amenorrhea is an issue that needs to be corrected quickly or the athlete may develop serious lifelong complications related to her hormone levels, bone health, and other problems. This is not "normal" even though it does, unfortunately, happen a lot in high school and college athletics.

71.

A 50-year-old client rushes to meet his CEP. He explains that he just saw his PCP and he has been diagnosed with sarcopenia. The client seems nervous and confused by this new information he received from his doctor.

How should the CEP respond?

"Sarcopenia refers to age-related muscle loss. This is a completely normal process that everyone goes through. The muscle loss occurs slowly over the years. Luckily, it can be somewhat mitigated through exercise and lifestyle changes."

"Sarcopenia is an aggressive cancer of the muscular system. If you need more information, you should contact your doctor and set up a follow-up appointment."

"Sarcopenia is a lateral curvature of the spine. While not life-threatening, this condition can sometimes cause issues for patients, depending on how severe the curvature is."

"Sarcopenia refers to the loss of muscle quantity as we age. Luckily, muscle quality remains the same, regardless of whether a person exercises or not."

Correct answer: "Sarcopenia refers to age-related muscle loss. This is a completely normal process that everyone goes through. The muscle loss occurs slowly over the years. Luckily, it can be somewhat mitigated through exercise and lifestyle changes."

While sarcopenia tends to be associated with older individuals, some people can begin to experience the effects of sarcopenia as young as 45 years old. While it can't necessarily "reverse" the process, appropriate exercise can help to reduce the severity of muscle loss.

Sarcomas are cancers occurring in muscles and connective tissues. Scoliosis is a lateral curvature of the spine. Sarcopenia causes a loss of both muscle quality and quantity.

72.

Which of the following is **true** regarding heart transplants?

The greatest risk for death occurs due to complications after the surgery, not during the surgery

Congenital heart disease is the most common indication for an adult heart transplant

Immunosuppressants are rarely prescribed following a heart transplant

With medical advancements, anyone who needs a heart transplant can easily get one these days

Correct answer: The greatest risk for death occurs due to complications after the surgery, not during the surgery

Issues such as acute rejection, graft failure, infection, and other problems all create a significant level of risk after heart transplant surgery.

Cardiomyopathy is the most common indication for adult heart transplant. Immunosuppressants are frequently prescribed following heart transplant. About 3,800 heart transplants are performed annually across the globe, but nearly 46,000 people are waiting for surgery.

73.

According to the 2009 IOM/NRC guidelines for weight gain during pregnancy, how much total weight should a pregnant woman gain throughout the pregnancy if she has a BMI of 17 kg/m²?

28-40 lbs

15-25 lbs

11-22 lbs

31-50 lbs

Correct answer: 28-40 lbs

According to the guidelines, women who are considered underweight (BMI < 18.5 kg/m²) should aim to gain a total of 28 to 40 pounds throughout the pregnancy.

Overweight individuals (BMI 25.0-29.9 kg/m²) should aim to gain 15 to 25 pounds throughout the pregnancy. Obese individuals (BMI > 29.9 kg/m²) should aim to gain 11 to 22 pounds throughout the pregnancy. Overweight mothers of twins should aim to gain 31 to 50 pounds throughout the pregnancy.

74.

Which of the following is **true** regarding type I diabetes mellitus (DM)?

Patients with type I DM are at increased risk of developing autoimmune conditions such as Grave's disease

Patients with type I DM should avoid exercise due to the increased risk of cardiovascular complications

Type I DM accounts for nearly 50% of all diabetes cases

Type I DM is usually diagnosed in older adults

Correct answer: Patients with type I DM are at increased risk of developing autoimmune conditions such as Grave's disease

Patients with type I DM are also at increased risk of developing Hashimoto thyroiditis, Addison's disease, and other autoimmune conditions.

Patients with type I DM should be encouraged to exercise due to the ability of exercise to decrease the chance of developing cardiovascular disease. Type I DM accounts for roughly 5% to 10% of all DM cases. Type I DM is usually diagnosed in childhood.

75.

Which of the following is **true** of the rotator cuff muscles?

The supraspinatus initiates abduction of the shoulder

The infraspinatus and teres minor are primarily responsible for internal rotation of the shoulder

The subscapularis is responsible for external rotation of the shoulder

The deltoid is the strongest of the rotator cuff muscles

Correct answer: The supraspinatus initiates abduction of the shoulder

The supraspinatus is a thin muscle and one of four that make up the rotator cuff complex. The other three muscles include the infraspinatus, the teres minor, and the subscapularis.

The infraspinatus and teres minor are primarily responsible for external rotation of the shoulder. The subscapularis is primarily responsible for internal rotation of the shoulder. The deltoid is not part of the rotator cuff group.

76.

Which of the following is **true** regarding prostate cancer?

One in every seven men will likely receive a prostate cancer diagnosis in his lifetime

Men are mostly in their 30s when diagnosed with prostate cancer

The five year survival rate for prostate cancer is roughly 25%

More men die from prostate cancer than lung cancer

Correct answer: One in every seven men will likely receive a prostate cancer diagnosis in his lifetime

Prostate cancer is extremely common, and many men in the U.S. will either receive a diagnosis at some point in their lives, or have already been diagnosed.

Men are mostly older (in their 60s or above) when diagnosed with prostate cancer. The five year survival rate for prostate cancer is nearly 99%. More men die from lung cancer than prostate cancer.

77.

Which of the following is **true** regarding Down Syndrome?

Down Syndrome is caused by the presence of an extra copy of chromosome 21

Mothers under the age of 20 are at increased risk of having a child with Down Syndrome

Patients with Down Syndrome tend to have high resting metabolisms

Exercise is contraindicated for most patients with Down Syndrome

Correct answer: Down Syndrome is caused by the presence of an extra copy of chromosome 21

It's unclear exactly why the disease occurs, but Down Syndrome results from an extra copy of the 21st chromosome.

Older mothers are at risk of having a child with Down Syndrome. Patients with Down Syndrome tend to have low resting metabolisms. Exercise is very beneficial for most patients with Down Syndrome and is encouraged in this population.

78.

Which of the following is **true** regarding higher altitudes?

As humans encounter higher altitudes, oxygen saturation drops

The air pressure is higher at high altitudes

To conserve energy, the human body adapts to exercise at high altitudes by decreasing the rate and depth of breathing

During exercise at high altitudes, cardiac output is decreased

Correct answer: As humans encounter higher altitudes, oxygen saturation drops

Initially, high altitudes lead to decreased arterial oxygen saturation levels.

Air pressure is lower at high altitudes. The body adapts to exercise at high altitudes by increasing respiration rate and depth. Cardiac output is increased during exercise at high altitudes.

79.

Which of the following is the **best** initial step one should take when arriving at an area of high altitude?

Limiting physical activity for a few days

Immediately exercising at high-intensity

Immediately exercising at low to moderate intensity

Performing resistance training and flexibility exercise, but avoiding cardiovascular exercise for a few days

Correct answer: Limiting physical activity for a few days

In order to allow the body to effectively acclimate to high altitude, clients should be encouraged to rest for a few days after arriving.

Immediate high-intensity exercise may lead to altitude sickness or cardiovascular complications. Exercise at low to moderate intensity may not lead to any complications, but it is better for most people to rest during the first few days at high altitude. Resistance training, cardiovascular exercise, and flexibility training should be limited in the first few days of arriving at high altitude in order to reduce the risk of complications in the muscular, cardiovascular, and respiratory systems.

80.

Which of the following is **true** regarding carbon monoxide exposure?

Carbon monoxide levels tend to be higher in the winter months than in the summer months

In the middle of the day, carbon monoxide levels are typically at their maximum

Carbon monoxide exposure has little effect on exercise capacity in patients with COPD

Carbon monoxide can be visually observed very easily, due to its light blue color

Correct answer: Carbon monoxide levels tend to be higher in the winter months than in the summer months

When people are driving more and using more fossil fuels to keep warm, carbon monoxide levels tend to be very high.

Carbon monoxide levels are highest during the morning and evening commutes. Carbon monoxide exposure significantly reduces exercise capacity in patients with COPD. Carbon monoxide is colorless and odorless.

81.

Which of the following indicates a diagnosis of obesity in men?

BMI of at least 30 kg/m² or waist girth greater than 102 cm (40 inches)

Waist girth of greater than 88 cm (35 inches)

Performing less than 30 minutes of moderate intensity physical activity for 3 or fewer days per week for 3 months or more

Systolic blood pressure greater than or equal to 120 mm Hg

Correct answer: BMI of at least 30 kg/m² or waist girth greater than 102 cm (40 inches)

For men, the defining criteria for a diagnosis of obesity are that the person has a BMI of at least 30kg/m² or a waist girth greater than 102 cm.

Waist girth of greater than 88 cm (35 inches) is a defining criterion for obesity in women. Performing less than 30 minutes of moderate intensity physical activity for three or fewer days a week for three months or more is a defining criterion for physical inactivity. Systolic blood pressure \geq 120 mm Hg is a defining criterion for hypertension.

82.

A patient experiences angina when exercising at 8 METs. Into which of the following risk categories for exercise participation should this client be placed?

Moderate risk

Lowest risk

Highest risk

Exercise is absolutely contraindicated for this patient

Correct answer: Moderate risk

Angina or similar symptoms such as dizziness which occur only at high levels of exertion (greater than or equal to 7 METs) place patients in the moderate risk category.

Those at the lowest risk for exercise participation generally include patients without a diagnosed disease and no signs or symptoms of disease. Highest risk patients generally have abnormal exercise responses and significant symptoms at low levels of exertion.

83.

Which of the following is **true** regarding the Mediterranean diet?

The Mediterranean diet consists of less red meat, butter, and sugar as compared to the typical American diet

The Mediterranean diet can increase the risk of developing heart disease

The Mediterranean diet is associated with higher rates of cancer

The Mediterranean diet is based on the eating habits of Native Americans

Correct answer: The Mediterranean diet consists of less red meat, butter, and sugar as compared to the typical American diet

The Mediterranean diet emphasizes fish, olive oil, and plant foods.

The Mediterranean diet can decrease the risk of heart disease as well as the risk of developing cancer. The Mediterranean diet is based on the eating habits of the people living in the Mediterranean region.

84.

Which of the following statements regarding cardiorespiratory fitness during middle age is correct?

Decreased fitness during middle age elevates mortality risk by over 50%

Middle aged individuals, regardless of gender, are more likely to be physically active than those considered "young adults"

Middle aged individuals need to perform exercise equivalent to a brisk walk for 75 minutes per day to decrease the risk of all-cause mortality seen in this age group

VO₂max values rarely decline during middle age

Correct answer: Decreased fitness during middle age elevates mortality risk by over 50%

All-cause mortality is increased during this period of life in response to decreased fitness levels.

Middle aged adults are less likely to be physically active than their young adult counterparts. Middle aged adults can perform exercise equivalent to a brisk walk for only 30 minutes a day to mitigate the risk of mortality seen at this age. VO₂ max values begin to steadily decline in midlife.

85.

Which of the following is **true** regarding patients with Multiple Sclerosis (MS) and heat exposure?

Most patients with MS report worse symptoms when exposed to passive or active heat

Most patients with MS only report increased symptoms when they exercise in the heat, not when they are passively exposed to heat

In the heat, most patients with MS will have an increased sweating response

In the heat, most patients with MS will have reduced blood flow to the skin

Correct answer: Most patients with MS report worse symptoms when exposed to passive or active heat

Regardless of whether patients with MS are exposed to passive or active heat, over 60% of these individuals report worse symptoms of the disease.

When exposed to heat, most patients with MS will demonstrate a decreased sweating response. When exposed to the heat, most patients with MS will, surprisingly, demonstrate normal increases in blood flow to the skin.

86.

A CEP is performing an intake with a client who has never exercised. The client has had three heart attacks in the past and is morbidly obese. What should the CEP do **first**?

Refer the client for medical clearance

Begin with very light cardiovascular exercise, taking frequent breaks as needed

Prescribe only resistance training exercises for the first month

Begin exercising with the client, pushing him as hard as he is able to handle without developing any symptoms

Correct answer: Refer the client for medical clearance

Seeing as the client has had multiple heart issues in the past, it's a good idea to have a physician screen this patient and make sure that exercise is safe.

Very light cardiovascular exercise with breaks might be a good plan, as long as the client has been evaluated by a medical professional first. Resistance training exercises will likely be helpful for this patient, but medical screening should be completed first. Pushing the client to his level of tolerance early on is probably inappropriate, especially if the client has not been evaluated by a medical provider.

87.

Which of the following is **not** a cardinal sign of Parkinson's Disease?

Cognitive decline

Bradykinesia

Resting tremor

Rigidity

Correct answer: Cognitive decline

While some patients can experience cognitive symptoms, especially as the disease progresses, cognitive decline is not one of the four cardinal signs of Parkinson's Disease.

The four cardinal signs of Parkinson's Disease are bradykinesia (slow movements), resting tremor (often seen as a "pill rolling" tremor in the hand at rest, but can occur elsewhere), rigidity (high muscle tone that is independent of velocity), and postural instability.

88.

Which of the following **best** describes sinus bradycardia?

A heart rate under 60 BPM

A fast heart rate above 100 BPM

A slight pause that occurs before a P wave

An early heartbeat detected in the atria

Correct answer: A heart rate under 60 BPM

Sinus bradycardia is simply a slower-than-normal heart rate.

Sinus tachycardia is a fast heart rate above 100 BPM. A slight pause that occurs before a P wave is a sinus pause. An early heartbeat detected in the atria is a premature atrial complex (PAC).

89.

Which of the following is **true** regarding obesity?

Excessive abdominal fat, with or without an official diagnosis of obesity, leads to health problems in patients

A person with a BMI greater than 40 kg/m² is classified as having class 2 obesity

People who are obese generally have no other comorbidities

A caloric deficit is not an important consideration when designing a weight loss diet for a patient

Correct answer: Excessive abdominal fat, with or without an official diagnosis of obesity, leads to health problems in patients

Obesity and a large amount of abdominal fat are both issues that can lead to heart problems, diabetes, and many other diseases.

A person with a BMI greater than 40 kg/m² is classified as having class 3 obesity. People who are obese are much more likely to have one or more comorbidities. Creating a caloric deficit is the best way for patients to lose weight, regardless of the specific diet they choose.

90.

Which of the following is the **best** description of frostnip?

Frostbite that causes damage to the outermost layer of skin, leading to similar symptoms to a first-degree burn, if the person is removed from the cold environment quickly

Frostbite that affects the outer layer of skin in addition to some of the tissue underneath, causing blisters to form in a day or less

Frostbite that leads to degeneration of the inner walls of vascular structures

Frostbite that causes blood clots to form in the arterioles

Correct answer: Frostbite that causes damage to the outermost layer of skin, leading to similar symptoms to a first-degree burn, if the person is removed from the cold environment quickly

Frostnip is a warning sign that more severe frostbite may occur if the person is not removed from the cold.

Frostbite that affects the outer layer of skin and some of the layers underneath is known as superficial frostbite. Frostbite that leads to degeneration within blood vessels and leads to blood clot formation is known as severe frostbite.

91.

Which of the following drug or drug combinations is commonly prescribed for patients with Parkinson's Disease?

Carbidopa/Levodopa

Lovastatin

Metaprolol

Lisinopril

Correct answer: Carbidopa/Levodopa

Carbidopa and Levodopa are two medications that are given in combination to patients with Parkinson's Disease (PD). The two medications are so commonly prescribed together that they can often be considered as one treatment for PD.

Lovastatin is a drug for lowering cholesterol levels. Metaprolol is a beta blocker. Lisinopril is an angiotensin-converting enzyme inhibitor.

92.

Which of the following is a major concern related to excess water consumption during exercise?

Hyponatremia

The client missing part of their exercise session due to taking extra bathroom breaks

Bloating

Cramping

Correct answer: Hyponatremia

Hyponatremia occurs when a person loses too much of their blood sodium. This phenomenon is often due to excessive water consumption, which flushes the sodium out of the system. Hyponatremia can be life-threatening.

Missing part of a workout due to bathroom breaks is not a major concern, but the CEP may want to discuss proper hydration habits with their client. Bloating may affect performance, but is not a major concern. Cramping is typically caused by dehydration. However, it may occur with hyponatremia as well. The CEP must be vigilant during exercise sessions and note all of the symptoms the client is experiencing in order to take the best, safest action for the client.

93.

Which of the following is **true** regarding how metabolism and exercise are influenced by the menstrual cycle?

There is inconsistent data pertaining to the menstrual cycle's influence on metabolism in eumenorrheic women

Research has shown that women demonstrate significantly decreased exercise performance during the follicular and luteal phases of the menstrual cycle

Very low calorie diets and excessive exercise have no effect on the menstrual cycle

Energy expenditure significantly increases after a meal during all phases of the menstrual cycle

Correct answer: There is inconsistent data pertaining to the menstrual cycle's influence on metabolism in eumenorrheic women

While there have been numerous studies on this topic, there is little agreement among researchers about the exact processes that occur during the menstrual cycle regarding exercise and metabolism.

Research has not demonstrated a difference in athletic performance during the follicular and luteal phases of the menstrual cycle. Very low calorie diets and excessive exercise can negatively impact the menstrual cycle and may lead to amenorrhea. No significant differences were found in the studies that examined energy expenditure after meals during the menstrual cycle.

94.

Which of the following is **false** regarding colorectal cancer?

The risk of developing colorectal cancer is higher in women than in men

Most colorectal cancers start as polyps in the lining of the large intestine or rectum

Sigmoidoscopies allow for inspection of the rectum and the lowest one-third of the large intestine

Blood in the stool is one of the most common symptoms of colorectal cancer

Correct answer: The risk of developing colorectal cancer is higher in women than in men

Men have a 1 in 22 risk of developing colon cancer, while women have a 1 in 24 risk.

Colorectal cancers typically start as noncancerous polyps, and less than 10% of these polyps progress to a malignant cancer. Sigmoidoscopies offer a more limited view of the lower GI tract, and are recommended every five years for those over the age of 50. Blood in the stool, rectal bleeding, and bowel obstruction are some of the most common early symptoms of colorectal cancer.

95.

Which of the following is **true** of McArdle's Disease?

It is caused by a defect in a single gene

McArdle's Disease is commonly found around the world

There are clear, established guidelines for prescribing exercise for patients with McArdle's Disease

High-intensity exercise seems to be the best option for patients with McArdle's Disease

Correct answer: It is caused by a defect in a single gene

McArdle's Disease results from a defect in the myophosphorylase gene on chromosome 11.

McArdle's disease is very rare, with only 81 cases documented across the globe. There are no exhaustive guidelines available for patients with McArdle's Disease. Patients with McArdle's Disease tend to have very low exercise tolerance, and most would be unable to participate in any high intensity exercise.

96.

Which of the following options includes the body's main mechanisms for cooling off in hot environments?

Sweating and vasodilation

Sweating and vasoconstriction

Sweating and shivering

Shivering and vasodilation

Correct answer: Sweating and vasodilation

When our bodies become too hot, our blood vessels naturally dilate to increase blood flow to the skin, and we produce sweat to cool us down through the process of evaporation.

Our blood vessels vasoconstrict in cold environments. We shiver in cold environments. Shivering serves to warm up our bodies.

97.

Which of the following is **true** of particulate matter?

Particulate matter includes commonly encountered substances such as dust and smoke

Exposure to particulate matter tends to be lower during exercise

The risk of myocardial infarction is independent of the duration of exposure to particulate matter

In healthy adults, submaximal exercise capacity seems to be unaffected by exposure to particulate matter

Correct answer: Particulate matter includes commonly encountered substances such as dust and smoke

Particulate matter encompasses many different substances including dust, mold, soot, and smoke.

Exposure to particulate matter often increases during exercise as a result of increased breathing rate. The risk of myocardial infarction increases with longer duration of exposure to particulate matter. Submaximal and maximal exercise capacity seem to be reduced in healthy adults following exposure to particulate matter.

98.

Which of the following is the biggest limitation for patients who require lung transplants?

A shortage of available donor lungs

Transplant patients' unwillingness to quit smoking

Patients do not want to receive an organ from another person

Rigid donation requirements

Correct answer: A shortage of available donor lungs

Lung transplants are lifesaving surgeries that greatly improve the quality of life in these patients. Sadly, a shortage of available organs is the biggest limiting factor for transplanting new lungs into ill patients who need them.

Patients who are set to receive new lungs are carefully screened and counseled to ensure that they will have the best chance of success. Therefore, patients who refuse to quit smoking are very unlikely to make it on the donor list. Most patients understand that a donor lung is the best chance they have at survival. Donation requirements have become more lax over the years, with older, sicker patients being accepted onto donor lists.

99.

Which of the following is the **best** initial treatment option for those patients affected by altitude illness?

Descending to a lower altitude

Immediate corticosteroid treatment

Furosemide medication

Relative rest in which the patient's body fights off the illness and acclimates to the altitude

Correct answer: Descending to a lower altitude

Whether a patient develops Acute Mountain Sickness, High-Altitude Pulmonary Edema, or High-Altitude Cerebral Edema, the best option is for them to descend to a lower altitude.

Corticosteroid treatment should be considered in cases of High-Altitude Cerebral Edema and Acute Mountain Sickness, but the best option is to return to lower altitude. Furosemide is a good option for patients who develop High-Altitude Pulmonary Edema, but returning to low altitude is the best first option. Patients should be encouraged to rest, but without treatment, including returning to low altitude, they may not recover from the altitude-induced illness.

100.

Which of the following is **false** regarding the risks and benefits of physical activity?

In people with cardiovascular disease, the potential risks associated with exercise are very high

For most people, the benefits of physical activity outweigh the risks

Sudden cardiac death post-exercise occurs more often in men than in women

Structural heart issues are the most common cause of sudden cardiac death in younger individuals

Correct answer: In people with cardiovascular disease, the potential risks associated with exercise are very high

The risks of exercise (assuming that the patient has been appropriately screened and that the exercise prescription is individualized) are very low for most people, with or without disease. The benefits of exercise far outweigh the risks except in some very rare instances.
