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# Fitness NASM-PES

**National Academy of Sports Medicine: Performance  
Enhancement Specialization**

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# Latest Version: 6.1

## Question: 1

A Sports Performance Coach wants to measure the speed of his basketball athletes. Which sports performance test would be the most appropriate for this population?

- A. 40-yard sprint
- B. 30-yard sprint
- C. 3/4-court sprint
- D. Lower-extremity functional test

**Answer: C**

Explanation:

3/4-court sprint is correct because the setting and length of this speed and acceleration assessment is specific to the sport of basketball. The distance of this test is from the baseline to the opposite free throw line. Other speed tests such as the 30 or 40 yard dash would serve to measure speed and acceleration as well, but they are not as specific a sports performance test.

30-yard sprint and 40-yard sprint are incorrect because these do not occur on a surface specific to basketball nor represent a distance commonly covered during the sport.

Lower-extremity functional test is incorrect because this is an assessment of lateral speed and agility.

## Question: 2

During a one-person spot, what is the location of that spotter compared to the lifter?

- A. Behind them
- B. In front of them
- C. To the side of them
- D. Any of these

**Answer: A**

Explanation:

Behind them is correct because this allows the spotter to aid either on the lifter's body or the barbell itself. One-person spotters are generally used to provide assistance to the lift, such as through the "sticking point." However, the one-person spot is typically ineffective and unsafe if the lifter has completely failed the lift.

In front of them is incorrect because this is an unsafe and ineffective position for both the athlete and the spotter.

To the side of them is incorrect because this is a typical location for a two-person spot.

### Question: 3

When performed by a skilled technician, which of the following methods of measuring body composition is the least accurate?

- A. DEXA scan
- B. Skin-fold measurement
- C. Bioelectrical impedance
- D. Underwater weighing

**Answer: C**

Explanation:

Bioelectrical impedance is correct because this method is highly sensitive to the water content of the tissues and the body, which can easily fluctuate. This method is based on the hypothesis that adipose tissue conducts electrical current with less resistance than lean tissue. Strict procedures must be followed for a valid measurement to occur, but this is a quick method in which technician error is minimal.

Skin-fold measurement is incorrect because this method has been found to be quite accurate when performed by an experienced and skilled technician.

Underwater weighing is incorrect because this method is considered the gold standard of body composition measurement.

DEXA scan is incorrect because this is a very medically accurate device that has little chance for technician error.

### Question: 4

Which of these stretches is not considered an active-isolated stretch?

- A. Figure 4 stretch
- B. 90-90 Hamstring stretch
- C. Kneeling hip flexor stretch
- D. Supine biceps femoris stretch

**Answer: A**

Explanation:

The active-isolated stretching process uses two muscle groups: agonists and synergists. These two work together to dynamically move the joint through a range of motion.

This process creates reciprocal inhibition of the functional antagonists that results in greater ranges of motion.

For example, the supine straight-leg raise stretch uses the quadriceps (agonist) and the hip flexors (synergist) to stretch the hamstrings (antagonist).

Other examples of an active-isolated stretch include the following:

- Standing adductor

- Kneeling hip flexor
- Standing TFL
- 90-90 Hamstring
- Supine biceps femoris

The Figure 4 stretch is an example of static stretching.

### Question: 5

During an endurance training session, an athlete's heart rate increases from 60 beats per minute to 160 beats per minute and from 100 milliliters to 170 milliliters. What is their difference in cardiac output from rest to during the exercise?

- A. 15 liters per minute
- B. 6 liters per minute
- C. 21.2 liters per minute
- D. 27.2 liters per minute

**Answer: C**

Explanation:

Correct answer: 21.2 liters per minute

21.2 liters per minute is correct because this is the resting cardiac output subtracted from the exercise cardiac output.

Cardiac output at rest is equal to:

Heart Rate  $\times$  Stroke Volume = 60 bpm  $\times$  100 mL/beat = 6 L/min; cardiac output during exercise = 160 bpm  $\times$  170 mL/beat = 27.2 L/min. The difference = 27.2 L/min - 6 L/min = 21.2 L/min.

6 liters per minute is incorrect because this is the cardiac output at rest. 27.2 liters per minute is incorrect because this is the cardiac output during exercise. 15 liters per minute is incorrect because this is the difference of the product of the heart rate during exercise and the stroke volume at rest and the product of the heart rate at rest and the stroke volume during exercise.

### Question: 6

A hockey coach is concerned about the ability of his players to perform at their maximum ability throughout an entire shift, which typically lasts about forty to sixty seconds. Which test will best assess this athletic ability?

- A. 1-mile run
- B. 300-yard shuttle
- C. 5-10-5 test
- D. Harvard step test

**Answer: B**

Explanation:

300-yard shuttle is correct because this is a measure of total anaerobic endurance. This test is performed by running a distance of 25 yards and back six times as quickly as possible, which will take approximately 50 to 70 seconds. A rest of five minutes is taken before repeating the test.

5-10-5 test is incorrect because this is a measurement of agility.

Harvard step test is incorrect because this is a submaximal test that is not near the intensity of a hockey shift.

1-mile run is incorrect because the intensity and duration of this test are not relevant to the sport of hockey.

### Question: 7

Which of the following effects of aging can lead to a decrease in flexibility?

- A. Altered length tension relationships
- B. Increased risk of falls
- C. Connective tissue hypertrophy
- D. Loss of ground substance

**Answer: C**

Explanation:

Connective tissue hypertrophy is correct because this occurs with the aging process and leads to less elasticity in the myofascial system. Other factors associated with aging which decrease flexibility include muscular and neural atrophy, increased stiffness in tissues, and dehydration of tissues. Loss of flexibility due to aging can be slowed, halted, or even reversed with consistent flexibility training.

Loss of ground substance is incorrect because, although this leads to decreased flexibility, it is not a natural result of aging.

Increased risk of falls is incorrect because, although a common consequence of aging, this has no direct effect on flexibility.

Altered length-tension relationships is incorrect because this is a result of immobilization, not the aging process.

### Question: 8

The tensor fasciae latae accelerates movement in which of the following planes of motion?

- A. Sagittal
- B. Frontal
- C. Transverse
- A. I and III only
- B. I only
- C. I, II and III
- D. I and II only

**Answer: C**

Explanation:

I, II and III is correct because the tensor fasciae latae muscle accelerates hip flexion (sagittal plane movement), hip adduction ( frontal plane movement), and hip internal rotation ( transverse plane movement). This muscle also decelerates hip extension, adduction and external rotation and serves to stabilize the lumbo-pelvic-hip complex. It is innervated by the superior gluteal nerve.

### Question: 9

If you wanted to help your athlete develop multidirectional speed, which of the following drills would you have them perform in their program?

- A. Tube walking
- B. Line-stop deceleration drill
- C. Supine heel pushes
- D. Resisted knee drives

**Answer: B**

Explanation:

The line-stop deceleration drill is an excellent choice for developing multidirectional speed in athletes. This drill focuses on improving agility, acceleration, deceleration, and directional change, making it an effective exercise for enhancing an athlete's ability to move quickly and efficiently in various directions.

In the line-stop deceleration drill, athletes perform a series of sprints in multiple directions, quickly decelerating and changing direction at designated points or lines. This helps train their ability to rapidly shift their body weight, maintain balance, and transition between different movement patterns.

Resisted knee drives are a type of strength and power exercise where an individual drives their knee upwards against resistance, often provided by a resistance band or similar equipment, to improve lower body strength and power, and promote hip flexion and core stability.

Supine heel pushes are a lower body exercise performed while lying on your back (in a supine position), where you press your heels into the floor to activate and strengthen your glutes and hamstrings.

Tube walking is a lower body exercise typically performed with a resistance band (or "tube") around the legs, where an individual takes lateral or forward/backward steps to strengthen their hip abductors and improve stability.

### Question: 10

Athletes do not require sufficient levels of which physical attribute before progressing into a plyometric training program?

- A. Core strength
- B. Flexibility
- C. Cardiovascular fitness
- D. Balance

**Answer: C**

Explanation:

Cardiovascular fitness is correct because plyometric training is not continuous and involves time for recovery (which can be increased based on fitness). To begin plyometric training, an athlete requires a sufficient level of flexibility as the elasticity of the musculature will be stressed, core strength due to the stress on the neuromuscular system, and balance to prevent injuries from falls. Though not an essential component, cardiovascular fitness would allow athletes to recover between sets and between training sessions.

Flexibility, core strength, and balance are incorrect because these are all essential requirements of beginning a plyometric training program.

### Question: 11

What is the grip technique called when the index and middle fingers squeeze down on the thumb?

- A. Mixed grip
- B. Pistol grip
- C. Hook grip
- D. Over-under grip

**Answer: C**

Explanation:

The grip technique called when the index and middle fingers squeeze down on the thumb is called the "hook grip" or simply "hooking." This grip is commonly used in Olympic weightlifting exercises, such as the snatch and the clean and jerk, to provide a secure and stable grip on the barbell during heavy lifts. The hook grip works by effectively locking the thumb between the fingers and the bar, creating a stronger grip that helps to prevent the bar from slipping out of the lifter's hands. It allows the lifter to maintain a solid hold on the bar throughout the entire movement, which is especially important during the explosive phases of the lift.

The pistol grip is similar to a hammer grip where the palms face one another.

A mixed grip involves one hand that is in an overhand grip and one hand that is in an underhand grip.

An over-under grip isn't an actual type of grip.

### Question: 12

Which of the following best describes the sequential firing pattern that reflects most athletic activity, including Olympic lifts?

- A. Anterior to posterior
- B. Proximal to distal
- C. Distal to proximal
- D. Inferior to superior

**Answer: B**

Explanation:

Proximal to distal is correct because the firing of the core muscles is followed by the hip extensors, knee extensors and plantar flexors during Olympic lifts and many other athletic activities. This sequential firing pattern must include both the proper timing and the intensity of muscular contractions. The highest intensity of muscle activation occurs in the hip extensors and decreases as it moves down the kinetic chain.

Distal to proximal is incorrect because activation from the limbs to the core would represent a faulty movement pattern.

Inferior to superior is incorrect because plantar flexion does not occur before knee or hip extension.

Anterior to posterior is incorrect because the firing pattern alternates between muscles found in the anterior and those found in the posterior.

### Question: 13

All of the following nutrients are examples of antioxidants except:

- A. Selenium
- B. Vitamin C
- C. Vitamin D
- D. Vitamin E

**Answer:**

Explanation:

Vitamin D is not an antioxidant. It is a fat-soluble vitamin that helps the body absorb calcium and maintain bone health.

Antioxidants are substances that help protect the body from free radicals, which are unstable molecules that can damage cells and contribute to the development of chronic diseases. Examples of antioxidants include vitamins C and E, beta-carotene, selenium, and flavonoids.

### Question: 14

Supersetting a barbell bench press with a medicine ball chest pass is an example of which type of training?

- A. Hypertrophy training
- B. Endurance training
- C. Power training
- D. Sports training

**Answer: C**

Explanation:

Supersetting a barbell bench press with a medicine ball chest pass is an example of power training.

Power training is a type of training that involves the development of explosive strength and the ability to generate force quickly.



The barbell bench press is a classic strength exercise that targets the chest, shoulders, and triceps. Supersetting it with the medicine ball chest pass, which is an explosive movement that targets the same muscle groups, creates a powerful combination that can help to develop power and explosiveness. Power training typically involves exercises that are explosive in nature, such as plyometrics, Olympic lifts, and medicine ball exercises. These exercises are performed at a high intensity and with maximum effort to develop power and explosiveness.

Supersetting is a training technique that involves performing two exercises back-to-back with little or no rest in between. This can help to increase the metabolic demand of the workout and improve overall conditioning.

Endurance training is a type of physical exercise that focuses on improving cardiovascular fitness and the body's ability to sustain prolonged activity by engaging in moderate-to-high intensity aerobic workouts, such as running, swimming, or cycling.

Hypertrophy training is a type of resistance exercise that focuses on stimulating muscle growth and increasing muscle size by performing high-volume, moderate-to-high intensity workouts, typically involving multiple sets and a moderate number of repetitions.

Sports training is the systematic and purposeful development of an individual's physical, technical, tactical, and mental skills specific to a particular sport, aimed at improving performance and achieving success in competition.

## Question: 15

What is the biggest difference between muscle spindles and Golgi tendon organs (GTO)?

- A. Muscle spindles monitor muscle tension, while GTOs detect muscle length changes
- B. Muscle spindles detect muscle length changes, while GTOs monitor muscle tension
- C. Muscle spindles are found in tendons, while GTOs are found within muscle fibers
- D. Muscle spindles initiate muscle contraction, while GTOs prevent muscle contraction

**Answer: B**

Explanation:

The biggest difference between muscle spindles and Golgi tendon organs (GTO) lies in their primary functions within the muscular system.

Muscle spindles are specialized sensory receptors located within muscle fibers that are sensitive to changes in muscle length and the rate of length change. They play a crucial role in maintaining muscle tone, balance, and coordination by providing continuous feedback to the central nervous system about the state of muscle length and tension.

In contrast, Golgi tendon organs are located at the junction between muscles and tendons and are primarily sensitive to muscle tension. GTOs provide feedback to the central nervous system about the level of force being generated by the muscle, functioning as a protective mechanism to prevent excessive muscle tension and potential injury. When the tension in the muscle becomes too high, GTOs stimulate a reflexive relaxation of the muscle, reducing the force being applied and helping to maintain proper muscle function and joint stability.



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