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ACSM 030-444

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Topic Break Down

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QUESTION NO: 1

Which of the following situations indicates progression to independent and unsupervised exercise for a client after CABG surgery in an outpatient program?

A. The client exhibits mild cardiac symptoms of angina, occurring intermittently during exercise and sometimes at home while reading.

B. The client has a functional capacity of greater than 8 MET with hemodynamic responses appropriate to this level of exercise.

C. The client is noncompliant with smoking cessation and weight loss intervention programs.

D. The client is unable to palpate HR, deliver RPEs, or maintain steady workload intensity during activity.

ANSWER: B

Explanation:

The client has a functional capacity of greater than 8 MET with hemodynamic responses appropriate to this level of exercise. A functional capacity above 8 METs indicates that the individual can sustain relatively vigorous physical demands, provided the exercise test and training sessions show an appropriate physiologic response. Appropriate hemodynamic responses include an expected rise in heart rate and systolic blood pressure with increasing workload, without clinically significant arrhythmias, abnormal blood-pressure responses, or ischemic symptoms/signs. This level of capacity, together with clinical stability, supports transition from closely monitored outpatient cardiac rehabilitation to a more independent exercise setting after coronary artery bypass graft surgery.

Progression is not based on MET level alone. The client should also have demonstrated the ability to exercise safely and consistently, use prescribed self-monitoring methods such as perceived exertion and heart-rate monitoring when appropriate, recognize warning symptoms, and follow an individualized exercise prescription. Cardiac rehabilitation is designed to build these skills while improving functional capacity and reducing cardiovascular risk. The American Heart Association describes cardiac rehabilitation as medically supervised programming that prepares patients to continue a heart-healthy lifestyle and physical activity after completion; see American Heart Association: What Is Cardiac Rehabilitation?. Exercise capacity expressed in METs is also a standard component of exercise testing and prescription described by the American College of Sports Medicine's Guidelines for Exercise Testing and Prescription.

QUESTION NO: 2

All of the following factors are important to consider when determining exercise intensity

EXCEPT

A. An individual's level of fitness.

B. The risk of cardiovascular or orthopedic injury.

C. Any previous history participating in organized sports.

D. Individual preference and exercise objectives.

ANSWER: C

Explanation:

Any previous history participating in organized sports is the best exception because participation in organized sport, by itself, is not a primary variable used to establish a safe, effective exercise-intensity prescription. Intensity should be individualized using current, clinically relevant information: present cardiorespiratory and muscular fitness, health conditions and symptoms, medications, risk of cardiovascular or musculoskeletal events, functional capacity, and the person's goals and preferences. These factors help the clinical exercise physiologist select an appropriate initial intensity and determine how to monitor and progress it using measures such as heart rate, rating of perceived exertion, workload, and symptoms. A person may have participated in sports previously while currently being sedentary, deconditioned, injured, or managing a new chronic condition; consequently, that history does not reliably establish current exercise tolerance or an appropriate training intensity. It can be useful background information during an interview, particularly for identifying activities the individual may enjoy, but current evaluation findings and individualized exercise objectives should drive the intensity decision. ACSM's exercise-preparticipation and prescription guidance emphasizes assessment of current health status, activity level, and desired intensity, along with individualized clinical judgment. See ACSM's Guidelines for Exercise Testing and Prescription and ACSM's preparticipation screening recommendations.

QUESTION NO: 3

What do effective program administration and management create and/or reduce?

A. They create problems with staff egos.

B. They reduce memberships.

C. They create successful programs and reduce problems.

D. They create more work for the staff and reduce feedback.

ANSWER: C

Explanation:

Effective program administration and management create successful programs and reduce problems. In clinical exercise physiology settings, administration translates organizational goals into consistently delivered, safe, participant-centered services. This includes defining program policies and workflows, appropriately allocating personnel and resources, maintaining clear communication, managing risk, monitoring quality, and using evaluation data to improve operations. When these functions are performed well, staff understand their roles, services are delivered reliably, participant needs are addressed efficiently, and the program is better positioned to meet its clinical, operational, and financial objectives. Proactive management also identifies potential issues before they affect participant safety, service quality, compliance, or continuity of care. Thus, administration is not simply an added layer of paperwork; it is a core process that supports effective program implementation and minimizes avoidable operational difficulties. ACSM's professional resources emphasize the importance of competent program planning, supervision, safety practices, and quality service delivery within exercise and clinical settings. Additional guidance on the role and scope of clinical exercise professionals is available from the American College of Sports Medicine Clinical Exercise Physiologist certification page and the ACSM physical activity and health resources.

QUESTION NO: 4

Which of the following is a method of strength and power training that involves an eccentric loading of muscles and tendons followed immediately by an explosive concentric contraction?

A. Super sets.

B. Split routines.

C. Plyometrics.

D. Periodization.

ANSWER: C

Explanation:

Plyometrics. is correct because plyometric exercise uses the stretch-shortening cycle: a rapid eccentric action preloads the muscle-tendon unit, followed with minimal delay by an explosive concentric action. For example, during a countermovement jump, the downward phase eccentrically loads the lower-extremity musculature and tendons; the immediate upward jump then uses a powerful concentric contraction. This sequence can enhance the rate of force development, muscular power, and performance in activities involving jumping, sprinting, and rapid changes of direction. Effective plyometric programming emphasizes appropriate participant screening, sound landing mechanics, gradual progression of volume and intensity, and adequate recovery, particularly in clinical or deconditioned populations. ACSM describes plyometric training as rapid eccentric loading followed by an immediate concentric contraction, with the short transition period being central to the intended training effect. Further guidance on resistance-training principles and exercise prescription is available in the ACSM physical activity guidance and the ACSM Position Stand on progression models in resistance training.

QUESTION NO: 5

Slow conduction in the A V node is associated with

A. Prolonged PR interval.

B. Prolonged QRS interval.

C. Shortened QT interval.

D. Elevated ST segment.

ANSWER: A

Explanation:

Prolonged PR interval. is correct because the PR interval measures the time from the onset of atrial depolarization to the onset of ventricular depolarization. It includes conduction through the atria, the atrioventricular (AV) node, the His bundle, bundle branches, and the Purkinje system. The AV node normally provides a brief physiologic delay that permits atrial contraction and ventricular filling before ventricular activation. When conduction through this node is slowed, more time elapses between the beginning of the P wave and the beginning of the QRS complex, producing a prolonged PR interval. Clinically, a PR interval greater than 0.20 seconds is consistent with first-degree AV block when each P wave is still followed by a QRS complex. Recognizing this relationship is important during exercise testing and clinical monitoring because AV nodal conduction is influenced by autonomic tone, medications, and cardiac disease. The American Heart Association's ECG standardization guidance describes the PR interval as reflecting atrial-to-ventricular conduction time, while the Merck Manual describes first-degree AV block as PR-interval prolongation due to delayed AV conduction. See American Heart Association ECG recommendations and Merck Manual: Atrioventricular Block.

QUESTION NO: 6

A 55-kilogram woman trains on a cycle ergometer by pedaling at 60 rpm against a resistance of 1.5 kiloponds. What is her absolute Yo2?

A. 1.36 L . min-1

B. 2.47 L . min-1

C. 3.62 L . min-1

D. 3600 mL . min-1

ANSWER: A

Explanation:

1.36 L . min-1 is correct. The ACSM leg-cycle ergometry metabolic equation first requires calculation of the external work rate in kilogram-meters per minute. A standard mechanically braked cycle ergometer travels 6 meters per pedal revolution, so the work rate is 1.5 kiloponds × 6 $m \cdot rev^{-1}$ × 60 $rev \cdot min^{-1}$, or 540 $kg \cdot m \cdot min^{-1}$. The cycling equation is VO_2 = (1.8 × work rate/body mass) + 7, expressed in $mL \cdot kg^{-1} \cdot min^{-1}$. Substitution gives (1.8 × 540/55) + 7 = 24.67 $mL \cdot kg^{-1} \cdot min^{-1}$. To convert this mass-specific value to absolute oxygen uptake, multiply by body mass: 24.67 × 55 = 1,356.7 $mL \cdot min^{-1}$. Dividing by 1,000 yields approximately 1.36 $L \cdot min^{-1}$. This procedure applies the steady-state ACSM prediction equation for leg cycling and correctly distinguishes relative oxygen uptake from the requested absolute value. The equation and cycle-ergometer work-rate convention are presented in ACSM's Guidelines for Exercise Testing and Prescription and summarized by ExRx's cycle ergometer calculator.

QUESTION NO: 7

An appropriate exercise for improving the strength of the low back muscles are

A. Straight leg lifts.

B. Parallel squats.

C. Spinal extension exercises.

D. Sit-ups with feet anchored.

ANSWER: C

Explanation:

Spinal extension exercises are appropriate for improving low-back muscle strength because they directly train the trunk extensor musculature, particularly the erector spinae and multifidus. These muscles produce and control spinal extension and contribute to maintaining spinal stability during upright posture, lifting, and other daily activities. Exercise selection should match the desired muscular action; therefore, controlled spinal-extension movements provide specific overload to the low-back extensors. Depending on the person's health status, symptoms, training experience, and movement tolerance, these exercises may be performed as prone trunk extensions, Roman-chair/back-extension variations, or other carefully progressed extension-based exercises. Proper technique is essential: use a neutral, controlled range of motion, avoid ballistic hyperextension, and progress resistance or volume gradually. For individuals with low-back pain or known spinal pathology, exercise should be individualized after appropriate clinical assessment, with modifications based on symptom response and functional goals. ACSM's evidence-based exercise resources emphasize resistance training that targets the involved muscle groups and is adapted to individual needs. The American College of Sports Medicine provides professional exercise guidance at ACSM Physical Activity Guidelines. Additional evidence-based guidance on exercise and low-back conditions is available from the Journal of Orthopaedic & Sports Physical Therapy clinical practice guideline.

QUESTION NO: 8

A comprehensive patient care plan is necessary for effective program management, because it

A. Is required by federal law.

B. Provides a " road map " for interventions.

C. Is a requirement for insurance reimbursement.

D. Provides raw data for analysis in CQI or outcomes assessment.

ANSWER: B

Explanation:

Provides a " road map " for interventions. is correct because a comprehensive patient care plan organizes individualized clinical information into an actionable course of care. It establishes the patient's assessed needs, measurable goals, planned exercise and behavioral interventions, responsibilities of the interdisciplinary team, monitoring parameters, and criteria for revising the plan. This structure enables exercise professionals to deliver care consistently across visits, coordinate with referring providers and other team members, and adapt programming as the patient's health status, functional capacity, symptoms, or goals change. In program management, the plan therefore serves as the operational guide that links assessment findings to specific services and follow-up decisions rather than simply functioning as a recordkeeping document. CMS similarly describes a comprehensive care plan as being based on assessment and including measurable objectives and timetables to meet a patient's needs, illustrating the central role of care planning in directing ongoing services. The ACSM certification framework also emphasizes individualized assessment, exercise prescription, implementation, and evaluation, all of which are practically coordinated through a patient-centered plan of care. See the CMS State Operations Manual and ACSM Certified Clinical Exercise Physiologist.

QUESTION NO: 9

The rules and regulations of a facility are commonly referred to as

A. The law.

B. The client rights statement.

C. Policies and procedures.

D. A check and balance for management and clients.

ANSWER: C

Explanation:

Policies and procedures. is correct because these documents establish the operational rules, standards, and step-by-step processes that govern how a facility functions. Policies state the organization's guiding expectations and boundaries, such as requirements for staff conduct, emergency preparedness, documentation, confidentiality, participant safety, and equipment maintenance. Procedures translate those policies into consistent actions by specifying who performs a task, when it is performed, and how it must be carried out. In a clinical exercise setting, clearly defined policies and procedures support safe, reliable service delivery, help personnel fulfill their professional responsibilities, promote compliance with applicable legal and regulatory requirements, and provide an organized framework for responding to routine and emergency situations. ACSM's professional guidance emphasizes the importance of established facility policies, emergency plans, qualified personnel, and documented operational practices for safe exercise programming and testing. The distinction is important: laws are externally imposed legal requirements, whereas policies and procedures are the facility's formal internal rules and methods for meeting its mission and obligations. Additional professional standards relevant to health and fitness facilities are available from the ACSM's Guidelines for Exercise Testing and Prescription and the ACSM Standards and Guidelines.

QUESTION NO: 10

According to the most recent National Institutes of Health's Clinical Guidelines for the

Identification, Evaluation, and Treatment of Overweight and Obesity in Adults, recommendations for practical clinical assessment include

A. Determining total body fat through the BMI to assess obesity.

B. Determining the degree of abdominal fat and health risk through waist circumference.

C. Using the waist-to-hip ratio as the only definition of obesity and lean muscle mass.

D. Both A and B.

ANSWER: B

Explanation:

Determining the degree of abdominal fat and health risk through waist circumference is correct. The NIH clinical guidelines recommend waist circumference as a practical component of risk assessment because central, or abdominal, adiposity is independently associated with cardiometabolic risk. In adults with a body mass index in the overweight or obesity range, an elevated waist circumference helps identify individuals who may have greater risk for conditions such as hypertension, dyslipidemia, type 2 diabetes, and cardiovascular disease. The guideline specifies increased-risk thresholds of more than 102 cm (40 in) for men and more than 88 cm (35 in) for women, with the important clinical caveat that risk assessment should consider the whole patient and relevant population-specific considerations. Waist circumference is particularly useful because it captures abdominal fat distribution, which BMI alone cannot directly characterize. In clinical exercise physiology, this measurement should be obtained using a standardized technique and integrated with BMI, medical history, blood pressure, lipid and glucose findings, and other cardiovascular risk factors to inform appropriate counseling, referral, and intervention planning. The original NIH guideline is available through the National Heart, Lung, and Blood Institute; related risk-assessment guidance is also summarized by the Centers for Disease Control and Prevention.

QUESTION NO: 11

Which one of the following statements concerning a needs assessment is NOT true?

A. The needs and/or program assessment is a useful tool for gathering data andsupport for program implementation.

B. The needs and/or program assessment often must be a creative tool developed inhouseto meet the program ' s specific needs.

C. Given that the needs assessment may be developed in-house without the benefitof external validity, generalizing the results may be difficult.

D. Program planning is an essential step before needs assessment can be performed.

ANSWER: D

Explanation:

“Program planning is an essential step before needs assessment can be performed.” is the statement that is not true because a needs assessment is ordinarily an early, foundational component of the planning process. Before an exercise, health-promotion, or clinical service is designed, the exercise professional must identify the priority health concerns, characteristics of the intended population, existing resources, barriers to participation, stakeholder perspectives, and gaps between current and desired services. Those findings establish whether a program is warranted and guide its goals, target population, delivery format, staffing, budget, and evaluation measures. Thus, planning is informed by the needs assessment rather than being a prerequisite for it. A needs assessment can be formal or locally developed to fit a specific setting, but its core function remains systematic data collection to support sound program decisions. The CDC’s program-evaluation framework places assessment of the program context and stakeholder needs at the outset of developing and evaluating public-health programs. Similarly, the World Health Organization describes needs assessment as a process used to identify and prioritize health needs for action. Conducting this work first helps ensure that a proposed program is relevant, feasible, and responsive to the population it is intended to serve. See the CDC Program Evaluation Framework and the WHO needs-assessment guidance.

QUESTION NO: 12

The MINIMAL duration of exercise necessary to achieve improvements in health for deconditioned individuals is

A. 20 minutes continuously.

B. 30 minutes continuously.

C. Multiple sessions of more than 10 minutes in duration throughout the day.

D. Two sessions of 20 minutes throughout the day.

ANSWER: C

Explanation:

Multiple sessions of more than 10 minutes in duration throughout the day is correct because accumulated physical activity provides a practical, progressive way for deconditioned individuals to begin obtaining health benefits. In the ACSM guideline framework reflected by this question, exercise did not need to be completed in one prolonged, continuous session. Instead, purposeful activity could be divided into short bouts—traditionally at least 10 minutes each—and accumulated over the day. This approach can improve adherence by making exercise more manageable for a person with low fitness, limited exercise tolerance, or substantial perceived barriers to continuous activity. As fitness and confidence improve, the individual can progressively increase the accumulated duration, frequency, and intensity toward recommended weekly physical-activity targets. ACSM’s position stand on exercise quantity and quality describes the role of accumulated bouts of aerobic activity in meeting health-related exercise recommendations: ACSM Position Stand: Quantity and Quality of Exercise. The U.S. physical activity guidelines also support accumulating activity across the week and emphasize that activity confers health value, particularly when it helps previously inactive adults become more consistently active: Physical Activity Guidelines for Americans, 2nd edition.

QUESTION NO: 13

A 150-pound male sets the treadmill speed at 5.0 mph and a 5.2% grade. Calculate his MET value.

A. 36.57 METs.

B. 10.45 METs.

C. 12.25 METs.

D. Not enough information to answer the question.

ANSWER: B

Explanation:

10.45 METs. is correct using the ACSM metabolic equation for running, which is appropriate at 5.0 mph. First, convert treadmill speed to meters per minute: 5.0 mph × 26.8 = 134.0 m/min. Convert the grade to a decimal: 5.2% = 0.052. The running equation is estimated oxygen uptake ($mL·kg^{-1}·min^{-1}$) = (0.2 × speed) + (0.9 × speed × grade) + 3.5. Substitution gives (0.2 × 134.0) + (0.9 × 134.0 × 0.052) + 3.5 = 36.58 $mL·kg^{-1}·min^{-1}$. Because 1 MET equals 3.5 $mL·kg^{-1}·min^{-1}$, dividing 36.58 by 3.5 yields 10.45 METs after rounding. Body mass is not needed because the equation expresses oxygen cost relative to body weight; it would be needed only to estimate an absolute oxygen uptake value such as L/min. The ACSM metabolic equations and their appropriate application are core content in the ACSM's Guidelines for Exercise Testing and Prescription and ACSM's Certified Clinical Exercise Physiologist resources.

QUESTION NO: 14

Digitalis effect refers to

A. Scooped-out depression of the ST segment produced by digitalis.

B. Elevation of the PR interval produced by digitalis.

C. Shortening of the QT interval produced by digitalis.

D. Prolongation of the QRS complex produced by digitalis.

ANSWER: A

Explanation:

"Scooped-out depression of the ST segment produced by digitalis." is the classic description of the *digitalis effect* on a resting electrocardiogram. In patients taking therapeutic doses of digoxin or related cardiac glycosides, the ST segment may show a characteristic sagging, downsloping, concave-upward appearance, often called "scooped," "reverse tick," or "Salvador Dalí moustache" ST depression. This is a medication-related repolarization pattern and, by itself, does not establish digitalis toxicity, myocardial ischemia, or an acute coronary syndrome. Correct interpretation requires clinical context, including the medication history, symptoms, rhythm, electrolyte status, and comparison with prior tracings when available. Exercise professionals working with clinical populations should recognize this expected drug-associated ECG appearance so it is not automatically interpreted as ischemic ST-segment depression during baseline ECG review or exercise testing. Findings suggestive of toxicity or a new ischemic process require appropriate clinical evaluation. See the ECG description of therapeutic digoxin effect from LITFL's ECG Library and the clinical review in StatPearls: Cardiac Glycoside and Digoxin Toxicity.

QUESTION NO: 15

Which energy source represents the largest potential energy store in the body?

A. Fat.

B. Blood glucose.

C. Muscle glycogen.

D. Protein.

ANSWER: A

Explanation:

Fat. represents the body’s largest potential energy reserve because it is stored predominantly as triglyceride in adipose tissue, with smaller intramuscular stores also available. Triglyceride is highly energy dense, supplying approximately 9 kcal per gram, and adipose tissue can be stored in substantial quantities even in lean individuals. Consequently, total body fat stores generally provide tens of thousands of kilocalories and can support prolonged, lower-to-moderate intensity activity when oxygen availability permits sustained fat oxidation. During exercise, fatty acids released from triglycerides are transported to working muscle, where they undergo beta-oxidation and contribute to ATP production through aerobic metabolism. This large reserve has important clinical exercise implications: fat metabolism makes a major contribution during longer-duration exercise and at relatively lower exercise intensities, although the proportion of energy derived from fat varies with exercise intensity, duration, training status, diet, and individual physiology. ACSM’s exercise physiology resources describe fat as a major fuel source for prolonged aerobic exercise and recognize the substantial energy availability of triglyceride stores. See the ACSM physical activity resources and the NCBI overview of exercise physiology and energy metabolism.

QUESTION NO: 16

What is the relative Y02 of running on a treadmill at 6.5 mph and a 0% grade?

A. 34.84 mL . kg-1. min-1

B. 34.48 mL . kg-1. min-1

C. 38.34 mL . kg-1. min-1

D. 43.83 mL . kg-1. min-1

ANSWER: C

Explanation:

38.34 mL . kg-1. min-1 is correct using the ACSM metabolic equation for level treadmill running: relative $\dot{V}O_2$ = (0.2 × speed in m/min) + (0.9 × speed in m/min × fractional grade) + 3.5. First, convert 6.5 mph to meters per minute: 6.5 × 26.8 = 174.2 m/min. Because the treadmill grade is 0%, the fractional grade is 0 and the vertical component of the equation is zero. The horizontal component is 0.2 × 174.2 = 34.84 $mL \cdot kg^{-1} \cdot min^{-1}$. Adding the resting component of 3.5 $mL \cdot kg^{-1} \cdot min^{-1}$ produces 38.34 $mL \cdot kg^{-1} \cdot min^{-1}$. This value is an estimate of the oxygen cost relative to body mass for steady-state running at the specified speed and level grade. The ACSM metabolic equations are standard tools for estimating exercise oxygen consumption and prescribing aerobic exercise intensity when direct gas analysis is not being used. The equation and its intended application are presented in ACSM exercise testing and prescription guidance; see ACSM's Guidelines for Exercise Testing and Prescription and the treadmill walking and running metabolic-equation calculator.

QUESTION NO: 17

If a healthy young man exercises at an intensity of 45 mL. kg-1.min -1 three times per week for 45 minutes each session, how long would it take him to lose 10 pounds of fat?

A. 4 weeks.

B. 7.14 weeks.

C. 16.5 weeks.

D. 19 weeks.

ANSWER: C

Explanation:

16.5 weeks. is correct when applying the conventional assumptions used for this type of ACSM exercise-energy-expenditure calculation: a 70-kg healthy young man, approximately 5 kcal expended per liter of oxygen consumed, and 3,500 kcal per pound of fat. First, convert the relative oxygen uptake to absolute oxygen uptake: $45\ mL \cdot kg^{-1} \cdot min^{-1} \times 70\ kg = 3{,}150\ mL/min$, or 3.15 L/min. At roughly 5 kcal per liter of oxygen, this equals 15.75 kcal/min. Each 45-minute session therefore expends about 709 kcal, and three sessions per week expend about 2,126 kcal/week. A loss of 10 lb of fat corresponds to approximately 35,000 kcal. Dividing 35,000 kcal by 2,126 kcal/week yields about 16.46 weeks, which rounds to 16.5 weeks. This is an estimated exercise-only energy deficit; actual body-mass change can vary with dietary intake, compensation, and individual metabolic responses. ACSM guidance recognizes indirect calorimetry and oxygen consumption as foundational methods for estimating energy expenditure during exercise. See ACSM's Guidelines for Exercise Testing and Prescription and the ACSM position stand on physical activity and weight loss.

QUESTION NO: 18

A common measure to assist in the evaluation of body fat distribution is

A. Height/weight charts.

B. Total body weight.

C. WHR.

D. Total body water.

ANSWER: C

Explanation:

WHR is correct because the waist-to-hip ratio is a simple anthropometric index of central, or abdominal, fat distribution. It is calculated by dividing waist circumference by hip circumference, using standardized measurement sites and technique. This ratio helps distinguish a more central pattern of adiposity from a more peripheral pattern, which is clinically meaningful because abdominal adiposity is associated with elevated cardiometabolic risk. In clinical exercise physiology, WHR can supplement other body-composition and risk-assessment measures by providing information about where adipose tissue is distributed rather than merely estimating total body mass. Standardized waist and hip measurements are therefore important for obtaining a valid, reproducible ratio and for interpreting changes over time. The American College of Sports Medicine includes waist-to-hip ratio among common field methods for evaluating body-fat distribution, and the World Health Organization recognizes waist-to-hip ratio as an indicator used in assessment of abdominal obesity and related health risk. See the American College of Sports Medicine body-composition resource and the World Health Organization guidance on waist circumference and waist-to-hip ratio.