1. Which of the following is true regarding lactate's role in exercise physiology?
   a. functions in energy metabolism
   b. confined to anaerobic conditions
   c. upregulates glucose use
   d. leads to muscular fatigue

2. Metabolic acidosis has a limited effect on which of the following processes?
   a. muscle contraction
   b. hemoglobin oxygen release
   c. ventilatory stimulation
   d. cardiovascular drive

3. Which of following is TRUE regarding maximal lactate steady state (MLSS) measurement for predicting performance?
   a. sports specific
   b. good test-retest reliability
   c. physiological system failure
   d. individual specific

4. Which of the following measures is MOST reliable for normalizing exercise intensity into training zones?
   a. V02max
   b. heart rate
   c. absolute blood lactate level
   d. maximal lactate steady state

5. According to the American College of Cardiologist/American Heart Association’s (ACC/AHA) Update of Practice Guidelines for Exercise Testing, the indication for Cardiopulmonary Exercising Testing is
   a. pulmonary disease.
   b. cardiac disease.
   c. deconditioning.
   d. muscular disease.
6. Protocols for cardiopulmonary exercise testing aim to avoid fatigue before 8 minutes because
   a. orthopedic factors limit the ability to exercise.
   b. pain factors limit the ability to exercise.
   c. a linear relationship between VO2 and exercise exists at this point.
   d. a non-linear relationship between VO2 and exercise exists at this point.

7. Cardiopulmonary exercise testing in the United States often uses a treadmill while in Europe, they
   utilize an ergometer. Compared to when using a treadmill, which of the following differences in results
   may occur when using an ergometer to perform cardiopulmonary exercise testing?
   a. lower peak VO2
   b. higher peak VO2
   c. increase in “warm-up” period
   d. decrease in “warm-up” period

8. Which test is meant for anaerobic testing?
   a. Bruce
   b. Balke
   c. Wingate
   d. Borg

9. Which of the following is an absolute contraindication to Cardiopulmonary Exercise Testing?
   a. moderate aortic stenosis
   b. stable angina
   c. hypertrophic cardiomyopathy
   d. uncontrolled Arrhythmia

10. Which of the following is the best definition of exercise associated hyponatremia (EAH)?
    a. serum sodium drop of 12-15%
    b. serum sodium drop of 2-4%
    c. serum blood sodium concentration < 140mmol/L
    d. serum blood sodium concentration <135mmol/L

11. Though not completely understood and likely multifactorial, which of the following best explains the
    pathophysiology EAH during endurance events?
    a. decreased sodium intake
    b. poor conditioning
    c. excessive fluid intake
    d. dehydration
12. Dilutional hyponatremia occurs secondary to which of the following?
   a. excessive fluid excretion
   b. restricted fluid intake
   c. inappropriate arginine vasopressin secretion
   d. increased sweating

13. Studies have shown that sodium supplementation during endurance events results in which of the following?
   a. improved performance
   b. no effect on serum sodium levels
   c. dehydration
   d. prevention of EAH

14. Which of the following is an early symptom of EAH in an endurance athlete?
   a. post-race weight loss
   b. decreased skin turgor
   c. constipation
   d. bloating

15. Severe symptomatic EAH is a life threatening condition that is best treated onsite with which of the following?
   a. oral sodium supplementation
   b. diuretic medication
   c. oral hydration with a sports drink
   d. intravenous hypertonic saline solution

16. To maximize shoulder functional stability, which of the following is NOT a requirement?
   a. alignment of the humerus and glenoid within ± 60 degrees angulation
   b. labral integrity
   c. a stable scapular base
   d. coordinated contraction of rotator cuff

17. An example of injury due to the “catch-up” phenomena would be:
   a. elbow pain due to poor hip external rotation in the stride phase.
   b. posterior superior labral tear due to weakness of the stance leg hip abductors.
   c. low back pain due to hyperflexion of the lumbar spine when arm-cocking.
   d. hand injury when abruptly stopping arm motion in follow-through phase.

18. Energy transfer for the efficient use of the kinetic chain in overhead throwing should go in which order?
   a. legs to core to arm to hand
   b. core to legs to arm to hand
   c. core to arm to hand to legs
   d. arm to hand to legs to core
19. An ideal assessment of the scapula would include:
   a. viewing dynamic motion of the scapula to 90 degrees of forward flexion
   b. evaluation for hypermobility of glenohumeral internal rotation
   c. observing scapular resting position alone
   d. measuring the distance from a wall to the anterior acromial tip

20. For a throwing athlete with shoulder injury, the best treatment option would be:
   a. a 3-phase rehabilitation program
   b. rest and immobilization of the joint
   c. passive modalities such as electrical stimulation
   d. referral for surgical repair

21. Which serum value relates to dynamic cerebral blood flow control and could serve as a biomarker for concussion and resolution of this injury?
   a. PaO2
   b. PaCO2
   c. VO2
   d. VCO2

22. Which form of subthreshold exercise has been show to restore brain physiology and in turn a reduction of persistent concussive symptoms?
   a. stretching
   b. balance
   c. aerobic
   d. strengthening

23. A patient 12 weeks out from sustaining a concussion presents to your office reporting vertigo. They undergo the Buffalo Concussion Treadmill Test and reach the point of voluntary exhaustion but report an exacerbation of the vertigo. According to this article, the patient’s symptoms are more likely related to
   a. post-concussive syndrome.
   b. cervical spondylosis.
   c. uncontrolled hypertension.
   d. traumatic stress disorder.

24. The ability to exercise to voluntary exhaustion at 85-90% of age predicted maximum HR for 20 minutes without exacerbation of symptoms for several days in a row denotes
   a. normal response to aerobic exercise.
   b. physiologic resolution of concussion.
   c. ability to return to play/activity.
   d. return of heart rate variability.
25. Stress fractures are most commonly found in the
   a. malleolus
   b. navicular
   c. femur
   d. tibia

26. The imaging modality with the greatest sensitivity and specificity for stress fractures is
   a. ultrasound
   b. x-ray
   c. MRI
   d. CT Scan

27. Surgical intervention is recommended as initial treatment in high risk stress fractures of the
   a. posterior medial tibia
   b. fifth metatarsal
   c. femur, tension side
   d. tarsal navicular

28. Common characteristics of high risk stress fractures include areas of high tension and
   a. cancellous bone
   b. metaphyseal structure
   c. hypovascularity
   d. flexibility

29. Which of the following is NOT a criteria to place a substance on the prohibited list, according to the World Anti-Doping Agency (WADA)?
   a. potential to enhance performance
   b. risk of health to the athlete
   c. psychoactivity of the substance
   d. violates the spirit of the sport

30. Which of the following is a therapeutic use exemption criteria for elite athletes?
   a. there is no medical alternative to the drug
   b. inability to perform the sport without the drug
   c. medical necessity regardless of potential for performance enhancement
   d. allergic reaction to a non-prohibited substance

31. Which of the following programs is used by the World Anti-Doping Agency (WADA) to perform out-of-competition drug testing?
   a. Transparency Program
   b. Athlete Biological Passport Program
   c. Supplement Program
   d. Whereabouts Program
32. In most cases, which of the following defines the in-competition period for elite athletes?
   a. the time from the beginning of the competition until the completion of the event
   b. 12 hours before the start of the event until the completion of the event
   c. the time from the beginning of the competition until 12 hours after the event
   d. 12 hours before the start of the event until 12 hours after the event

33. The highest diagnostic imaging resolution of superficial soft tissue structures is obtained by:
   a. radiographs
   b. computed tomography scan
   c. ultrasound
   d. magnetic resonance imaging

34. Advantages of diagnostic ultrasound compared to MRI include:
   a. decreased pain during the procedure
   b. not operator dependent
   c. deep soft tissue imaging
   d. economical

35. The dynamic use of ultrasound evaluation improves diagnostic capabilities for demonstrating
   a. vascular entrapment syndromes
   b. meniscal injuries
   c. abnormal compartment pressures
   d. bulging discs

36. Ultrasound guided surgeries with standard needles, newer minimally invasive procedures, can be performed in the office setting for:
   a. cubital tunnel release
   b. A1 pulley fenestration
   c. TFCC repair
   d. ganglion excision