1. Which of the following is true about free-weight barbell exercises:

A) They are uniplanar in motion
B) The resistance torque remains the same throughout the movement
C) The resistance torque increases throughout the movement
D) The resistance torque decreases throughout the movement

2. Which of the following is true about an eccentric muscle action?

A) The resistance torque is greater than the muscle torque
B) The resistance torque is less than the muscle torque
C) The resistance torque is thee same as the muscle torque
D) None of the above are correct

3. Which of the following connective tissues is/are contiguous with the tendonous insertion of a muscle?

A) The perimysium
B) The epimysium
C) The endomysium
D) More than one answer is correct

4. A muscle fiber is composed of bundles of:

A) microfibirils
B) myofibrils
C) sarcomeres
D) fasciculi

5. Time under peak tension (TUPT) when resistance training is critical in which of the following adaptations:

A) Muscle endurance
B) Muscle hypertrophy
C) Muscle strength
D) Muscle power

6. The basic contractile unit of the muscle ...

A) Is a myofibril
B) Goes from M-line to Z-line
C) Is MYOSIN
D) Goes from Z-line to Z-line

7. Which of the following will increase net force produced during a concentric muscle action?

a) antagonist prestretching
b) more calcium released in the sarcoplasmic reticulum

c) decreased antagonist activity
d) increased contraction velocity

8. The name of the regulatory protein that interacts with the calcium released from the sarcoplasmic reticulum is ....

A) troponin
B) tropomyosin
C) actin
D) titan

9. The number of myosin proteins that surrounds each actin molecule is ...

A) 2
B) 4
C) twice as many as the number of actin molecules that surround each myosin
D) one-half as many as the number of actin molecules that surround each myosin

10. Type IIa fibres exhibit all of the following characteristics except:

A) Have more muscle fibers innervated by a single motoneuron than a type I fibre
B) use both aerobic & anaerobic pathways to produce ATP
C) larger in X-sectional area than a type I fiber
D) are very fatigue resistant

11. A weight lifter adds 40 minutes of LDS (60% of VO2 max) cardiovascular work to her heavy resistance program. Which of the following best describes the effect this will have on her training overall?

A) strength gains will be enhanced
B) strength gains will be compromised
C) muscle size will increase
D) it will have no effect on muscular adaptation

12. A 22-year old soccer player begins resistance training for the 1st time. After three weeks, he notices that his legs are noticeably stronger. Which of the following best explains this increase in strength?

A) muscle hypertrophy
B) muscle hyperplasia
C) neurogenic improvements in muscle contraction
D) more than one answer is correct

13. Most human limbs operate as which class of lever

A) Class I
B) Class II
C) Class III
D) Class IV

14. Which of the following combination of fiber type and tendon insertion (muscle movement arm) would be optimal for a baseball pitcher's throwing arm?

A) Type IIb fibers and a long Lbow flexor insertion
B) Type IIa fibers and a short Lbow flexor insertion
C) Type IIb fibers and a short Lbow flexor insertion
D) Type IIa fibers and a long Lbow flexor insertion

15. Which of the following combination of fiber type and tendon insertion (muscle movement arm) would be optimal for a power lifter's arms?

A) Type IIb fibers and a long Lbow flexor insertion
B) Type IIa fibers and a short Lbow flexor insertion
C) Type IIb fibers and a short Lbow flexor insertion
D) Type IIa fibers and a long Lbow flexor insertion

16. Which of the following hormones is capable of stimulation neurogenic improvements in muscle contractile force, and increased protein synthesis?

A) growth hormone
B) cortisol
C) IGF-1
D) testosterone

17. Clinical overtraining is a pathological condition that has a clinical symptom of ...

A) Sleeplessness
B) increased free testosterone-cortisol ratio
C) decreased free testosterone-cortisol ratio
D) training apathy

18. All of the following are true of prepubescent athletes when compared to adults, EXCEPT ...?

A) they have fewer sweat glands
B) they have a similar relative VO2 max
C) they have limited phosphofructokinase enzymatic activity
D) they have a lower sweating threshold

19. If one wishes to increase serum testosterone levels from resistance training, than the program must include:

A) heavy resistance using multi-joint exercise
B) moderately heavy exercises with 8-12 reps
C) moderately heavy resistance, single joint exercises, decreased rest interval
D) lighter resistance (<60%), more than 12 reps/set, 3-5 minute rest interval

20. The threshold stimulus to initiate increases in bone mineral density, or the Minimal Essential Strain, is:

A) 1/20 of the stress to failure of the bone
B) 1/10 of the stress to failure of the bone
C) greater in geriatrics than in active adolescent
D) less in an elite athlete than recreational athlete

21. Which of the following is true about the aging athlete:

A) there is a loss of contractile strength of the sarcomere
B) there is a decrease in muscle mass with age
C) there is an increase in muscle mass with age
D) there can be no improvement in maximal O2 consumption

22. It appears that a very strong stimulus for the release of IGF-1 is:

A) oxygen ion concentration
B) the amount of tissue damage from exercise
C) the oxygen tension of the venous blood supply
D) serum levels of growth hormone

23. The maximum rate of carbohydrate replacement can be accomplished by eating:

A) a big pasta meal the night following depletion
B) 10g. glucose w/in 10 minutes + 10g CHO/Kg BW every hour
C) 20g. glucose w/in 20 minutes + 10g CHO/Kg BW every hour
D) 50g. glucose w/in 20 minutes + 3.0g CHO/Kg BW every hour

24. One way that catecholamine production during intense exercising leads to increased performance is by:

A) decreasing the force of contraction through improved neural response
B) decreasing reaction time
C) increasing force production through acute hypertrophy response
D) decreasing the motoneuron firing rate

25. Resistance training using high intensity low volume workouts will result in the following chronic adaptation to resting heart rate:

A) an increase
B) a decrease
C) no change
D) no change or slight decrease

26. High intensity resistance training will result in the following acute adaptation of the lifter's BLOOD PRESSURE:

A) an increase

B) a decrease
C) no change
D) no change or slight decrease

27. Endurance-type resistance training will result in the following chronic adaptation of Vo2 max:

A) an increase
B) a decrease
C) no change or slight increase
D) no change or slight decrease

28. Endurance-type resistance training will result in the following chronic adaptation of Vo2 max:

A) decrease in Vo2 max
B) increase in stroke volume
C) increase in o2 consumption at a given submaximal effort
D) increase in maximum heart rate

29. A valsalva maneuver will cause which of the following acute responses:

A) increased atrial filling
B) increased systolic pressure
C) decreased diastolic pressure
D) decreased left ventricle wall thickness

30. In highly trained endurance athletes, the relationship between haemoglobin levels and plasma volume is:

A) haemoglobin levels decrease while plasma volume increases
B) haemoglobin levels increase while plasma volume increases
C) haemoglobin levels decrease while plasma volume decreases
D) haemoglobin levels increase while plasma volume increases

31. Which of the following best describes a Vo2 max:

A) the highest rate of oxygen consumption allowable under exhaustive exercise
B) the highest rate of oxygen consumption at a given submaximal exercise load
C) is the best predictor of endurance performance
D) more than one answer is correct

32. Overtraining is symptomized by all of the following physical parameters except:

A) clumsiness
B) increase susceptibility to colds and flu
C) increased joint and muscle discomfort
D) increased body weight

33. An athlete suffering from overtraining will exhibit all of the following except:

A) excessive fatigue
B) unusual irritability
C) lack of motivation to start the next training session
D) excessive eating habits

34. The degree to which the various energy systems are recruited during exercise depends primarily on:

A) the duration of the exercise
B) the intensity of the exercise
C) the volume of exercise
D) the type of exercise undertaken

35. At the level of the contractile proteins, the energy required for contraction is supplied by the splitting of:

A) ATP
B) PCr
C) Carbohydrates
D) FFA

36. Which of the following is a true statement?

A) aerobic glycoysis produces energy faster than anaerobic glycolysis
A) aerobic glycoysis produces more ATP than anaerobic beta-oxidation
B) the phosphogen system produces more ATP than anaerobic glycolysis
C) none of the above is true

37. Which of the following reactions predominates the mode of ATP production during bouts of maximal effort lasting 10 seconds in duration

A) CrP ---> Cr + Pi + E + ADP --> ATP
B) glycogen --> pyruvate --> lactate + 3 ATP
C) glycogen --> pyruvate --> Krebs cycle --> Co2 + H2o + 39 ATP
D) FFAs -->Krebs cycle --> Co2 + H2o + 129 ATP

38. What type of fiber type would predominate in the muscles (leg) of an athlete who had a 32 inch vertical jump

A) type I
B) type Ix
C) type IIa
D) type IIb

39. Which of the following reactions predominates the mode of ATP production during bouts of high intensity but submaximal effort lasting 5 minutes or longer in duration, when there is increasing accumulation of lactate?

A) CrP ---> Cr + Pi + E + ADP --> ATP
B) glycogen --> pyruvate --> lactate + 3 ATP
C) glycogen --> pyruvate --> Krebs cycle --> Co2 + H2o + 39 ATP
D) FFAs -->Krebs cycle --> Co2 + H2o + 129 ATP

40. The research on adaptation of connective shows that it:

A) increases its tensile strength as strength improves
B) is anabolized by excessive anabolic hormone presence
C) becomes less rigid with age (after the 5th decade)
D) increases the aldol crossbridges with increased resistance training

41. Which of the following IS a myogenic adaptation from resistance training?

A) decreased activation of 'high threshold' motoneurons
B) increased cross-sectional area of the contractile proteins
C) decreased effect of the 'bilateral defecit'
D) decreased recruitment of type II

42. The myostatic stretch reflex is initiation in part during the stretch of the muscle via the:

A) golgi tendon organs
B) muscle spindles
C) muscle efferents
D) none of the above are correct

43. When compared to the serum levels in men, the serum level of _____ in women shows a significant increase as a result of similar exercise stress

A) testosterone
B) insulin-like growth factors
C) growth hormone
D) cortisol

44. A strong stimulus for the release of cortisol is:

A) hydrogen ion concentration in the blood
B) oxygen tension of the venous blood supply
C) serum levels of IGF - 1
D) the inflammatory response to tissue damage

45. High intensity endurance training will result in all of the following chronic adaptations of the heart except:

A) increased thickness of the interventricular septum
B) increased left ventricle wall thickness
C) increased stroke volume
D) increase in mass of the heart/kg lean body mass

Answer the following questions based on the following graph & information given. ***Use Heart Rate Reserve method for calculating all questions***

Male, 33 yrs old, resting heart rate (RHR) = 55, % B F = 25%
weight of fat mass = 20 kg, non-smoker
Using: MHR = 2-8 - (0.7 * age) or 214 - (0.8 * age)

46. What is the heart rate estimate for OBLA? ___ 160____ bpm
46. What is the subject's total heart rate reserve? ___ 130____ bpm
46. What is the subject's OBLA as a percentage of his maximal heart rate using HRR method? ___ 80.7% ___
46. What would the training heart range be for moving his OBLA even further to the right? ___ 155-165 bpm ___
46. What would the training heart range be for increasing his VO2 max? ___ 150-154 bpm ___