

2001 HIGHER SCHOOL CERTIFICATE EXAMINATION  
Personal Development, Health  
and Physical Education

Section I – Part B (continued)

---

In your answers you will be assessed on how well you:

- demonstrate an understanding of health and physical activity concepts
  - apply the skills of critical thinking and analysis
  - illustrate your answer with relevant examples
  - present ideas in a clear and logical way
- 

Marks

Question 22 — Factors Affecting Performance (20 marks)

- (a) Describe how an athlete's level of arousal affects performance.

4

An athlete's arousal level is vital in achieving optimal performance. Arousal is the level of electrical activity experienced by the brain & is largely influenced by one's anxiety. Each athlete is different but ultimately the inverted U-hypothesis explains how arousal affects performance (e.g. when an athlete is under-aroused their performance is low (not motivated), optimal arousal = best performance (blood flow, readiness & calmness) whilst by being over aroused the athlete's performance again declines (e.g. -fear of failure, hyped up or feelings of aggressiveness). An athlete must find the right level to achieve their best performance.

Question 22 continues on page 14

Question 22 (continued)

- (b) Discuss how prescribed judging criteria are used to measure the quality of a performance. 6

Prescribed judging criteria is a set of categories/standards that are previously worked out in order to promote the most objective measurement of skill & performance possible. The criteria must be reliable (e.g. - it does not change from athlete to athlete or from day-to-day) and valid. Personalised criteria is subject to an individual's perceptions of a quality performance (subjective) & hence prescribed criteria allows standards to be set, levels outlined & this is known by all athletes allowing them to gauge exactly where they are in terms of their competitors. It can therefore be motivating to athletes as they can see how far they have come & how much work is still to be done. By using this there is usually no argument as to the quality of performance (e.g. In a basketball game statistical categories are formed - FG%, blocked shots, assists, points, steals etc. which allow an athlete's performance to be compared & appropriate accolades (e.g. Best player of the game) to be awarded (e.g. Someone who gets 20 points, 10 rebounds & shoots at 50% is of more quality than someone who gets 5 pts, 5 rbd's and shoots 33%). It is easy for people watching the game to judge how athletes perform.

Question 22 continues on page 15

Long term

- ~~↓ RHR~~ / ↑ oxygen uptake ←
- ↑ Lung capacity (Not as important)
- ↑ haemoglobin levels (↑ blood plasma)
- ↑ stroke volume (cardiac output)
- ↓ Resting blood pressure
- up to 20% ↑ in aerobic threshold (Finish with this)

Marks

Question 22 (continued)

- (c) Analyse the physiological adaptations that occur when an untrained individual undertakes a 20-week aerobic training program. **10**

An untrained athlete undertaking a 20 week aerobic training program will undergo significant physiological adaptations to their cardiovascular system (Heart, lungs, blood & blood delivery system) which will see an improved ability to effectively distribute oxygenated blood to the working muscles, allowing a prolonged period of time that the individual will be able to sustain an effort in the upper end of their aerobic capacity but not above the anaerobic threshold. The long term nature of the activity means that a wide range of adaptations will occur:

- A lowered resting heart rate would be achieved through an enhanced oxygen delivery system (Not as many heart beats are needed to pump blood (oxygen) to the muscles → efficient/stronger heart)
- Increased haemoglobin levels in the blood (the oxygen carrying part of blood - red blood cell count ↑) & total blood plasma is increased improving the amount of blood & the amount of oxygen in the bloodstream (increased oxygen uptake is the result)
- An increased lung capacity would occur but wouldn't have much effect (we already breathe in more than we need) but an improved ability to diffuse oxygenated blood from the lungs would be an advantage resulting from this improved capacity.

Question 22 continues on page 16

Question 22 (continued)

- An increase in stroke volume (the left ventricle can more forcefully contract distributing more blood around the body with less effort). This systolic increase would also, subsequently, increase the cardiac output of the individual.
- A lowered resting blood pressure (<sup>systolic</sup>/<sub>diastolic</sub>) would result & the blood vessels are more healthy as a result of this athletes training program.
- The athletes  $VO_2$  max would have improved significantly increasing his/her ability to uptake oxygen & distribute it to the necessary working muscles.

In conclusion the originally untrained athlete may have improved their aerobic threshold by 20% through this cardiovascular training regime. It would see them experience the physiological adaptations listed above as well as improve their ability to sustain long periods of exercise in the upper end of their aerobic capacity. Ultimately this individual ~~is~~ has an efficient cardiovascular system & is most probably a healthier individual.

End of Question 22