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**

Arousal refers to a heightened state of awareness and if controlled appropriately can lead to an improved athletic performance.

The optimal level of arousal is a temporary state of equilibrium when the athletes physical and mental condition is at their peak and will allow for optimal performance. This level will vary significantly based on the sport and the athlete. For example, a sport requiring many gross motor movements and aggressive performance such as sprinting or Rugby, will have a higher level of optimal arousal than those sports such as darts or archery where finesse and accuracy are required.

An athlete who is underaroused will likely be disinterested in the task, unmotivated and unable to perform at their peak. In comparison, an athlete who is over aroused may be too excited, tense and anxious to perform at their peak. An athlete must therefore identify their optimal level of arousal and use techniques such as managing anxiety through relaxation / centered breathing and mental rehearsal in order to maintain this state, leading into a performance.

Question 22 continues on page 14

Marks

Question 22 (continued)

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

Prescribed judging criteria are widely used when attempting to measure the quality of a performance. They attempt to remove the bias from juding and increase the reliability and objectivity of such a process.

Prescribed criteria outline what is expected of an athlete and detail components of a performance which will be marked as errors.

Criteria such as this is extremly common in sports such as gymnastics, dance and diving, as judging of performances in these sports is extremly subjective to anindividuals personal opinion. They therefere work to make the judging more fair.

An example of judging criteria for gymnastics includes: A floor routine is judged out of a mark of 10, point 5 of a mark will be deducted for a fall, 0.2 deducted for a bend leg and so on.

While sports such as gymnastics are highly subjective and therefere rely on prescribed criteria to measure the quality of a performance, all sports can be ranked on a continum of objective to subjective and therefore even sports such as basketball require some prescribed criteria, particularly when dealing with rules such as fouls and the breaking of rules.

Question 22 continues on page 15

Marks

Question 22 (continued)

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

There are both physiological responses and physiological adaptations which occur as a result of aerobic training

An untrained individual who undertakes a 20 week aerobic training program will notice physiological responses after each session however, will be most affected by the physiological adaptations that occur, after prolonged participation

These adaptations include a decreased resting heart rate as well as a decreased heart rate at any workload or level of intensity. This occurs as the heart becomes more efficient at delivering blood around the body and to working muscles and therefore doesn't have to work as hard.

There will be an increase in the athletes stroke volume which refers to the amount of blood pumped by the heart each minute, and in the cardiac output which refers to the amount of blood pumped each minute.

Cardiac output is the product of heart rate and stroke volume $Q = HR \times SV$ and therefore it compensates for the decrease heart rate and allows the body to pump more oxygen rich

Question 22 continues on page 16

Question 22 (continued)

blood around the body and to working muscles.

Although stroke volume can only improve by approximately 20% as a result of heredity and personal characteristics, cardiac output can be as high as 30ℓ/min in a trained person as opposed to 5ℓ/min in an untrained individual.

As a result of aerobic training the athlete will also expierence an increase in ventilation rate and lung capacity. Aerobic training works to improve the ability of the heart and lungs and therefore the lungs ability can increase significantly as can their VO_2 max. The rate of an untrained athete can be as low as 35ml/kg/min while a trained athlete ventilation rate will be significantly higher at approximately 75ml/min.

This improved function of the lungs will also lead to improved oxygen delivery leading to improved performance.

Aerobic training is also the cause of increased haemoglobin levels which refers to the oxygen carrying capacity of the blood. It refers to an increased production of red blood cells and therefore greater ability to deliver oxygen and delay the onset of fatigue.

The final adaptation in response to aerobic training is a decrease bloop pressure which refers to the efficiency of the heart and the fact that there is less pressure on the wall of the left ventricle as the heart delivers oxygen rich blood and nutrients around the body and delays the onset of fatigue.

End of Question 22

Aerobic training will overall increase the functioning of the heart and lungs, delay the onset of fatigue and lead to improved perfermance.