

PERSONAL DEVELOPMENT, HEALTH AND PHYSICAL EDUCATION

Introduction

In 1996, 7 978 students presented for the examination in 2 Unit Personal Development, Health and Physical Education. This was a slight increase on the number of students who presented for the examination in 1995.

There were many pleasing aspects about the 1996 HSC examination process, but none as exciting as the fact that 2 of the top 14 students in the State who gained a TER of 100 had studied 2 Unit PDHPE.

While the results of the top students gave cause for excitement, it was also pleasing to see that the quality of answers from all candidates continues to improve. All Core questions were well answered, showing a depth of understanding of all aspects of the Syllabus.

Most students seemed to answer the question on the option they had studied at school, although, again, there were problems with the quality of responses to Question 26 (Community Health Issues). From the number of students answering Question 26 and the poor quality of responses it was obvious few had studied this option. Fewer candidates answered Question 25 (First Aid and Sports Injuries) this year, with more choosing to answer Question 30 (Coaching) than in previous years.

Again a number of students attempted to answer more than one option question, with some trying to answer all option questions in Section 3.

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HSC MARKING PROCEDURE

The Marking Process

Multiple choice answers to Section I of the 2 Unit Personal Development, Health and Physical Education examination are computer-processed. Sections II and III are marked by at least two independent markers from different groups at different stages of the marking process.

Marking teams comprise 8-9 markers led by a Senior Marker. Each team is usually assigned one question to mark for the whole marking process. Some teams or markers may switch over to a new question during the process in order to mark an option question.

First marking of responses begins after marker briefing and pilot marking phases. In the first of these phases, markers read a range of sample responses and are briefed on appropriate marking guidelines. Once marking guidelines and standards are agreed upon by all markers for a specific question, pilot marking begins. Pilot marking indicates the accuracy of the marking guidelines and markers' ability to interpret those guidelines consistently.

First marking usually begins 2-3 days after briefing commences. Second marking usually begins about 5 days later or when approximately two-thirds of the scripts have been marked for the first time.

A script is considered discrepant if the mark given during first marking differs by a certain amount from that given during second marking. For questions marked out of 15, the difference is 4, for those out of 20, the difference is 5.

Once a discrepant script is discovered it is marked by a third marker, usually one of the Senior Markers, who does so without any knowledge of the marks previously awarded. If the third mark does not resolve the discrepancy, the script will go for a fourth mark and so on until the discrepancy is resolved.

Markers are given the following advice to help them in the marking process:

- This is a ranking process. Use the entire range of marks. Beware of procrastinating.
- Forget personal and school standards and your memories of past papers and performances. Adhere to the marking guidelines set for the current year.
- Within each band (e.g. A, B, C, D, E) and on each mark (e.g. 15 to 0) of the marking guidelines there will be a range of scripts. For example, some A scripts will be *15 out of 15*, others will be better still. They will both get 15. Yet again others will be *14 out of 15*.

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- Keep to the marking guidelines and use your professional judgment. Place the script in a band first and then award a numerical mark.
- Mark positively. Mark what is there, **not** what is missing and don't *take off marks* for incorrect statements. Aim for an impression mark after a careful reading of the whole answer.
- Do not agonise over a script. If you find a script that cannot be easily placed within the marking guidelines, discuss it with your Senior Marker.
- Aim for accuracy of marking, not speed.

The Clerical Operation

All scripts are divided into bundles from the one examination centre and are separated into bundles for each question. Schools are identified by the examination centre number only.

Each bundle has an accompanying mark sheet which already has the relevant candidate numbers on it. Marks are recorded on these mark sheets. No annotation is made on the scripts whatsoever. There is a second mark sheet for the recording of marks during second marking. Both the first and second mark sheets are completed independently at different times by different markers.

There are procedures in train to ensure that markers do not mark scripts from their own school or scripts belonging to close relatives sitting for the examination.

The confidential nature of the marking process is stressed at all times and markers do not have access to marks awarded by other markers.

The clerical operation identifies discrepant scripts and checks the final marks sent for computer processing.

Marker Statistics Operation

The marker statistics operation involves the following steps:

- When markers allocate a mark to a script, they place a tally mark on their tally cards alongside that mark value.
- Markers' tally cards are processed after each night of marking and statistical reports generated.
- The statistical reports are given to the Supervisor of Marking prior to the start of the next marking session. The reports contain information on the distribution of marks for each

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question (i.e. mean and standard deviation across all the teams marking the same question), as well as information on each marker (i.e. marking rate, mean and standard deviation).

- Copies of the team reports are given to each Senior Marker to help them in monitoring the marking patterns of each of their markers.

The Supervisor of Marking uses the reports to check marking trends for the duration of the marking process. They are initially used in the pilot marking phase to ascertain whether the marking guidelines are providing an acceptable distribution of marks for each question.

Once the marking schemes are finalised and first marking commences, the statistical reports are used to check that an acceptable distribution of marks is being maintained. The Supervisor of Marking discusses the results with the Senior Markers at the start of each session to ensure that any problems in applying the marking guidelines are resolved consistently.

WRITTEN PAPER

Section I : Multiple Choice

Questions 1 -20

The following table gives, for each question, the percentage of candidates who chose each response. The correct answer for each question is marked in the table with the symbol *.

Most questions were well answered, except for Questions 2 and 12. The ability of the questions to discriminate was generally good, with a mean of 10.59 and a standard deviation of 2.9.

Question	% Response A	% Response B	% Response C	% Response D	% Correct
1	11.69	5.21	76.91*	6.03	76.91
2	32.25	25.81	9.80*	32.02	9.80
3	4.16	41.07*	39.26	15.35	41.07
4	25.31*	14.55	11.60	48.40	25.31
5	63.39*	4.16	1.21	31.04	63.39
6	23.25	1.30	2.74	72.68*	72.68
7	16.06	9.37	19.05	55.23*	55.23

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Question	% Response A	% Response B	% Response C	% Response D	% Correct
8	4.93	74.12*	13.93	6.97	74.12
9	10.74	11.67	74.69*	2.70	74.69
10	54.16*	11.56	25.63	8.47	54.16
11	83.87*	8.63	5.98	1.42	83.87
12	25.10	16.70*	56.40	1.62	16.70
13	10.87	41.07	12.95	34.88*	34.88
14	30.74	7.40	34.51	27.20*	27.20
15	12.86	56.94*	4.55	25.51	56.94
16	3.52	11.69	81.52*	3.15	81.52
17	9.57	14.60	12.84	62.72*	62.72
18	48.68*	14.30	16.06	20.83	48.68
19	12.86	6.30	75.24*	5.41	75.24
20	23.41*	12.01	29.67	34.70	23.41

Section II : Core

Question 21 : Core 3 : Analysis and Management of Community Health

The majority of students attempted all parts of this question which was generally well answered.

- (a) *Describe how the age structure of the Australian population is changing. Discuss the implications of this for Australia's health care system.*

Most candidates were able to identify the fact that the Australian population is ageing. The better candidates gave reasons for the changing age structure and also provided thoughtful explanations of both medical and social implications for the health care system. For example:

Australia's population is ageing at an increasing rate. This is due to improvement in medicines, technology, education and lifestyle-related risk factors and a greater access to better health-care services. The progression of the baby-boomers into the older age groups is also a significant factor.

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Average responses acknowledged the fact that the population is ageing but gave limited discussion or explanations for the implications. Average responses concentrated on institutionalised services and their effect on the health-care system. For example:

The ageing population will increase the demand on our hospital beds and nursing homes, thus increasing the costs of health-care.

The poorer responses identified the fact that the population is ageing, but did not discuss implications or reasons for this occurrence.

Our elderly are living longer and therefore placing more of a demand on our health-care system.

(b) *Death by suicide is a significant health issue in Australia.*

(i) *Discuss the factors that have contributed to the incidence of suicide.*

Most candidates were able to list some general factors that have contributed to the incidence of suicide. These factors were generally brief, with little discussion to indicate why they were causes of suicide. The majority of candidates focused on teenage suicide.

The better candidates were able to discuss clearly and provide links between three or more factors and explain the relationship between each factor and suicide. For example:

Males may feel social pressures to maintain a good job and provide financial support for the family. In times of economic hardship and unemployment this may lead to stress, reduced self-esteem and increasing levels of suicide.

Average responses either discussed some factors briefly, failing to link the factors specifically to suicide, or provided an extensive list of factors contributing to suicide, e.g.

Unemployment causes stress and depression.

Depression, mental illness, inability to hold relationships, unemployment, death in the family, money worries, low self-esteem.

Poorer responses listed a few factors contributing to suicide but gave no explanation, or very briefly described only one factor.

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Suicide is caused by unemployment, stress, depression.

Suicide is usually due to personal problems.

- (ii) *Describe management strategies that could be employed to assist in reducing the incidence of suicide in Australia.*

Most candidates in this section were able to identify some strategies for the management of suicide. Community support and modifications to personal behaviour patterns were the most common strategies discussed, but, on the whole, there was limited discussion of how these linked to the management of suicide.

The better candidates offered a thorough discussion of a number of strategies such as modifications to the environment through government legislation and intervention, a range of community support services, e.g. counselling, and modification of personal behaviour, e.g. stress management.

The better candidates were able to link the above information to health promotion initiatives and showed an understanding of how these approaches would change the behaviour of an individual. For example:

Government/community - restrictions on alcohol and drugs, gun laws, funding and research into mental health, advice lines, provision of recreational facilities to decrease boredom, increased job opportunities and training.

Intervention by others - ...education programs, recognising signs and symptoms, use of media, implementation of workplace strategies.

Personal skills -counselling, increasing self-esteem, stress management courses.

In average responses candidates were able to identify management strategies but tended to concentrate on just one area of intervention. For example, government strategies such as hot lines, media campaigns, etc.

Further study and work training opportunities are needed. When young people have something positive to occupy them, they are less likely to attempt suicide.

The poorer responses identified a few management strategies for reducing suicide, but included limited discussion. There were no identifiable links to show how such strategies would manage the problem.

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Counselling for the kids that feel that they no longer want to be here anymore.

For there to be less suicide in Australia people have to listen and try to talk them out of it.

Question 22 : Core 3 : Analysis and Management of Community Health

In answering this question candidates demonstrated a general understanding of both part (a) and part (b). On the whole, the former was answered better than the latter.

- (a) *Discuss the risk factors that contribute to the incidence of cardiovascular disease (CVD) in Australia.*

Most candidates could identify the risk factors that contribute to the incidence of cardiovascular disease (CVD), but had some difficulty in linking each risk factor to the incidence of CVD.

While better candidates focused on specific responses in relation to the risk factors of the disease, average and poorer candidates tended to describe various types of CVD e.g. atherosclerosis, angina, stroke.

In the better answers candidates discussed each risk factor in some detail, identifying and outlining their casual relationship to CVD. Such answers included high quality discussion of a broad range of risk factors, e.g.

High fat diets/cholesterol → cholesterol builds up fatty tissue on the inside of the artery walls and restricts the blood flow around the body. This is called atherosclerosis.

A high fat diet and obesity, along with high cholesterol levels, are associated with the build-up of fatty tissue on the inside walls of the arteries. This is a fatty substance which narrows the volume of the arteries, making it even harder for blood supplies to be pumped around the body.

Better responses were able to establish links between combinations of risk factors. For example:

A man who smokes, is obese and has a family history of heart disease is at a much higher risk than someone who only has a family history of heart disease.

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The better responses were also able to show a clear understanding of both modifiable and non-modifiable risk factors. For example:

We cannot modify the risk of CVD if it is hereditary or more common in males and older people aged 65+. We can modify the behaviours and lifestyle which contribute to the incidence of CVD.

Risk factors of CVD are modifiable, i.e. they can be changed. Such factors are smoking, unhealthy diet and weight. There are also non-modifiable factors which cannot be changed. They are age, gender and heredity.

Average answers discussed risk factors in general terms or discussed a few risk factors well, only listing others. For example:

A high blood cholesterol level resulting from poor diet including the consumption of fat, salt, sugar increases the pressure around the heart.

Hypertension - high blood pressure means that the heart is forced to work harder than normal.

The average responses also tended to discuss risk factors generally without referring to those which can be changed and those which cannot.

- (b) *Design a health promotion initiative to reduce the incidence of CVD in Australia. Outline your initiative, giving reasons for the strategies that you would include.*

In answering this question most students were able to identify health promotion strategies, although many failed either to give reasons for such strategies or to link them to their initiative. Many students had difficulty in differentiating between the terms *initiative* and *strategy* in the question.

Many responses identified different approaches to health promotion. Some candidates developed their discussion around a focus and settings approach, others based their discussion on levels of responsibility for health promotion or the goals of the Ottawa Charter.

A number of candidates referred to existing initiatives and strategies.

In the better responses candidates clearly identified an initiative and discussed a range of strategies with supporting links to that initiative, e.g.

Stress management programs can be implemented as a part of the Occupational Health and Safety Act. Work places will be subsidised by

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their governments to run relaxation and leisure activities and seminars dealing with the risk factors of CVD.

The better candidates indicated where responsibility would lie for the implementation of strategies, then provided reasons for the implementation of strategies at each level of responsibility, e.g.

The initiative would have to be employed across many levels of responsibility and would include governments, industry, educational bodies, companies, scientists, media, health organisations and individuals. Governments would be required to provide funding and change legislation to allow the initiative to work.

Average responses identified relevant strategies, but the reasons given for the inclusion of such strategies were vague or inaccurate.

Through workplaces and communities stress management programs will be introduced to people with lower levels of stress.

Introduce a restriction or ban on alcohol and cigarettes. These should be kept to a minimum to ensure a healthy lifestyle without risk of CVD.

In poorer responses candidates used terminology with no link to relevant discussion; for example: *I will use the focus and settings approach.* These candidates often described only one strategy that they would employ, e.g. a TV commercial.

Question 23 : Core 4 : Movement Skill and Performance

To be successful in an 800 metre event, a runner needs to perform at high intensity for approximately two minutes.

Discuss the most important considerations in the preparation of an athlete for this event.

The format of this question was very pleasing as it allowed candidates to use process skills to identify and discuss specific knowledge based on a broad Syllabus area.

The result of this was a very low non-attempt rate as most candidates were able to apply what they had learned in some way.

The majority of candidates did have difficulty in placing in order of priority the considerations thought to be most important. Many candidates simply identified and defined relevant Syllabus terms without relating them to the 800m event or the identified time.

The better responses focused specifically on the key elements necessary in the preparation of an 800m runner. The majority of these responses highlighted the types of training, e.g. interval, fartlek, circuit, and the principles of training, i.e. specification, overload, adaptation, reversibility,

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warm-up. For example:

Fartlek training will improve the athlete's ability to tolerate lactic acid build-up. By increasing this tolerance the athlete will be able to use the lactic acid system more successfully for the full two (2) minutes of the 800m. Lactic acid tolerance will be built up by training just above the anaerobic threshold.

Another training method when considering specificity is interval-training. The 800m runner should engage in medium intervals in which the body will have to adapt to lactic acid build-up. This will increase the runner's anaerobic threshold.

The better responses also identified the specific energy system and the need to exceed the anaerobic threshold in training to increase performance at high intensity by increasing lactic acid tolerance. For example:

An 800m event will rely predominantly on anaerobic sources of energy, thus, in training it is important to develop the energy systems - ATP/PC and lactic acid. To perform at high intensity the athlete's ATP/PC system will supply energy for around 10-15 seconds after which the lactic acid system will be used. At high intensity the lactic acid system can provide energy for 30 secs - 2 mins, therefore the 800m runner will also rely on the oxygen system to a certain extent.

Many of the better responses also identified and discussed the role of psychological factors in pre-competition preparation. For example:

Psychology plays an important part. The athlete must have an appropriate level of motivation and arousal. The use of mental rehearsal which is the technique of mentally picturing the performance beforehand will help. Mental rehearsal heightens the body to an appropriate level of arousal, provides a clear picture of what has to be done, increases concentration and narrows thoughts to the task at hand.

Average responses to this question generally followed two distinct patterns.

In the first, candidates identified some of the key elements of training, e.g. specificity, overload, or types of training, e.g. interval, fartlek, but failed to discuss their application to the preparation of the 800m runner.

Some of these responses simply identified the appropriate energy systems which they discussed in general terms, often making diet and psychology the main focus. Some examples included:

The 800m runner uses the ATP/PC system first then changes to the lactic acid system; towards the end of the race the runner changes to the oxygen system.

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The athlete should use the FITT principles.

Frequency - 3-4 times a week.
Intensity - High intensity / maximum effort
Time - 30 minutes including warm-up / cool-down
Type - specific is best to build muscle endurance.

Psychology is quite important, athletes must mentally rehearse before the race to improve performance.

The second type of average response took a broad variety of Syllabus areas and simply defined them with very little reference to the preparation of the 800m runner. This type of response frequently mentioned all energy systems, psychology, diet, hydration, acclimatisation, ergogenic aids and hereditary factors. Some examples included:

The athlete needs all three energy systems. First the ATP/PC for the first 10 secs then Lactic Acid for 30 secs to 1 minute. The oxygen system then supplies the ATP after 12 minutes.

Training must be specific to what the athlete is doing (800m). Also he/she should be carbohydrate loading for glycogen stores to be high.

*The runner could use ergogenic aids such as **warm-up** and **cool down**, they could also drag a tyre behind them when they run to train for overload. Blood doping occurs when blood is taken out and then put back, but this is dangerous to the runner's heart.*

The poorer responses to this question had difficulty in identifying the key factors to be taken into account in the preparation of the 800m runner. A number tended to focus on diet, hydration or psychology without making any reference to physical training. Areas such as pre-game nutrition and feedback were common in such responses. Many placed undue emphasis on carbohydrate loading. Some examples included:

Physically the athletes need to be in excellent condition, they must be fully fit and trained in every aspect.

The runner needs to have aerobic and anaerobic factors of fitness so that all energy systems can work together.

The runner will use the lactate system so a pre-game meal of carbohydrates and amino acids can help them run better.

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Question 24 : Core 4 : Movement Skill and Performance

This question was generally well answered, with an impressive number of candidates demonstrating good knowledge in key areas of the Syllabus. The better candidates were those capable of processing the main requirements of the questions, rather than simply recalling the information.

- (a) *'Pre-screening' is essential prior to participation in a fitness training program. Explain the benefits of pre-screening.*

The majority of candidates were conversant with the term *pre-screening* and were able to outline features of a pre-screening test. Discrimination between candidates was achieved through their ability to *discuss the benefits* of pre-screening. A small percentage of candidates interpreted a pre-screening test as being a *drug test*. The depth of explanation of the benefits or the identification of a wide range of benefits were the key components of a better response.

The better candidates were able to give an in-depth explanation of at least two benefits of pre-screening. Most commonly identified were the reduction in injury risk and the application of appropriate and specific fitness programs. Less commonly identified was the ability to set goals based on the results of the test, for use as a motivational tool or as a legal matter to offset the risk of litigation. Some students were able to give a concise and accurate explanation of several benefits, for example:

Pre-screening is now a common and important practice in the fitness industry. Firstly, a pre-screening test allows the identification of any possible areas of weakness or ill-health which may be dangerous in some types of fitness programs. Personal fitness programs can be designed (using the F.I.T.T. principles) to ensure that they provide maximum benefit to the individual. The results from the pre-screening test can be used to set short and long term goals which can be used for motivation. The identification of medical problems may be useful in preventing the fitness centre from being sued.

Average candidates lacked the ability to identify and discover several benefits and tended to get bogged down in a detailed explanation of one benefit, for example:

The pre-screening test checks the person's medical history to see his/her age, if he/she smokes or drinks, if he/she has heart problems or has suffered from any injuries. A program can then be designed to make sure that there is no danger involved, e.g. that the person doesn't work too hard, that he/she does not have a heart attack and that old injuries don't flare up again.

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In poorer responses candidates listed aspects such as body type, age, weight and gender, but their discussions lacked depth and focus. Such candidates also tended to discuss pre-screening as a concept, focusing on the process, rather than its purpose. Typical of poorer responses is the following:

Pre-screening is when you are given a test by a person. This asks you things like your age, weight, diet, do you smoke, do you drink and what sex you are. The coach then takes this and looks at this before the season starts. It helps the coach give you your position on the team.

- (b) *Compare the effectiveness of different types of flexibility training.*

Many candidates displayed an impressive depth of knowledge about the effectiveness of different types of flexibility and training techniques used to improve it. The majority were able to identify *static*, *PNF*, and *ballistic* as three major types of flexibility training. Some candidates also referred to *dynamic* and/or *range of movement* training. A small percentage were confused, and included types of muscular contraction into their answers, such as *isotonic*, *isokinetic*, *concentric* and *eccentric* while others compared the flexibility requirements of different sports.

The key to a successful answer lies in the ability to compare types of flexibility training. Better candidates successfully identified training techniques including a description of method as well as a good comparison, i.e. good/better, dangerous/safe, simple/difficult, beginner/advanced. For example:

Ballistic stretching is not recommended for beginners. It can be dangerous as torn muscles may occur because of it. The sudden muscle stretch activates the muscle spindles which initiate the stretch reflex causing the muscle to contract at the same time as it is supposed to stretch. Ballistic stretching can be important, though, in some sports such as hurdling and sprinting as they require rapid muscle contraction, but should be used by advanced performers. So ballistic stretching can be dangerous and not recommended for beginning trainers, whereas static and PNF stretching are much safer.

Average candidates could identify 2-3 types of flexibility training techniques showing good understanding of how they are performed and citing their benefits. Many of these candidates also listed the general benefits of flexibility training such as increased range of movement and reduced incidence of injury, but failed to draw comprehensive comparisons between them. For example:

Static stretching occurs when a muscle is stretched to its full range and held at this point for a period of 10-15 seconds. This is an appropriate stretch during a warm-up.

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Poorer candidates often confused weight training and flexibility training or related flexibility training in general to individual sports. They could often identify types of flexibility training, but could not adequately describe them. Many were unable to identify the benefits or dangers of different types of stretches. For example:

The type of stretching required by a gymnast is different from that required by a footballer. A gymnast must stretch the whole body to develop flexibility whereas the footballer only needs to train for flexibility in the legs.

- (c) *Discuss the importance of intrinsic and extrinsic motivation at each stage of skill acquisition.*

The majority of candidates were able to identify and explain the three stages of skill acquisition, although many responses confused feedback with motivation. Candidates were generally able to differentiate between intrinsic and extrinsic motivation.

The better students provided a good explanation of what occurred at each of the stages of skill acquisition. They understood intrinsic and extrinsic motivation well and were able to discuss the importance of both to each stage of skill acquisition. For example:

The cognitive stage of learning is associated with frustration and many errors. Intrinsic motivation is provided by the desire to learn a new skill and extrinsic motivation from coaches, friends in the form of encouragement, awards, certificates, etc.

The associative or practice stage is characterised by some skill development and fewer errors. Success provides intrinsic motivation as the learner becomes more confident and experiences a rise in self esteem. The setting of goals by the coach, e.g. being selected in a team provides extrinsic motivation.

Autonomous stage - the skill becomes automatic with few errors. Extrinsic motivation comes from the coach, crowd and parents and gives the athlete the satisfaction of achievement. This can take the form of applause, trophies, media/peer recognition.

Average candidates lacked the ability to link both intrinsic and extrinsic motivation with all three stages of skill acquisition. Often candidates confused intrinsic motivation with kinesthetic sense and extrinsic motivation with knowledge of performance. For example:

In the associative stage intrinsic motivation is provided by the learner's developing kinesthetic feel for the skill and extrinsic being provided by coach/parents saying what is being done wrongly.

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Poorer candidates either identified the stages of skill acquisition or discussed intrinsic and extrinsic motivation/feedback. Such students showed a lack of understanding of the question with no link between the stages of skill acquisition and motivation.

In the associative stage, new strategies and ideas are being taught. Extrinsic motivation is needed to show the athlete where he/she is making mistakes.

- (d) *Identify and discuss factors that need to be considered when developing tests that measure physical skill and performance.*

This question produced the widest range of responses. Many of these used Syllabus terminology such as validity, reliability, subjectivity and objectivity. Some candidates focused more on the appraisal of performance rather than the establishment of tests, but their responses were quite valid. Other valid responses highlighted the need to determine the stage of skill development of the performer or his/her age. The quality of responses here, however, was not as good as in the other three parts of this question.

The better candidates were able to use and describe the appropriate terminology. They discussed a wide range of factors and included other areas such as prescribed and personal criteria. The depth of their understanding was clearly apparent. For example:

Validity is an important factor in the development of tests. A valid test is one which is appropriate for the sport being analysed. There would be no use in giving a swimmer a running test as it is not specific to swimming. The measurement of agility for a netball Centre would be an example of a valid test.

Average candidates were able to identify three or four factors but were not able to discuss them adequately. For example:

Validity is the truthfulness of a test and reliability is whether it can be repeated. Validity and reliability are important in the design of tests.

Other average responses discussed subjectivity and objectivity, but ignored validity or reliability.

Poorer responses identified several factors which inferred that tests need to be valid, reliable or objective, but were unable to discuss this in any depth. For example:

When developing a test, you need to think about the sex and skill level of the athlete because athletes differ in strength and ability.

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Section III : Option Questions

Question 25 : First Aid and Sports Injuries

Fewer candidates attempted this question in 1996 than in previous years. The quality of responses was also not as high as in previous years.

- (a) *Describe how the key principles of taping and bandaging would be applied in the prevention and treatment of an inversion ankle injury.*

The better candidates discussed taping principles, procedures and reasons for use, and bandaging specific to an inversion ankle injury. Such candidates related both taping and bandaging to prevention and treatment of this type of injury.

Many students included diagrams in their answers to explain taping procedures, and the better candidates used these to reinforce their explanations

For taping principles, the better responses included such information as follows:

*Preventive taping should not interfere with effective performance, its main objective is to support the ankle and provide the athlete with awareness of the movement of the ankle so as to prevent inversion. Taping should provide support while still allowing adequate movement. It should not be so tight as to cause numbness or **pins and needles** by cutting off the blood supply.*

For taping procedures, better responses included such information as below:

Firstly an anchor should be applied around the ankle below the gastrocnemius, followed by stirrups under the foot. These help keep the ankle in a straightened position so that it can't be moved sideways and injure ligaments. The figure sixes and heel locks reinforce this support; the tape should be fairly wide and have each layer overlapping the previous one by half. All the ankle must be covered to stop pinching of exposed skin or irritation and the tape should not be so tight as to restrict movement or cause loss of circulation. A more supportive technique is the basket weave in which the ankle is reinforced by successive anchors and stirrups in a weaving pattern before heel locks are applied.

An example of a better response on bandaging was:

For the treatment of an inversion ankle sprain, a compression bandage (i.e. an elastic-flexible bandage) should be applied to the ankle, being sure to cover thoroughly and securely the ankle and heel, with emphasis on support around the lateral aspect of the ankle to reduce swelling and

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inflammation of the place where the torn ligament has occurred through inversion of the ankle. Again the bandage should not be too tight but just adequate enough to provide support and reduce swelling.

Average responses discussed either taping principles or taping procedures, but in less detail. Reasons for the procedures advocated were not supplied. A typical average response dealing with prevention was:

To prevent an inversion injury the ankle first needs two anchors, one either side of the ankle, followed by one to two stirrups up the ankle, then figure of sixes, again one either side of the ankle, then two heel locks, one either side of the heel. This is then tied up and reinforced by another two anchors, one on either side.

A typical average response to treatment was:

In treating an ankle injury, bandages are used at the ankle to support the foot and decrease the weight placed on the ankle joint.

Poorer candidates provided limited information, such as one reason for bandaging and taping or just listing two or three methods of taping without explanation.

- (b) *Identify the major components of sports drinks, and describe how each component may affect sports performance.*

This question was generally answered better than that in part (a). Candidates, even if unaware of specific sports drinks, gave good responses by discussing the common ingredients of glucose (sugar), sodium (salt), water and electrolytes. A small number of candidates discussed specific types of sports drinks such as 'Sustagen' and 'Protein-Body Building Drinks'.

The better candidates discussed at least three ingredients and looked at the beneficial and/or harmful effects of each ingredient on sports performance. For example:

Sports drinks such as Staminade, Gatorade and Powerade all contain extra substances to affect sports performance. These substances are salt, glucose (sugar) and water substances.

The salt in these drinks acts to reduce the muscle spasm known as a stitch. It also keeps salt levels in the body at the appropriate level due to the loss of salt through sweat. Yet this is not really needed. Research shows that the average Australian diet contains excessive salt through salty processed foods. This means that through our natural diet we get enough salt without drinking salty fluid.

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The sugary sweetness of these drinks is used to give our body glycogen or glucose. This is used in anaerobic activity as a fuel source for anaerobic glycolysis. If these highly sugary drinks are taken prior to exercise, it is believed that the glycogen stores will be increased. This is not always true. Insulin in the body combats this glycogen, reducing fuel for exercise and causing fatigue.

The water combats the loss of liquid through sweat. 500ml of water should be taken prior to exercise, 200-300ml during exercise. These sports drinks are more suitable after exercise to replace lost salt (not much) sugar and liquid.

Average candidates discussed only two of the components and often described sugar, glucose and carbohydrate as different items. The better of the average responses included discussion of the effects of these on sports performance. For example:

Sports drinks contain many components which will have an effect on the performance of an athlete. Sports drinks contain carbohydrate which will provide quick energy replacement for the body and therefore increase individual performance. Glucose is also contained which benefits the athlete by supplying him/her with the essential aid and increasing blood sugar levels. Salt is also contained in sports drinks which enables the body to be replenished and replace the salt which is lost through excessive sweating during performance.

Poorer responses either listed a few components or explained just one component. Drinks such as Coca Cola and coffee (caffeine) were discussed often by these candidates. For example:

The major components in sports drinks are glucose, water and carbohydrates. These components help the body to replace what is lost and it will stop you from dehydrating.

(c) Describe the steps you would take in the immediate management of a person experiencing:

- (i) an epileptic seizure;
- (ii) a diabetic hypoglycemic condition;
- (iii) a diabetic hyperglycemic condition.

The majority of candidates answered the question on epilepsy well, but many confused hypoglycaemic and hyperglycemic diabetes. DRABC was seen by many as the major and/or only treatment for these conditions.

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The better candidates showed good understanding of the nature of the conditions and described detailed management of each. These candidates included management of each condition in the conscious and unconscious states. For example:

Hyperglycemia is excessive blood sugar. The patient may be urinating excessively, have a dry mouth, and be nauseated. If unconscious (same for Hypoglycaemic) - DRABC. Check for danger, response, ensure the airway is clear and open and look, listen and feel for breathing. If this is present, it is still a diabetic emergency.

Look for an identification bracelet that shows the casualty as diabetic, place them in recovery position with nose and mouth turned downwards, and preferably send someone else for the ambulance while you monitor the patient closely and continuously, check breathing and pulse. (If breathing is absent, 5 quick full breaths and check pulse. If present - continue EAR. If absent, CPR 15 compressions, 2 breaths, 4 times/min).

If conscious, the hyperglycemic patient can be questioned about his/her condition, insulin medication etc, and, if a known diabetic who has forgotten his/her insulin, can be helped to administer it. It is best to wait for medical help to arrive before giving anything by mouth. The emergency may be severe. Sit the patient down quietly and reassure him/her, send someone for help and stay with the casualty until help arrives.

Average candidates failed to link the nature of the condition with the management, supplied less detail and often confused the nature of hypoglycemia and hyperglycemia.

Poorer candidates showed no understanding of the nature of each condition. Many did not attempt to answer the questions on diabetes. Those who did so, confused hypoglycaemia with hyperglycemia and simply stated *DRABC* but gave no explanation.

- (d) *Compare the administration of CPR and EAR to a child with the administration of CPR and EAR to an adult.*

On the whole, this part of the question was reasonably well answered, with very few non-attempts. Unless candidates used a table, however, the answers were very wordy and often confused.

Better candidates were able to identify, through discussion or a chart, the differences between adult and child resuscitation techniques, using both one and two operators. For example:

EAR to an adult will usually involve mouth to mouth resuscitation, although the operator may choose to use mouth to nose resuscitation in

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some circumstances. Child EAR can be mouth to mouth resuscitation; if the child is very young or small, however, the operator may use mouth to mouth and nose resuscitation.

EAR to an adult will require substantial heavy blows of air into the adult's mouth while watching for chest inflation. For an adult the rate is 1 breath every 4 seconds. EAR to a child requires less force of air and only a puff of air for small children or infants. The rate of EAR for a child is 1 breath every 3 seconds.

CPR (Cardio Pulmonary Compression) involves EAR and ECC (External Cardiac Compression). When using compressions on an adult, the operator uses a 'heel lock' on the patient's breast bone and, while keeping straight arms, puts considerable pressure with compression. The rate of CPR is 1 breath every 5 compressions (2 people CPR) and 2 breaths every 15 compressions (1 person CPR).

With a child, when doing compressions, the pressure to be applied must be fewer and usually 1 hand is sufficient for the compression (compress about 5cm). For infants and small children, the use of 2 index fingers may be sufficient to complete the compressions successfully (for infants compress about 2cm). The rate of CPR for children and infants is the same as for adults.

Average candidates were able to give a brief comparison of EAR and CPR for adult and child.

Poorer candidates provided little information on the differences between adults and children, and gave no mention of timing, rates or number of operators. For example:

CPR and EAR is easier to do on a child than on an adult. Fewer breaths are needed, with less amount of pressure being applied to the chest.

Question 26 : Community Health Issues

While 42 students indicated that they had studied this option as part of the course, 186 candidates attempted the question. It was obvious that few of those answering this question had studied the option, consequently, it was poorly answered.

Answers to part (a) were of a higher standard than those to part (b).

- (a) *You are concerned about the increasing incidence of eating disorders among young people in your local community. In order to convince health authorities that action is required, you plan to present them with a detailed report on the extent of the problem.*

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- (i) *Describe the field techniques that you would use to gather relevant data.*
- (iii) *Describe the approach that you would take in preparing this report.*

The better answers referred specifically to field techniques such as surveys, questionnaires, consultation, interviews and documentary evidence from sources such as the Australian Bureau of Statistics, hospital admissions and health care centres. Surveys and questionnaires included pilot studies with the questions in these studies being related to the documentary evidence already acquired. For example:

Questionnaires would then be formulated from the observation, consultation, documentary evidence and the interviews to receive community in-put.

The better responses provided a good description of at least three of the following points related to the report : results and analysis of data, reasons for research, presentation of the report, summaries, conclusions and recommendations.

Average candidates examined a limited number of field techniques, with general discussion focusing on surveys, questionnaires and interviews. For example:

Field techniques that I would use to gather relevant data would be:

- *see my local doctor,*
- *find out information from the hospital, and*
- *talk to people who have known or had an eating disorder.*

Average candidates tended to discuss in a very general manner only two areas related to the report. The majority concentrated on the collection of data, with many failing to prepare a detailed report to convince health authorities of the need for action. Reports that were prepared were limited to data such as graphs, facts and statistics.

The poorer responses showed little or no understanding of field techniques. To gather relevant data they asked people questions and found out information but their discussion lacked structure. For example:

I would go to the hospitals and talk to patients that have had eating disorders recently and ask them what made them go that way.

The poorer responses had no understanding of how to construct a report nor of the contents of a report. They responded by saying, for example:

I will show the authorities what I found out.

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- (b) *Discuss the factors contributing to inequalities in health status within a specific community or region.*

This part was answered poorly. Once again, many candidates relied upon Core knowledge and many presented a narrow, stereotypical view of inequalities in health status, e.g. *Outback Aborigines*.

The better responses to this question clearly identified factors relating to the inequalities in health status such as patterns of income, welfare dependence, crime rates, non-English speaking backgrounds, access to health care, isolation, the environment and education, and applied these to one specific community or region.

Average candidates simply listed some of the inequalities in health status and gave poor or limited discussion. Although they could list some factors, they had difficulty in relating them to a specific community or region.

Poorer candidates showed limited knowledge of inequalities in health status and, as a result, mentioned unrelated factors.

Question 27 : The Sociology of Games and Sports

392 candidates answered this question, but their answers were, on the whole, not good. Many responses were superficial and lacked depth and understanding of the Syllabus. This was particularly evident where a *single* candidate from a large centre chose to answer this option.

- (a) *Describe how sex-role socialisation has influenced the nature of women's sport. In your answer refer to:*
- (i) *patterns of participation of women in sport;*
 - (ii) *the reporting of women's sport in the media.*

The better responses to this part showed a clear understanding of sex-role socialisation, including those factors that have contributed to defining sex-roles. This was clearly linked to a description of the patterns of participation of women in sport and the reporting of women's sport in the media.

The better candidates described participation patterns in terms of historical changes, comparisons with male participation, the types of activities available and participated in by women as well as the level of participation and the quality of the facilities allocated to women's sport. Many suggested that society's challenge to sex-role stereotypes has been paralleled by women's entering traditionally male-dominated sports e.g. football codes and the expansion of unisex competitions. For example:

Many women have challenged the traditional male stereotypes through their participation in, and the establishment of, formal competitions for

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women in Rugby League, Cricket and Boxing. This has also been seen through an increased popularity of unisex competitions such as Touch Football and Netball.

In discussing media, the better responses raised issues related to the degree of coverage in both print media and television. For the former, the absence of women on the priority pages, the relative absence of coverage in general, particularly for lower profile sports, and the focus on glamour and social issues rather than skill and achievement were discussed. In relation to television, the better responses discussed the channels that support women's sport (e.g. ABC), the absence of coverage during prime time and again the focus on attractive, marketable individuals. For example:

The media reporting of women's sport often emphasises appearance, uniforms, relationships and family or children, while little attention is devoted to skills and performance levels.

Average responses described some aspects of participation patterns and media reporting. Often this was limited to a general comparison between men and women. For example:

Male sport dominates the newspaper, with women's sport lucky if it gets a few short articles.

Average candidates were able to give a very general description of sex-role stereotypes, but drew narrow conclusions on how these have affected patterns of participation. For example:

The traditional role for women has been to look after the house and children so they have had less opportunity to play sport.

Poorer responses tended to provide superficial treatment of a personal experience related to sport or participation, and often supported their answers with lists of sports that now involve women. There was no link to socialisation. For example:

More women play sport these days. They play Cricket, Rugby League, Basketball, Golf, Soccer and even Boxing.

- (b) *Discuss the advantages and disadvantages associated with the sponsorship of sport.*

The better candidates demonstrated a thorough knowledge of the broad range of advantages and disadvantages of sponsorship of sport. This broader range was often displayed through an understanding of the positive and negative impacts of sponsorship upon the individual athlete, the team, spectators, administration and the sponsor. For example:

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Sponsorship can provide an opportunity for the elite athlete to train on a full-time basis. In most cases this would be expected to improve performance and provide better individual results, as well as a more successful team, a higher quality competition and a better spectacle for supporters.

Average candidates were able to provide a number of advantages and disadvantages, but failed to present a broad range of both. The advantages identified were often confined to the monetary benefit provided to the athlete and the increased sales to the sponsor. In terms of disadvantages, average responses mostly focused upon the conflict between sponsors and the negative health effects of tobacco and alcohol sponsorship. For example:

Alcohol and tobacco companies which sponsor sports such as the Toohey's Bathurst 100 would encourage young people to drink.

Poorer candidates were able to list, with limited supporting material, a brief number of advantages and disadvantages of sponsorship. Their answers drew mostly upon general knowledge, focusing upon high profile sports people. For example:

More people wear Nike shoes because of Michael Jordan.

Question 28 : Two Social Health Issues B Drug use and HIV/AIDS

1051 candidates answered this question. The quality of responses was very good.

- (a) *Discuss the nature of the human immunodeficiency virus (HIV) and the resultant symptoms at each stage of infection.*

The better candidates thoroughly described the changing nature of the HIV virus. These responses discussed a combination of the following: the ability of the virus to mutate and replicate T4 cells, the link between the T4 cell count and the progressive destruction of the immune system, and modes of transmission.

The better candidates correctly identified each of the stages of the virus, with extensive lists or descriptions of resultant symptoms for each stage. In these responses candidates were able to identify the concept of the window period and the need to re-test for an antibody-positive status using the Eliza test. Correct terminology was often used to identify specific symptoms or stages, for example:

In Stage 4 the individual is at risk of developing opportunistic diseases such as Kaposi Sarcoma, pneumonia, neurological disorders, e.g. meningitis.

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Average responses provided a general or limited description of the nature of HIV, either discussing its effect on the immune system or identifying modes of transmission or the ability of the virus to mask its presence in the body. In these responses candidates showed a basic understanding of the stages with limited resultant symptoms, but often failed to identify symptoms explicitly, for example:

At the final stage the individual contracts AIDS and its related diseases.

Poorer responses either provided an incomplete description of the nature of HIV or listed some of the resultant symptoms. For example:

HIV attacks the immune system and the person gets the flu, or aches, pains and swelling.

Poorer responses did not relate the symptoms to the specific stages.

- (b) *Australia's incidence of HIV infection is low when compared to many other parts of the world. Discuss how strategies adopted in Australia have helped to contain the spread of HIV infection.*

The better candidates provided a good explanation of how a range of strategies have targeted modes of transmission and at risk populations to reduce the incidence of HIV. Examples of the strategies discussed included:

- blood screening for the protection of people who have transfusions;
- needle exchange programs and sharp bins for IV drug users;
- HIV testing of prisoners;
- workplace practices in health and other industries - e.g. safety glasses for medical staff, autoclaving of dental equipment.

These responses also addressed the issue of re-orientating health and education services to reach at risk populations, e.g. AIDS awareness vans being located where young people congregate such as the beach or nightclubs. In each case the effectiveness of the strategies was explained clearly and the reduced incidence of HIV identified.

In the better responses students further argued the value of broad community education programs as a major preventative approach. This included reference to media campaigns, school education programs and National AIDS awareness initiatives.

A typical better response stated:

The Needle Exchange program has been developed to prevent the spread of HIV amongst IV drug users. By providing access to clean needles

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without fear of discrimination or legal implications, safe practices have become the norm. Also associated with this program is counselling and advice on sterilising needles, e.g. 2x bleach, 2x water.

Average responses provided a narrower range of strategies and did not evaluate their effectiveness. These responses failed to link the strategies to the at-risk populations. A typical average response was:

Everyone has been exposed to the TV commercial about the Grim Reaper and, as a result, safe sex practices have been adopted.

Average candidates tended to give a superficial description of the appropriate strategies, failing to explain the essential elements of the program or the initiatives. For example:

The Needle Exchange Program gives out free needles for drug users.

Poorer responses were limited to a list of strategies. The following is typical of these responses:

Australia has controlled the spread of HIV by :

- *Providing free condoms*
- *Health lessons*
- *Media campaigns*

(c) *Discuss the role of governments and communities in reducing the harm associated with drug use.*

Excellent candidates clearly distinguished between the role of Government and the community in reducing the harm associated with drug use and showed a depth of understanding about the concepts of harm, e.g. physical, social, economic, emotional, and harm minimization, e.g. reduce incidence and promote responsible use.

The better responses identified legal drugs as being not only the major source of harm in the community, but also an important target for specific programs.

Typical better responses included:

Legislation and community pressure have led to the adoption and acceptance of smoke-free zones in public transport, work settings and restaurants. By reducing exposure to passive smoking those who choose not to smoke have a reduced risk of developing respiratory disorders.

Domestic violence, crime, family separation, road trauma and other accidents are clearly linked to the abuse of alcohol. Governments can provide policy and programs to target both the consumption of alcohol

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and the associated harms, e.g. excise tax can affect the demand, while government health services can support victims of domestic violence.

Average responses, while providing a range of both government and community strategies, identified only the physical harm associated with drug use. Strategies and their resultant outcomes were described in general terms only. For example:

The Quit program encourage smokers to give up so that the incidence of lung cancer will be reduced.

Poorer responses had a very limited concept of harm, concentrating on abuse of illegal drugs. For example:

Governments should set up groups that help heroin addicts give up drugs.

Often poorer answers consisted of a short list of initiatives only. For example:

To reduce drug use we need:

- counselling*
- education*
- more policy.*

Question 29A : Human Movement Analysis : Biomechanics

Only 42 candidates attempted this question.

In general the quality of responses was good. Most candidates could identify the biochemical principles involved, although the practical application to specific sporting activities proved difficult for some.

- (a) *Explain how biomechanical principles apply to successful performance in the high jump.*

The better candidates provided a detailed explanation of the following points linking them to successful performance in the high jump:

- generation of linear velocity
- conservation of linear momentum to angular momentum, linking angle of take-off, traction at take-off and summation of forces to gain optional height.
- comparison of centre of mass in various techniques, identifying the Fosbury Flop as the preferred method since the centre of mass passes under the bar.

Average responses described several points in more general terms, but failed to identify the importance of centre of mass on the successful performance of the high jump.

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Poorer responses discussed the jump in general terms, failing to identify specific principles. For example:

A fast run-up will increase height.

- (b) *Use biomechanical principles as applied to projectiles to explain how far a javelin will travel through the air.*

The majority of candidates answered this section well, identifying and applying the biomechanical principles of projectile motion to explain how far a javelin will travel through the air.

The better candidates accurately identified the principles related to projectiles, using diagrams to support their discussions of:

- Speed of release
- Angle of release
- Height of release
- Angle of altitude
- Aerodynamics influences (e.g. lift and drag)
- The effects of gravity.

For example:

In order to gain maximum distance the thrower would release the javelin at about 45 degrees to gain maximum speed and height of release.

Average candidates discussed angle and speed of release well.

Poorer responses could discuss either speed or angle of release in general terms only. For example:

A javelin thrown too high won't go too far.

- (c) *Discuss the implications of Newton's first law for the design of softball bats of varying dimensions.*

The majority of responses to this question focused on the mass and velocity of the softball bat. Most candidates, however, failed to apply specific biomechanical principles.

The better candidates stated and applied Newton's first law and its significance in the design of softball bats, discussing the manipulation of:

- length of the bat
- circumference of the bat

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- distributions of mass in the bat, in order to alter inertia and the bat's momentum to cater for individual differences.

An example of such a response was:

A bat with greater mass at the end will create more rotational inertia.

Average candidates identified Newtown's first law in discussions of inertia and momentum that were generally confused. For example:

The heavier the bat, the greater the momentum.

In poorer responses candidates either failed to identify or incorrectly stated Newtown's first law. They discussed in general terms only, and failed to give any biomechanical applications. For example:

A big bat will hit the ball further.

Question 29B : Applied Anatomy, Exercise Physiology, Principles of Training and Fitness Testing

244 candidates attempted this question. Responses varied from very poor to excellent with the full range of available marks being awarded in each section.

(a) *Study the figure below.*

- Identify the major muscle used in the movement from Position A to Position B.*
- Identify the origin and insertion of this muscle.*
- What is the function of the deltoid muscle in this movement?*

The better candidates correctly identified the major muscle as pectoralis major (pectoral group) with the appropriate points of origin (i.e. clavicle) and insertion (i.e. humerus - head of bone in upper arm).

They correctly identified the deltoid as performing the role of either a synergist or stabiliser in the action represented in the figure.

Average candidates indicated the pectorals as being the prime mover, but failed to identify either the correct origin and insertion or the function of the deltoid. Many average candidates confused *origin* with *insertion*.

Poorer candidates incorrectly identified the muscle group and indicated incorrect origin and insertion as a consequence.

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- (b) *Outline the reasons for fatigue in activities performed at maximal intensity for about one minute.*

A thorough understanding of the three energy systems and their interrelationship was necessary in order to answer this question successfully.

The better candidates indicated a clear understanding of the contribution of the anaerobic energy systems in providing for activity at maximal intensity for one minute and the failure of the aerobic and ATP-PC systems to satisfy these requirements. They correctly cited lactic acid accumulation, resulting from anaerobic glycolysis, as the major cause of fatigue. For example:

The ATP-PC energy system can last for only 10 seconds, after which, when performing at maximal effort, the body converts to the lactic acid system (anaerobic). In this system muscle glycogen is broken down to form pyruvic acid which creates new ATP by combining with ADP. It has, however, a waste product, lactic acid. This is released in the muscles, causing muscle fatigue and pain.

Average candidates indicated lactic acid accumulation as the cause of fatigue, but failed to give a clear explanation of why the lactic acid was the chief contributing system. For example;

Activities performed at maximal intensity for about one minute use the anaerobic lactic acid energy system. The anaerobic lactic acid system is inefficient in that lactic acid is produced in large amounts during exercise. The lactic acid is responsible for fatigue as it produces muscle fatigue and soreness. It will take approximately 90 minutes to recover from exercise which uses the lactic acid system and causes muscle fatigue.

Poorer responses failed to acknowledge the role of lactic acid accumulation in causing muscle fatigue, rather they referred to other non-specific causes of muscle fatigue, such as energy shortage or lack of fitness.

- (c) *Study the graphs below.*

Describe the relationship between muscular strength and the FOUR determinants of muscular strength presented above.

This question required candidates to interpret the four graphs to describe how the four determinants presented relate to muscular strength.

The better candidates gave the following explanations:

GRAPH 1 : Tension produced by muscle contraction increases with increasing muscle length up to approximately 130 degrees of resting muscle length.

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- GRAPH 2 : The slower the velocity of muscle contraction in knee extension, the greater the force generated.
- GRAPH 3 : Tension produced by muscle contraction is at its greatest at 120 degrees angle of pull. Greater or lesser angles result in less tension.
- GRAPH 4 : The percentage of fast twitch fibres is in direct proportion to the maximum force that can be produced in knee extension - noting that the higher the percentage of fast twitch fibres, the greater the force possible.

Average candidates correctly identified and interpreted several of the graphs, but failed to be specific in regard to the others. For example:

Muscular strength is the amount of force a muscle uses to lift or pull or push something.

Graph 1 shows us the amount or percent of resting muscle length as tension increases.

*Graph 2 shows us force. As the velocity increases, the force decreases.
Graph 3 shows us angle of pull and the length of the muscle at a different angle. It shows us at which length or angle the muscle works best (120 degrees).*

Graph 4 shows us fast-twitch fibres or how quick the muscle contracts at different forces.

Poorer responses made a generic statement about the four determinants of muscular strength. For example:

Muscular strength depends on resting length, force composition, angle of pull and speed of contraction.

- (d) *Describe the relationship between heart-rate and workload. Use an example to illustrate how this relationship is used in tests that measure cardiorespiratory endurance.*

The better candidates drew a clear relationship between heart-rate and workload by providing statements that indicated that increased workload produces increased heart rate to meet the extra demand for fuel and oxygen.

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These candidates named a specific test (e.g. PWC170, Step test), gave a detailed explanation of the steps involved in administration of the test, and showed how this test related to the estimation of CV endurance. For example:

*Heart rate is a good indicator of how **intense** a workout is and therefore can accurately determine the workload. As we exercise, our heart needs to pump oxygen to fuel these working muscles. As we work harder we require the heart to pump harder and faster to ensure that the oxygen is being delivered efficiently.*

The PWC 170 test is a cardiorespiratory endurance test that calculates a person's VO_2 max. (PWC = Physical work capacity). The procedure:

- *A person is placed on a bicycle ergometer set at a constant workload (i.e. for beginners: 300-500kpm)*
- *The individual is then asked to cycle. They continue to cycle for 4 mins in which their heart rate is noted over 2 mins.*
- *They continue to cycle for 4 min intervals in which the load gets progressively harder (e.g. 170kpm per set). This is continued for 3 sets.*
- *Once the average heart rates are determined for the workloads, they are plotted on a special graph.*

This graph is then continued to a heart rate of 170 bpm where their VO_2 can be read. Therefore, by determining a person's heart rate at various workloads a relationship becomes apparent that allows a comparison to be made.

Average candidates established the relationship between heart-rate and workload, but provided an example that failed to draw clearly the relationship between all aspects.

A number of candidates in this section compared the heart-rate responses of trained to untrained athletes at given workloads. For example:

An untrained person will experience a higher heart rate for a particular workload than a trained person. The untrained person will experience more stress at this workload and therefore will become fatigued more quickly.

Poorer responses described in basic terms the relationship between heart-rate and workload. For example:

If you work harder your heart rate goes up.

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- (e) *Identify an overload technique used in resistance training. Describe the steps involved in this technique.*

This question discriminated between candidates who possessed a sound knowledge of the Option content and those who relied on Core 4 knowledge.

The better candidates identified a specific overload technique (eg super sets, forced repetitions, pre-exhaustion, pyramiding) and accurately described the steps in the administration of the overload technique. For example:

Supersets: performing 2-3 sets one after the other without a rest in between; for example, a leg curl exercise immediately followed by a squat activity.

Average responses provided either a detailed description of an overload technique (without specifying it), or made a general statement about changes in load, sets, repetitions etc as the variables in overload training.

Poorer responses talked about one of the FITT principles, giving no real specifics or named an overload technique without description.

Question 30 : The Art and Science of Coaching

This question was generally well answered and more candidates elected to answer it than in previous years. While the majority were able to recall the broader concepts of coaching techniques and strategies, many failed to apply their knowledge effectively to the given scenarios.

- (a) *Discuss the importance of the coach's communication, demonstration, and observation techniques in the development of physical skill.*

The majority of candidates were able to discuss how a coach uses communication, demonstration and observation techniques; many, however, did not relate those techniques to the stages of skill development

The better candidates showed an excellent understanding of coaching methods, being able to identify and describe each technique and then link them to the three stages of development. For example:

The athletes in the cognitive stage of skill acquisition need to be told clearly and simply the components of the skills they are to perform. For them to understand the skill the coach must be able to convey the components of the skill to them effectively. The coach's instructions need to be clear, concise and he/she must use positive reinforcement. Demonstration should be given of correct technique, identifying 2 or 3

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key points and followed closely by practice, broken into steps so that the beginner can grasp the concept of the skill more easily. The skill of observation is fundamentally important, allowing the coach to identify problems with the performance and offer appropriate feedback.

Average responses included good discussion of communication, demonstration and observation with some links to skill development. For example:

The coach must have good observation techniques to help people develop their skills. He must be able to watch the performance and give good feedback. By observing the skill the coach can pick up mistakes and errors.

Poorer responses briefly discussed communication, demonstration and observation techniques, without linking them to the stages of development.

- (b) *Describe how you, as a coach, would establish an appropriate balance between the development of skill and the development of physical fitness for a group of ten-year-old children in a team sport.*

Generally, most candidates were able to establish the importance of skill development to the specific age group and to incorporate physical fitness into skill practices. The better candidates, however, indicated the correct balance and described a range of appropriate strategies available to the coach. For example:

At such a young age the emphasis should be on fun and enjoyment and the development of basic skills and fundamentals. Both the fitness element and skill development would be successfully catered for by combining a variety of activities e.g. relays, circuits, minor games etc.

Additional strategies described in the better responses included - variety, fun, length of practice time, relevance and partner / group work.

Average responses were brief. They tended to describe the appropriate balance between the development of skill and that of physical fitness, but with limited strategies, or gave a good description of a training session that separated fitness and skill for a team of 10 year olds. For example:

Ten year old children are quite active, but they do not need to be overtrained, so physical fitness would not be the most important thing when coaching this age group. Skill would take priority but while skills are being worked on, so can physical fitness.

Poorer responses did not describe the appropriate balance between fitness and skill and/or included limited strategies.

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- (c) *Individuals within a sports team may have different needs and levels of experience. Explain how the coach can use various strategies to foster the development and potential of all individuals within a team.*

Generally, part (c) was not as well answered as parts (a) and (b).

Most students described a number of strategies that could be used. The better responses linked these strategies directly to a variety of different needs and levels of experience, giving appropriate examples, e.g.

Every individual has different needs. The main ways in which individuals can differ is through age, previous experience, training experiences, current skill level, reasons for participation and gender.

The better candidates were then able to discuss a wide variety of appropriate strategies directly linked to specific individual needs. For example: goal setting, skill groupings, mentors/partners, peer coaching, types of training, varied skill practices and reinforcement.

Average responses gave a range of strategies but, however, failed to link them adequately to the needs and levels of experience of the individual.

Poorer responses did not examine individual needs and levels of experience. They briefly discussed differences between the experienced and inexperienced, and suggested vague or limited strategies.