

**The Application of Anatomical and Physiological
Knowledge to Improve Performance
(2562)**

Specimen Question showing new format

November 2001

2 (a) Before a 100 m sprint race a performer gently warmed up then settled into his blocks. He then ran a personal best of 10.6 secs.

(i) Identify the muscle fibre type used during the warm-up period and say why these fibres were recruited.

Fibre type _____

Why fibres were recruited _____

_____ [2]

(ii) How did the sprinter produce the force and speed of contraction required during the race?

_____ [2]

(iii) Use your knowledge of balance to explain how a sprinter can achieve an effective sprint start.

_____ [2]

(b) Many endurance athletes are now using a power breathe to improve the strength of their respiratory muscles. Why is it important for an endurance athlete to be able to breathe deeply and efficiently?

_____ [3]

- (c) When people train at altitude they have to cope with a lower partial pressure of oxygen in the atmosphere.
Why does the endurance athlete have problems completing his training schedule during the first few days at altitude?

[3]

- (d) (i) Explain the change in heart rate that occurs during the performance of a headstand.

- (ii) Why is it advisable to use distributed practice when trying to improve the headstand?

[3]

[Total: 15]

2 (a) (i) 1 mark for each of

- slow oxidative fibres
- SO fibres are recruited during sub-maximal aerobic activity as they have a high oxidative capacity. **[max 2]**

(ii) 1 mark for each of

- Fast glycolytic fibres are recruited
- These fibres have high contractile speed because of the size of the motor neurone and have highest motor unit strength as they have more fibres in unit **[max 2]**

(iii) 1 mark for each of

- a sprinter needs to be on balance in the set position and centre of gravity must be over area of support
- therefore the athlete's centre of gravity needs to be as close to the edge of the support area as possible
- athlete removes hands from the track and then becomes off balance and moves forward rather than up. **[max 2]**

(b) 1 mark for each of

- during exercise more air needs to be inspired to help increase the supply of oxygen
- more air needs to be expired to help get rid of the carbon dioxide
- if an athlete breathes more deeply they are further increasing the volume of their thoracic cavity
- this further reduces the pressure of air within the lungs
- this increases the diffusion gradient between atmospheric air and the lungs and air will enter the lungs quicker
- strong expiratory muscles means that air can be forced out of the lungs more effectively. **[max 3]**

(c) 1 mark for each of

- because the partial pressure of oxygen drops at altitude this effects the diffusion gradient between the air and the lungs
- this drop in partial pressure means that the haemoglobin is not fully saturated at the lungs
- therefore the oxygen carrying capacity of the blood is reduced
- not as much oxygen is available at the cells for aerobic respiration lowering the athletes aerobic capacity
- the athlete becomes tired more quickly and cannot complete the same amount of training as they did at sea level. **[max 3]**

(d) (i) 1 mark for one of

- the heart rate usually drops when performing a handstand
- gravity acting on the blood causes the blood pressure to increase which is detected by baroreceptors
- this increase causes an increase in parasympathetic stimulation of the heart in an attempt to reduce pressure
- in addition venous return increases and therefore the stroke volume increases

(ii) distributed practice is better as continual changes in blood pressure can make performer feel dizzy and sick. **[max 3]**

[Total: 15]

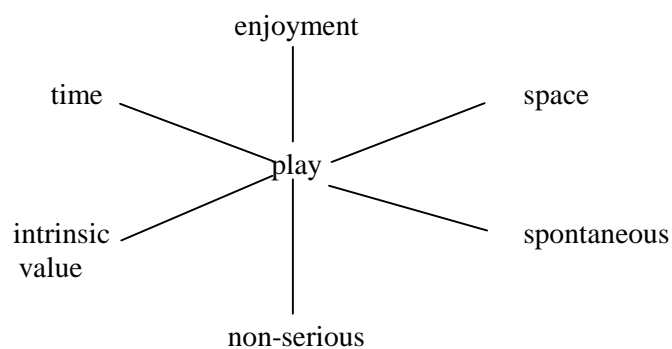
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**Contemporary Studies in Physical Education
(2563)**

Specimen Question showing new format

November 2001

- 2 (a) (i) Choose **four** of the characteristics of play shown in the diagram below and define what each means.



characteristic 1 _____

characteristic 2 _____

characteristic 3 _____

characteristic 4 _____

_____ [4]

- (ii) Now take **three** of your definitions, other than enjoyment and show how a game of hide and seek might differ, e.g. your enjoyment can be spoilt through injury.

_____ [3]

- (ii) Present a case for a total ban on the use of drugs in sport, under the following headings: *reasons for the ban and problems with implementation.*

Reasons for the ban _____

Problems with implementation _____

_____ [6]

[Total: 21]

2 (a) (i) (definitions of play)

- (Time) children decide how long to play the game...
- (Space) children decide where to play/territory/numbers of players...
- (Enjoyment) (reason is to have fun) chasing/hiding etc...
- (Intrinsic value) feel-good factor uppermost/personal expression/friendships/for the sake of it...
- (Spontaneous) very limited rules/rules agreed/immediate gratification/not pre-planned...
- (Non-serious) No extrinsic rewards/non-productive/child oriented/non-competitive

[max 4]

(ii) (Negative characteristics)

- (Time) game ends when only some players want to stop/when bell goes etc.
- (Space) space limitations due to restricted areas/limited hiding places...
- (Intrinsic) some might get upset/hurt/picked on/excluded from group/there are some skills and strategies/extrinsic learning/awareness of environment/may be some rewards...
- (Spontaneous) there are already standard rules/rules not agreed/dispute/pre-organised
- (Non-serious) very serious during the game/child may well get lost/cheating.

[max 3]

(b) (group identification)

1 mark for one of

- Women
- Diasabled
- Race
- Age

[max 1]

(strategies to encourage participation)

1 mark for each of

- Remove all instances of inequalities/discrimination
- Publicity/advertise opportunities/target information/use appropriate role models...
- Facilities/suitability/access e.g.. for disabled/more of them in the right places...
- Less accent on success (more on taking part)/social goals/friendship
- Funding/support financially/sponsorship/concessions...
- Educate/inform about physiological and psychological benefits...
- More coaches/competitions/leagues/changes in rules...
- Encourage self esteem of group concerned.

[max 5]

(c) (i) (anabolic steroids)

1 mark for each of

- Increase in male hormone activity/testosterone...
- Increased training drive/attitude/motivation...
- Increase in strength/possible increase in performance/aid recovery from training/injury...
- Rewards for success so great/others are on drugs...

[max 2]

(ii) (case for a ban)

1 mark for each of (no more than 3 marks from each section)

(reasons)

- Immoral basis of taking drugs to increase performance
- Cheating is wrong/unfair advantage/breaking the rules...
- Lowers the status of sport/bad example to youth...
- Dangerous to health...
- The disgrace/consequences if caught...

(problems)

- Difficulty in successful testing/new drugs being developed/freely available/masking...
- Normal use of some drugs for medical reasons...
- High rewards for winning/worth the risk...
- Illegal support given by some gov. bodies/coaches/countries/fellow competitors...
- Cost of widespread testing/legal aspects...
- Difficulty in access/getting to the athletes during training...

[max 6]

[Total: 21]