

MARK SCHEME for the October/November 2006 question paper

8666 PHYSICAL EDUCATION

8666/01 Paper 1 (Theory), maximum raw mark 100

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

The grade thresholds for various grades are published in the report on the examination for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses.

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- 1 (a) (i) Flexion [1]
- (ii) Either: **Cartilagenous**
 Joints between (bodies) of adjacent vertebrae
 In cervical, thoracic and lumbar region
 Slightly moveable joint
- Or: **Gliding**
 Joints between adjacent spiny processes / synovial joint
 Surfaces are flat
 Surfaces are approx same size
 Limited amount of motion in all directions [2]
- (iii) rectus abdominus [1]
- (b) (i) fast twitch / fast glycolytic / type IIb [1]
- (ii) **structural characteristics**
 large
 few mitochondria
 few capillaries
 low myoglobin
 high glycogen stores (2)
- functional characteristics**
 fast contractile speed
 high contractile strength
 fatigues quickly
 low aerobic capacity
 high anaerobic capacity (2)
- [4]
- (c) A Aorta
 B Bicuspid / mitral value / atrioventricular valve
 C Septum / cordial / myocardium
 D Right Atrium
 E (Superior) venae cavae [5]

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- (d) (i) **Inspiration**
external intercostal muscles contract
diaphragm contracts/flattens
ribs and sternum move upwards and outwards / ribcage
volume of thorax increases
air pressure in lungs decreases / pressure is less than atmospheric pressure
air rushes into lungs (2)
- Expiration**
internal intercostal muscles relax
diaphragm relaxes
diaphragm moves upwards/relaxes
ribs and sternum move in and down
volume of thoracic cavity decreases
air pressure in lungs increases / pressure is greater than atmospheric pressure
air rushes out of lungs (2)
- (ii) more muscles are involved to further increase thoracic cavity
sternocleidomastoid (lifts the sternum)
scalenes (lift ribs further)
pectoralis minor (lifts ribs further)
pressure gradient is increased further between atmosphere and lungs
expiration becomes an active process [3]
- (e) Haemoglobin combines with O₂ in RBCs / oxyhaemoglobin
O₂ travels in the blood to capillaries surrounding muscles
capillary blood has high PP of O₂
Haemoglobin has higher affinity to CO₂ than O₂
muscle cells have low PP of O₂
during exercise PP of CO₂ increases speeding up of dissociation of O₂ from haemoglobin
O₂ transferred from (haemoglobin) of blood into (myoglobin) of muscle tissue
Increase in temperature affects dissociation of O₂ from haemoglobin
Drop in pH affects dissociation of O₂ from haemoglobin (2)
- more O₂ transported to working muscles / to site of energy production (mitochondria)/myoglobin
CO₂ and waste products are removed from the muscle cell (2)
- [4]

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- 2 (a) (i) Flexion [1]
- (ii) humerus [2]
ulna
- (iii) e.g. Biceps curl or other acceptable action
muscles are normally arranged in pairs
whilst one muscle is contracting/concentric action
opposing muscle is relaxing/lengthens/eccentric
to produce coordinated muscle action
contracting/shortening muscle is agonist
relaxing muscle is antagonist [3]
- (iv) (agonist) Biceps brachii [2]
(antagonist) Triceps brachii
- (b) Varying the frequency/number of the stimulus / wave summation
low frequencies/numbers / produce weak contractions
high frequencies/numbers / produce more powerful contractions
varying the number of motor units recruited for the activity /
recruitment of motor units
different motor units are involved / synchronisation of motor units /
spatial summation
All or none law [3]
- (c) muscle lengthens under tension/force
occurs in antagonist muscle
only occurs if antagonist muscle is acting as a brake to assist control
of joint movement
E.g. downward phase of biceps curl. Biceps brachii is antagonist,
lengthens to allow forearm to lower. Applies a brake to lowering
action. Keeps action in control [2]
- (d) (i) (Stroke volume) volume of blood ejected from the ventricles/heart at
each contraction/cardiac cycle
(Heart rate) number of times the ventricles beat in one minute
(Cardiac output) volume of blood ejected by ventricles/heart in one
minute [3]
- (ii) (Cardiac output) $Q = SV \times HR$ (1)
- during exercise venous return increases, increasing Q
Starling's Law of the heart / SV is dependant on venous return
If SV increases, Q increases
Adrenalin increases HR and SV, increases Q / anticipatory rise
SA node stimulated by sympathetic NS increases SV and HR,
increases Q [3]
[4]

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- (e) SA node generates impulse
SA node situated in wall of right atrium
Impulse passes from SA node through atria wall
Causes both atria to contract
Impulse activates AV node in (right atrium)
Impulse passes to bundle of His (in septum)
Bundle of His splits into left and right bundle branches
Impulse spreads down to bottom of heart
Purkinje fibres are in walls of both ventricles
Impulse spreads up and around both ventricles causing them to contract [5]
- 3 (a) efficient/effortless
fluent
aesthetic
learned
goal directed
follows a technical model
controlled
co-ordinated [4]
- (b) (i) sub routines are easily separated
can be practised separately
can be put back together as a whole
Examples: swimming strokes, gymnastic sequences (1 mark for example) [3]
- (ii) subroutines are closely linked
subroutines are difficult to separate
practiced as a whole
Examples: golf swing, football kick, cartwheel (1 mark for example) [3]
- (c) skills are presented as a whole
skill is difficult to break down into sub routines
involves insight / develops a perception of what is required
whole problem is solved
learner uses past experiences
problem solving using memory
learner must be motivated [5]

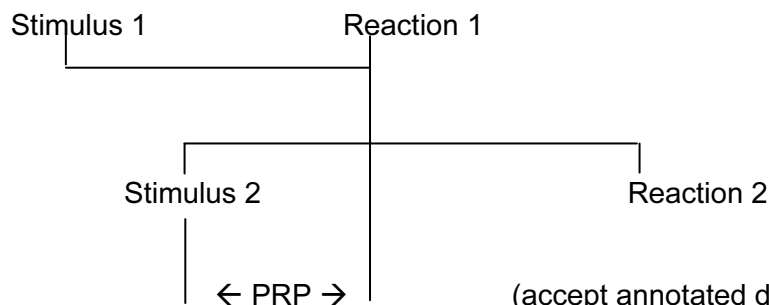
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- (d) (i) the time between the presentation of a stimulus and the first response to it [1]
- (ii) Examples: sprint start / netball toss-up, or any action where there needs to be a quick response to the presentation of a stimulus e.g. whistle, gun [2]
- (iii) whether it is simple or choice reaction time
age
sex
previous experience
stimulus response compatibility
presence of warning signals
anticipation
psychological refractory period
arousal level / easily distracted
fatigue
drugs/alcohol
intensity of stimulus [3]
- (e) hand eye coordination / speed / stamina / manual dexterity / aiming / limb coordination / reaction time / strength / balance (1)
- abilities are improved through childhood
abilities are innate / genetically determined
early fms are walking / running / throwing / catching / skipping / jumping
fms stem from abilities e.g. balance → walking
each fms has subroutines / coaching points to aid learning
fms is practised until mastered
fms needs to be mastered when young
fms matches requirement of specific sports, e.g. catching → cricket fielding
could use Schema theory
fms adopted to sport specific skill (3)
[4]
- 4 (a) (i) not affected by the environment
usually self paced
definite beginning and end
mainly habitual
movements follow a set pattern [2]
- (ii) affected by the environment
mainly perceptual / involve decision making
no definite beginning and end
mostly externally paced [2]

(b) Accept diagram



- (i) 10. (javelin throw) closed end [1]
 - (ii) 11. (pass in rugby) open skill [1]
 - (iii) 12. (tennis serve) closed [1]
 - (iv) 13. (receiving a badminton serve) more open than closed [1]
- (c) (i) performer has automatic control
minimum conscious thought
neural pathways are established / skill is grooved / definition of skilful performance – fluent, max certainty/consistent
can concentrate on other factors e.g. tactics
process feedback [1]
- (ii) return to associative phase / practice / repetition
return to cognitive phase / more instructions
need positive feedback / reinforcement
mental rehearsal important
skill becomes part/sub routine of a new programme
use self analysis
goal setting / new challenge / motivation [3]
- (d) (i) psychological refractory period [1]
- (ii) stimulus one: start to process this information
reaction one:
prior to reaction one a second stimulus is received
unable to react to second stimulus
until reaction to first stimulus complete
single channel hypothesis
therefore delay in reacting to second stimulus
therefore increased reaction time



(accept annotated diagram / may describe through example) [4]

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- (e) (i) increases the probability of a behaviour occurring
 increases the S-R bond
 shapes behaviour
 increases motivation
 positive impact of learning [2]
- (ii) Must use example: swimming badges, certificates, praise for sporting success
 A reward is given
 To strengthen the SR bond
 Shapes the correct behaviour
 Ensures the correct behaviour is repeated
 Reward should be given immediately
 manipulates the environment
 trial and error [4]
- (iii) negative reinforcement is the removal of an unpleasant experience in order to increase the probability of the desired response / removal of praise
 e.g. ball hitting the shins in field hockey: learning to stop the ball with the stick
 punishment is given as a result of a response to prevent the response recurring / weakening S/R bond
 e.g. player messes about in training – not put on field to start game [2]
- 5 (a) (i) (Play)**
 (Swimming) e.g.
1. (who) – adults and children
 2. (when) – on holiday
 3. (where) – in the sea
 4. (why) – for fun
 5. (how) – structured [2]
- (ii) (Physical Education)
 (Swimming) e.g.
6. (who) – all school children
 7. (when) – in the school curriculum
 8. (where) – in the school pool
 9. (why) – to learn skills/safety
 10. (how) – in an organised lesson [2]
- (iii) (Recreation)
 (Swimming) e.g.
11. (who) – all / choice
 12. (when) – any time
 13. (where) – at the local pool
 14. (why) – fitness / social / relaxation
 15. (how) – swim if you choose, flexible arrangement [2]
- (iv) (Sport)
 (Swimming) e.g.
16. (who) – elite performers / those who wish to excel / competitive / win
 17. (when) – during a training session
 18. (where) – in the centre of excellence / designated training pool
 19. (why) – to achieve personal bests / Olympic selection
 20. (how) – highly organised training session [2]

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- (b) fitness
skill development
social skills / working with others
self realisation / personal skills / safety
preparation for life / career / continue sport
moral / desirable behaviour / right and wrong
appreciation of movement / aesthetic appreciation
active learning / physical [4]
- (c) Country to be selected and used in answer.
(Public sector) – government provision / grants / lottery / taxes / grants / to schemes
(Public sector) – local authorities / council tax / rates / community facilities
(Private sector) – sponsorship / business / TV
(Voluntary sector) – NGBs / grants / fund raising / allocate funding from central Government
(Voluntary sector) – Private clubs / companies [5]
- Other valid points should be accepted
- This could be split so that approx 15 opportunities for marks are available
- (d) (i) difference physically between men and women
not all sports are for women / men more interesting to watch in sport
gender role in society / myths / history
role of the media
prize money / sponsorship
role models
attitudes to women
esteem / women confident to compete
fewer coaches [4]
- (ii) increase coverage of women's sport
create role models
highlight the issue of funding / provide sponsorship
educate / create understanding about women's sport
increase number of female presenters
focus on positive aspects – not what women are wearing [4]

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- 6 (a)** competition / winners and losers
physically demanding / fitness required
coaching required
appropriate facilities / equipment
an element of chance in involved
high levels of organisation required / rules
extrinsic rewards available
commitment / dedication **[4]**
- (b)** (advantages)
excellence can be achieved
in poor countries / shop window effect
provision of funding / coaching / kit / full time training
sports science support
coaching
role models **(2)**
- (disadvantages)
only a few can achieve / rest ignored / left behind
only a few receive benefits / kit / funding / coaching
no planning for the future / junior development
ethical problems / need to cheat
burn out / misuse of young talent **(2)**
[4]
- (c)** Answer will vary according to country
Facilities / pools / sports centres / gyms / pitches / parks
Funding / local authorities / grants
Community activities / local authority activities
Clubs
Schools
Business sponsorship
Leagues / Competitions – only give one mark
Coaching / coach education
Voluntary services / private groups **[5]**

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(d) (i) one who is paid a wage/salary for playing sport [1]

(ii) (advantages)
time is available for training
performer does not have to fund themselves by other paid employment
funding for travel / training / kit
likelihood of sponsorship
working with like minded others
availability of top coaching / facilities / centres of excellence
opportunity to secure a future
fame / recognition / titles etc (3)

(disadvantages)
commitment to training
loss of enjoyment / compulsory
early serious injury
demanding sponsors
performing demands / time away from home
no second career when playing career finished
lack of privacy from media
temptation to cheat to maintain place (3)

(iii) (opposite)

fair play	gamesmanship / time wasting
abide by the rules	cheat / drug taking
respect opponents	verbal abuse / violence
respect officials	question decisions
control aggression	lose control
show commitment to training / skills	no application to working at the game
respect body / live correctly	late nights / alcohol
respect spectators / supporters	abuse supporters

[5]