M12/4/SPEXS/SP2/ENG/TZ0/XX/M

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MARKSCHEME

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SPORTS, EXERCISE AND HEALTH SCIENCE

Standard Level

Paper 2

20 pages

General Marking Instructions

Assistant Examiners (AEs) will be contacted by their team leader (TL) by e-mail (or telephone) – if by e-mail, please reply to confirm that you have downloaded the markscheme from IBIS. The purpose of this initial contact is to allow AEs to raise any queries they have regarding the markscheme and its interpretation. AEs should contact their team leader by e-mail at any time if they have any problems/queries during the marking process.

Note:
The DHL courier service must be used to send assessment material to your team leader/senior moderator and the IB Assessment Centre. (However, this service is not available in every country.) The cost is met directly by the IB. It is vitally important that the correct DHL account number is used.

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1. Follow the markscheme provided, award only whole marks and mark only in **RED**.

2. Where a mark is awarded, a tick/check (✓) **must** be placed in the text at the **precise point** where it becomes clear that the candidate deserves the mark. **One tick to be shown for each mark awarded.**

3. Sometimes, careful consideration is required to decide whether or not to award a mark. In these cases write a brief annotation to explain your decision. You are encouraged to write comments where it helps clarity, especially for moderation and re-marking. It should be remembered that the script may be returned to the candidate.

4. Unexplained symbols or personal codes/notations are unacceptable.

5. Record marks in the right-hand margin. For Section A this should be against each mark allocation shown in square brackets *e.g.* ***[2]***. The total mark for a question must equal the number of ticks for the question.

6. Do **not** circle sub-totals. **Circle the total mark** for the question in the right-hand margin **at the end of the question.**

7. Where an answer to a part question is worth no marks, put a zero in the right-hand margin next to the square bracket.

8. Where work is submitted on additional sheets the marks awarded should be shown as ticks and a note made on both the additional sheet and in the right-hand margin of the corresponding question part in the body of the script.

9. Section A: Add together the total for each question and write it in the Examiner column on the cover sheet.
Section B: Insert the total for each question in the Examiner column on the cover sheet.
Total: Add up the marks awarded and enter this in the box marked TOTAL in the Examiner column on the cover sheet.

10. After entering the marks on the cover sheet check your addition to ensure that you have not made an error. Check also that you have transferred the marks correctly to the cover sheet. **All scripts are checked and a note of all clerical errors will be given in feedback to examiners.**

11. If an answer extends over more than one page and no marks have been awarded on a section draw a diagonal line through that section to indicate that it has been marked.

12. If a candidate has attempted more than the required number of questions within a paper or section of a paper, mark all the answers and use the marks of those answers that have the highest mark, **even if the candidate has indicated the question(s) to be marked on the cover sheet.**

13. Mark positively. Give candidates credit for what they have achieved and for what they have got correct, rather than penalizing them for what they have got wrong. However, a mark should not be awarded where there is contradiction within an answer. Make a comment to this effect in the left-hand margin.

Subject Details: Sports, Exercise and Health Science SL Paper 2 Markscheme

Mark Allocation

Candidates are required to answer **ALL** questions in Section A **[30 marks]** and **ONE** question in Section B **[20 marks]**. Maximum total = **[50 marks]**.

1. A markscheme often has more marking points than the total allows. This is intentional.

2. Each marking point has a separate line and the end is shown by means of a semicolon (;).

3. An alternative answer or wording is indicated in the markscheme by a slash (/). Either wording can be accepted.

4. Words in brackets ( ) in the markscheme are not necessary to gain the mark.

5. Words that are underlined are essential for the mark.

6. The order of marking points does not have to be as in the markscheme, unless stated otherwise.

7. If the candidate's answer has the same "meaning" or can be clearly interpreted as being of equivalent significance, detail and validity as that in the markscheme then award the mark. Where this point is considered to be particularly relevant in a question it is emphasized by ***OWTTE*** (or words to that effect).

8. Remember that many candidates are writing in a second language. Effective communication is more important than grammatical accuracy.

9. Occasionally, a part of a question may require an answer that is required for subsequent marking points. If an error is made in the first marking point then it should be penalized. However, if the incorrect answer is used correctly in subsequent marking points then **follow through** marks should be awarded. When marking, indicate this by adding **ECF** (error carried forward) on the script.

10. Do **not** penalize candidates for errors in units or significant figures, **unless** it is specifically referred to in the markscheme.

SECTION A

1. (a) the volume of air inspired or expired (per breath) ***[1]***

(b) (157.5 – 145.7 = 11.8
11.8/157.5 = 0.074
0.074 × 100 =) 7.49/7.5% ***[1]***

(c) when tidal volume/V_T increases, inspiratory reserve volume/IRV decreases by the same volume / any increase in tidal volume/V_T is reciprocated by a fall in IRV;
IRV volume decreases during exercise;
tidal volume will increase during exercise;
the IRV is additional inspired air over and above tidal volume/V_T; ***[1 max]***

(d) the greater volumes of V_E max are due entirely to the combination of larger tidal volumes/V_T and faster respiratory frequencies/f_R during cycling;
these increases are a result of the H^+ ions produced from the breakdown of carbon dioxide stimulating the respiratory centres of the brain;
the different posture required in cycling is thought to be a factor in producing higher levels in all three variables / *OWTTE*;
smaller muscle mass recruited in cycle ergometry as opposed to treadmill running results in greater V_E max in order to maintain a given oxygen consumption;
reduced number of motor units recruited in cycle ergometry as opposed to treadmill running results in greater V_E max in order to maintain a given oxygen consumption;
the static nature of the upper body muscle contraction puts increased stress on the respiratory pump to get blood back into the chest cavity / makes the respiratory pump less effective;
differences in the entrainment of muscles of the diaphragm / a change or resetting of the respiratory rhythm/rate;
skill/motor control influencing motor unit recruitment patterns (for the two different modes of exercise);
other differences in ventilation response to exercise between running and cycling include arterial oxygenation;
oxygen diffusion capacity *i.e.* higher desaturation during running, explained by the crouched position on the bicycle, a decrease in thoracic volume;
a lower efficiency of the peripheral muscle pump when cycling compared to running; ***[3 max]***

(e) standard deviation (SD) measures how much a set of data varies from the mean of that data / tells you the spread of the data about the mean;
an estimate of the average variability / spread of a set of data measured in the same units of measurement as the original data / the square root of the variance;
a small SD indicates that the data is clustered very close around the mean value, whereas a large SD indicates the data are spread out over a large range of values;
e.g. the smaller SD for respiratory frequency / V_E max during treadmill running suggests that the participants were more homogenous in their treadmill running responses; ***[2 max]***

(f) 25 ***[1]***
Accept values 25–26.

(g) significantly higher values of respiratory frequency have been reported for walking with *versus* without poles;
chemoreceptors/changes in CO_2/blood acidity levels (low pH) due to presence of hydrogen ions would have stimulated respiratory frequency due to higher workload in both conditions;
lung stretch receptors/muscle proprioceptors *i.e.* when using poles, with the increase in the propulsive action of the upper body the interaction of the ventilatory rhythm may be impacted upon due to the proximity of the respiratory and locomotor muscles due to muscle proprioceptors / *OWTTE*;
respiratory frequency/energy cost is higher when using poles (due to the added weight of the poles);
combined with eccentric exercise involved with downhill walking, using the poles may have resulted in different/less efficient walk mechanics;
it is also likely that an amplified arm swing while using hiking poles increases energy expenditure when contrasted with a natural and smooth no pole arm action / *OWTTE*; ***[2 max]***

2. (a) glucose/monosaccharide ***[1]***

(b) carbohydrate – primary fuel source;
lipid/fat – energy storage / structural component of membranes;
protein – promotes growth and repair of muscle tissue;
water – transporting nutrients/waste products / thermoregulation / helps maintain blood pressure / *OWTTE*; ***[2 max]***
*Award **[1]** for macronutrient and role.*

(c) the onset of exercise results in a fall in insulin output of the pancreas;
as a result of increased blood flow provoked by the exercise, the insulin receptors on the muscle cells become more effective in transporting the hormone across the cell membrane;
as a result of the lower insulin levels, the liver is stimulated to release stored glycogen/glucose;
it is this hormonal balance system that keeps the level of blood glucose within the normal narrow range during exercise / *OWTTE*;
insulin plays an important role in regulating glucose transport into skeletal muscle;
the ability of insulin to bind to its receptors on muscle cells increases during exercise (increased blood flow to the muscles);
the body's sensitivity to insulin increases during exercise (reducing the need to maintain high plasma insulin concentration for transporting glucose into the muscle cells); ***[2 max]***

3. (a) femur / tibia / patella; ***[1]***
*Award **[1]** for two correct responses.*

(b) during the upward motion/preparation phase/hamstring curl the joint action is flexion;
during the upward motion/preparation phase/hamstring curl the hamstring contracts concentrically/the quadriceps relaxes eccentrically;
during the upward motion/preparation phase/hamstring curl the joint action is extension;
during the downward motion/action phase quadriceps contracts concentrically while the hamstring relaxes eccentrically;
during the downward motion/action phase quadriceps contracts concentrically and the joint action is extension; ***[3 max]***
*Award **[1]** for identification of the joint action, **[1]** for identification of agonist muscle and type of contraction, **[1]** for antagonist muscle and type of contraction.*

4. (a) feedback for information about performance execution (knowledge of results)/outcome *e.g.* successful basket;
knowledge of performance *e.g.* information about basketball shooting technique;
feedback for reinforcement (either positive or negative);
feedback as punishment;
feedback as motivation; ***[2 max]***

(b) the capacity of the short-term sensory store (STS) is regarded as limitless (storing massive amounts of sensory information without much recoding, *i.e.* the information is recorded in the same way as it came into the system in terms of spatial location and form);
information is held in the STS for perhaps as little as one second;
selected information may be passed onto the short-term memory (STM) for further processing;
STM is the capacity for holding a small amount of information in mind in an active, readily available state for a short period of time;
the duration of STM (when rehearsal or active maintenance is prevented) is believed to be in the order of seconds (estimates of STM capacity are 7 plus or minus 2 units, depending upon the experimental design used to estimate capacity);
the STM receives coded stimuli from both the STS via selective attention and the long-term memory (retrieval);
the STM sends information to the long term memory for future reference (rehearsal);
the STM makes information available for decision making; ***[3 max]***
Responses should clearly identify differences in relation to capacity, duration or retrieval.

(c) PRP occurs when two stimuli are presented close together so that the reaction time to the second stimulus is slower than normal;
if we detect a stimulus, and are processing that information whilst a second stimulus comes along, we are unable to attend to and process the second stimulus until we have finished processing the first one (single channel mechanism);
the effect of this is to make our reaction time to the second stimulus longer;
this increase in reaction time is referred to as the psychological refractory period/PRP;
sport-specific example to explain how PRP explains deception in sport *e.g.* dodges/feints – look one way but pass/shoot in the opposite direction in soccer / drop shots in tennis / googlies/doosras in cricket; ***[3 max]***
Accept marking points in a sufficiently detailed schematic diagram.

(d) progressive part practice is used when the skill is too complex/difficult for the learner / the component parts can be isolated / a lot of information processing is required;
progressive part practice is useful when the mechanics/technique of the movement is important (*e.g.* closed skills such as swimming);
progressive part breaks down a skill into its component parts *e.g.* breast-stroke swimming can be broken down into body position, the glide, the arm pull and the leg action;
progressive part practice is used when there is an element of danger;
progressive part practice is used to build confidence; ***[2 max]***
*Award **[1 max]** for an example of progressive part practice in swimming.*

SECTION B

5. (a) (i) origin is the attachment of a muscle tendon to a stationary bone;
insertion is the attachment of a muscle tendon to a moveable bone; ***[2]***

(ii) the axial skeleton protects internal organs (*e.g.* the brain, spinal cord, heart and lungs);
the axial skeleton acts as a calcium store;
the appendicular skeleton provides attachment points for muscles that enable body movement;
the appendicular skeleton provides protection for reproductive organs;
the appendicular skeleton acts as a source of calcium / *OWTTE*; ***[3 max]***

(b) ball and socket joint – mulitiaxial/polyaxial/permit movement around three axes;
flexion and extension;
abduction and adduction;
rotation – bone revolves around its own longitudinal axis;
circumduction – movement of the distal end of a body part in a circle;
hyperextension;
joint dislocation – displacement of a bone from a joint; ***[4 max]***

(c) high capillary density;
high myoglobin content;
high mitochondrial density;
high triglyceride stores;
high oxidative enzyme activity;
high ability to generate ATP;
fatigue level is low; ***[4 max]***
Response to link these features to improved endurance performance.

(d) (i) bodies launched into the air (*e.g.* shot put) that are subject only to the forces of gravity and air resistance are termed projectiles;

speed of release: ***[2 max]***
speed of release is defined as the magnitude of the projectile's velocity vector at the instant of release;
when projectile angle and height are held constant (*e.g.* an elite shot putter using the O'Brien technique), speed of release will determine range (horizontal displacement);
the O'Brien technique increases speed by application of force over a longer period of time, as it incorporates a one and three quarter turn / *OWTTE*;

height of release:
for a given projection and speed angle, the greater the relative projection height the longer the flight time and greater the range (horizontal displacement);
given that speed of release and angle of release are equal for two shot put athletes, the taller athlete has an advantage;

angle of release: ***[2 max]***
angle of release is defined as the angle between the projectile's velocity vector and the horizontal at the instant of release;
activities requiring maximum horizontal range such as shot put tend to use smaller angles than those in which maximum height is the objective;
between 35 and 45 degrees is the optimal angle of release for shot put which should be incorporated into the athlete's technique; ***[4 max]***

(ii) *Newton's first law (the law of inertia)*:
the shot putter has to apply force to overcome the inertia of the shot / *OWTTE*;

Newton's second law (the law of acceleration):
the O'Brien technique incorporates a one and three quarter turn/glide technique/rotation and enables force to be applied over a longer period of time and increasing the acceleration of the shot/transfer of momentum / *OWTTE*;

Newton's third law (the action/reaction law):
for every action there is an equal and opposite reaction;
the shot putter contracts their muscles to apply force against the ground (action);
the ground applies an equal but opposite force against the shot putter (reaction); ***[3 max]***

*Award **[1]** for each law of motion.*

6. (a) (i) hemoglobin is the principal carrier of oxygen in the erythrocytes/red blood cells / hemoglobin is the iron-containing oxygen transport protein in the red blood cells / 98.5 %/high percentage of blood O_2 is bound to hemoglobin (in red blood cells);
at rest the oxyhemoglobin releases only a quarter of its oxygen to resting tissues (50 ml l^{-1}) / during strenuous aerobic sports, oxygen demand increases and oxyhemoglobin releases up to 150 ml l^{-1} of its oxygen to the working tissues / *OWTTE*;
hemoglobin transports oxygen from the lungs to the rest of the body, such as the muscles;
the oxygen content of mixed venous blood falls dramatically during exercise compared to resting levels;
it releases its load of oxygen to the supporting muscles;
each atom of iron is capable of binding to a molecule of O_2 / each hemoglobin molecule carries four molecules of oxygen; ***[2 max]***

(ii) increased left ventricular volume;
increased left ventricular wall thickness/hypertrophy;
there is an increase in the strength potential of left ventricular contractions;
increased stroke volume at rest/during submaximal exercise for a standardized workload/during maximal exercise;
left ventricle fills more during diastole;
blood plasma increases causing an increased end-diastolic volume;
increased contractility/elastic recoil increases the ejection fraction of left ventricle;
these adaptations result in lower resting and submaximal heart rate for a standard workload;
increased capillarization of trained muscles;
greater opening of existing capillaries in trained muscles;
more effective blood redistribution;
increased arterio-venous oxygen difference (a-VO_2 difference);
heart rate recovery period is reduced / heart rate returns to its resting level much more quickly after standardized sub maximal exercise/maximal exercise;
resting blood pressure is generally reduced by endurance training; ***[4 max]***

(b) during static exercise systolic blood pressure increases;
during static exercise diastolic blood pressure increases;
this is due to increased resistance of the blood vessels due to:
muscles squeezing the veins;
increasing peripheral resistance;
increasing intra-thoracic pressure due to the contraction of the abdominal muscles;
increasing peripheral resistance reduces muscle perfusion;
the magnitude/size of the hypertensive response relates directly to the intensity of the static effort;
the magnitude of the hypertensive response relates directly to the amount of the muscle mass involved in static exercise;
there appears to be no differences between racial groups in the diastolic or systolic blood pressure response to static exercise; ***[4 max]***

(c) catabolism involves chemical reactions that break down complex organic compounds into simple ones / involves the network of chemical pathways in which molecules are broken down into smaller molecules / *OWTTE*;
catabolic reactions are usually exergonic/exothermic (because they release more energy than they absorb) / catabolic reactions release the chemical energy stored in organic modules / *OWTTE*;
the reactions involved in aerobic respiration are catabolic reactions that involve the breakdown of glucose in the presence of oxygen / *OWTTE*;
anaerobic glycolysis is the breakdown of glucose to lactic acid when limited amounts of oxygen/O_2 are available / *OWTTE*;
glycolysis plays a role in both aerobic and anaerobic ATP production / glycolysis does not require oxygen / anaerobic glycolysis / *OWTTE*;
the process of glycolysis is the same regardless of whether oxygen is present or not / the presence of oxygen determines the fate of the end product of glycolysis;
without oxygen the NADH molecules cannot be converted to ATP, and the pyruvate is reduced to lactic acid;
in the presence of oxygen the three carbon pyruvate molecules lose a carbon atom and enters the citric acid cycle via acetyl coenzyme A, releasing carbon dioxide, water and ATP/ *OWTTE*;
oxidation of glucose to produce ATP involves four sets of reactions (glycolysis, formation of a acetyl coenzyme A, the Krebs cycle, electron transport chain) / *OWTTE*; ***[4 max]***

(d) players of invasive team games *e.g.* soccer/rugby/hockey/basketball/netball – use three metabolic systems to provide the essential ATP needed for muscle contraction;
ATP–CP, lactic acid and aerobic energy systems;
in the ATP–CP system, inorganic phosphate (Pi) is separated from creatine phosphate (PCr) (through the action of creatine kinase);
the Pi combines with ADP to form ATP (using the energy released from the breakdown of PCr);
the ATP–CP system is anaerobic;
the lactic acid system involves glycolysis, through which glucose/glycogen is broken down to pyruvic acid;
when glycolysis occurs without oxygen, the pyruvic acid is converted to lactic acid;
oxidation of carbohydrate/CHO involves glycolysis, the Krebs cycle, and the electron transport chain;
fat oxidation begins with β-oxidation of free fatty acids and involves the Krebs cycle and the electron transport chain;
energy yield for fat oxidation is much higher than for CHO oxidation;
protein oxidation is more complex/contributes relatively little to energy production/generally less than 5 %;
evaluated in terms of intensity and duration of the demands of the sport / the relative contribution of the pathways for ATP production differs, depending on exercise intensity and duration;
in short-duration, intense exercise the ATP–CP system provide the energy for exercise;
for less intense exercise of longer duration (1 to 2 minutes), anaerobic reactions of glycolysis generate most of the energy;
as exercise progresses beyond several minutes the aerobic system predominates; ***[6 max]***
*Award **[1]** for an evaluation (implications and limitations) of each energy system, up to **[3 max]**.*
*Award **[1]** for an appropriate sporting example, from each energy system, up to **[3 max]**.*

7. (a) skill is learned/requires practice/results from experience;
skill has an end result/is goal directed *e.g.* scoring one point from a free throw in basketball;
skilled performers achieve their goals consistently/with consistency/with maximum certainty *e.g.* goal kicking in rugby;
skill results in economic and efficient movement/well coordinated and precise movement whereas the novice is slow, error prone and awkward *e.g.* efficient sprint technique allowing maximum speed with controlled movement;
a skilled performer can vary the timing of a movement according to the demands of the task *e.g.* a 1:2 pass in football;
a skilled performer's movement appears fluent/controlled/aesthetically pleasing *e.g.* figure skating routine/execution of dive;
a skilled performer makes appropriate decisions/is a good "technician" who is able to use technique at the right moment; ***[4 max]***
*Award **[2]** for distinguishing characteristics and **[2]** for appropriate examples.*
A range of sport specific examples should be linked to consistency, accuracy, control, learned, efficiency, certainty, goal directed and fluency.

(b) pre-exercise screening is a key principle before sedentary individuals start becoming more physically active;
determining one's readiness for physical activity involvement is a prudent and important first step in the fitness assessment and exercise prescription process;
the Physical Activity Readiness Questionnaire (PAR-Q) has been recommended prior to low to moderate exercise involvement;
PAR-Q can be self-administered at one's own convenience *e.g.* in one's own home;
PAR-Q is composed of seven questions that have been shown to be sensitive for detection of pre existing medical conditions/injuries;
if an answer is yes to one or more of the PAR-Q questions it is essential to consult/talk with your doctor before commencing an exercise programme;
if the answer is no to all PAR-Q questions, it can be reasonably assumed that it is safe to become more physically active;
the possibility of undetected serious disease is diminished by administering the PAR-Q;
the PAR-Q not only helps you determine your readiness to begin exercise, it also determines your readiness to intensify a physical activity/exercise programme;
PAR-Q is designated to prevent sudden death syndrome;
PAR-Q is designated to prevent muscle/joint/bone injuries; ***[4 max]***

(c) subjects run between two lines 20 m apart trying to keep up with a set of pre-recorded bleeps on a tape/CD;
every minute the level changes (and the bleeps get closer together) and the running speed gets 0.5 km/h faster (start speed is 8.5 km/h);
the athlete tries to keep up with the recording getting as many levels and shuttles into the test as possible;
should an athlete miss two shuttles in a row they are excluded from the test;
each score implies the test level and the number of shuttles completed successfully (*e.g.* 4/6 = level four and six shuttles completed);
the runner stops when he/she can no longer maintain the running speed and his/her score is recorded as the final level and number of shuttles completed;
this score can be used as a basic measure of aerobic fitness, which becomes a reference point against which future changes can be monitored;
a validated table of values enables scores on the test to be converted into an estimate of maximum oxygen consumption;
there are variations in the validated table for specific population groups;
in order for the test results to be accurate and reproducible/comparable with scores obtained elsewhere, it is essential that the test procedures are carried out properly/in a standardised way/needs to be exact measurement of the 20-metre distance/use a standarised running surface/pre-test preparation/environmental conditions;
medical clearance is required pre-test;
the test starts slowly/there is a gentle warm-up as the test progresses;
advisable to do some light jogging and gentle stretching before starting;
the coach/teacher can test several subjects at the same time;
possible to administer and test yourself;
for the results to be valid, athletes must give their maximum effort when performing the test;
large numbers of people can be tested at any one time, although the observers must be able to cope with the recording of levels and shuttles as athletes drop out; ***[4 max]***

(d) three models of body composition: chemical (fat, protein, carbohydrate, water, mineral)/anatomical (adipose tissue, muscle, organs, bone, other)/ two-compartment (fat mass, fat-free mass);
the assessment of body composition provides additional information beyond the basic measures of height and weight;

e.g. body mass index (BMI):
WHO classification system for underweight, overweight and obese based on BMI values / racial/ethnic differences affect the relationship between BMI and obesity levels;
standard height-weight tables do not provide accurate estimates of what an athlete should weigh because they do not take into account the composition of the weight / an athlete can be overweight according to the height-weight tables yet have very little body fat;
the calculation is simple and easily repeated;
reference values for different groups can lead to misinterpretation (underweight, overweight, obese, elite endurance, elite power/strength);

e.g. skinfold fat thickness:
most widely applied field technique to estimate body composition;
recommended for accuracy that measurements from three or more skinfold sites be used (in a quadratic/curvilinear equation);
linear equations underestimate the body density of lean people which causes over estimate of body fat/opposite for obese people (body density is overestimated and body fat is underestimated);
there are limitations and reliability issues if the testing is taken by an inexperienced person;

e.g underwater weighing:
is the most widely used test of body density and in the past was the criterion measure for other indirect measures;
the equipment required to do underwater weighing is expensive / tanks are mostly located at university or other research institutions, and there is generally not easy access for the general population;
underwater weighing may underestimate body fat percentage of athletes as they tend to have denser bones and muscles than non-athletes, and may overestimate body fat percentage of elderly patients suffering from osteoporosis;
relative body fat in lean athletic population tends to be overestimated with bioelectrical impedance; ***[6 max]***
*Award **[3 max]** per method of testing.*

(e) physical proficiency abilities (physical factors) relate to physical or structural aspects of the body;
they include static strength / dynamic strength / explosive strength / trunk strength / extent flexibility / dynamic flexibility / gross body coordination / gross body equilibrium / stamina;
perceptual motor abilities (psychomotor factors) are physical attributes that combine the senses;
involve movement control;
they may be associated with visual and/or auditory perception or cognitive speed;
these include limb coordination / control precision / response orientation / reaction time / speed of arm movement / rate of control / manual dexterity / finger dexterity / arm hand steadiness / wrist finger speed / aiming; ***[2 max]***