M09/4/ECOSO/SP1/ENG/TZ0/XX/M+

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MARKSCHEME

May 2009

ECOSYSTEMS AND SOCIETIES

Standard Level

Paper 1

11 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 to IB Cardiff. (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.

If you have any queries on **administration** please contact:

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1. Follow the markscheme provided, do **not** use decimals or fractions and mark only in **RED**.

2. Where a mark is awarded, a tick (✓) should be placed in the text at the **precise point** where it becomes clear that the candidate deserves the mark.

3. Sometimes, careful consideration is required to decide whether or not to award a mark. In these cases write a brief note in the **left hand margin** to explain your decision. You are encouraged to write comments where it helps clarity, especially for moderation and re-marking.

4. Unexplained symbols or personal codes/notations on their own are unacceptable.

5. Record subtotals (where applicable) in the right-hand margin against the part of the answer to which they refer next to the mark allocation. Do **not** circle subtotals. **Circle the total mark for the question in the right-hand margin opposite the last line of the answer.**

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

7. Add together the marks for each question and enter this in the box marked TOTAL in the Examiner column on the front cover of the exam paper.

8. After entering the marks on the front cover check your addition to ensure that you have not made an error. Check also that you have transferred the marks correctly to the front cover. **We have script checking and a note of all clerical errors may be given in feedback to examiners.**

9. Every page and every question must have an indication that you have marked it. Do this by **writing your initials** on each page where you have made no other mark.

10. A candidate can be penalized if he/she clearly contradicts him/herself within an answer. Make a comment to this effect in the left hand margin.

Subject Details: Ecosystems and Societies SLP1 Markscheme

General

A markscheme often has more specific points worthy of a mark than the total allows. This is intentional. Do not award more than the maximum marks allowed for part of a question.

When deciding upon alternative answers by candidates to those given in the markscheme, consider the following points:

- Each marking point has a separate line and the end is signified by means of a semicolon (;).
- An alternative answer or wording is indicated in the markscheme by a (/) either wording can be accepted.
- Words in (…) in the markscheme are not necessary to gain the mark.
- Words that are underlined are essential for the mark.
- The order of points does not have to be as written (unless stated otherwise).
- If the candidate's answer has the same meaning or can be clearly interpreted as being the same as that in the mark scheme, then award the mark.
- Mark positively. Give candidates credit for what they have achieved, and for what they have got correct, rather than penalising them for what they have got wrong.
- Remember that many candidates are writing in a second language. Effective communication is more important than grammatical accuracy.
- Occasionally, a part of a question may require a calculation whose answer is required for subsequent parts. If an error is made in the first part then it should be penalized. However, if the incorrect answer is used correctly in subsequent parts then **follow through** marks should be awarded. Indicate this with "**ECF**", error carried forward.
- Units should always be given where appropriate. Omission of units should only be penalized once. Indicate this by "**U-1**" at the first point it occurs. Ignore this, if marks for units are already specified in the markscheme.
- Do not penalize candidates for errors in significant figures, unless it is specifically referred to in the markscheme.

1. (a)

Energy source	***Advantage***	***Disadvantage***
natural gas;	plentiful supply at present / cheaper than burning coal or oil;	burning releases carbon dioxide / non renewable;
wind;	renewable resource / once turbines built it is cheap;	only available when wind blows / not always near population centres;

[3 max]

*Award **[1 max]** for natural gas/wind.*
*Award **[1]** for each pair of correct responses of advantages and/or disadvantages.*
Do not credit "cheap" with no qualifier.
Accept any reasonable advantages or disadvantages.
Credit advantages and disadvantages for an incorrect source to avoid error carried forward.

(b) inertia / satisfied with existing system;
country wishes to increase diversity of energy sources;
pressure to meet quotas for renewable energy;
some resources not continuously available;
country does not have that resource *e.g.* HEP, near sea for wave; ***[2 max]***
Accept other reasonable responses.

(c) people are selfish / inertia / tragedy of the commons;
people desire a better lifestyle which is equated with wanting more *e.g.* bigger car / having a fridge;
poor design of equipment/buildings *e.g.* standby on electrical equipment / phantom loads;
education; (*do not accept* "don't know better") ***[2 max]***

(d) environmental systems increase their disorder / all energy ends up as heat;
environmental systems increase their order so go against the law for a short time; ***[1 max]***
Do not credit answers which just state the second law without relating it to environmental systems.

2. (a) zonation; ***[1]***

(b) time submerged in sea water decreases / time in air increases / salt water / slope/gradient / area of beach habitat / exposure to wind / oxygen availability / temperature / exposure to sun; ***[1]***

(c) cannot survive drying out for too long;
cannot compete with organisms which are always submerged;
are able to close their shells so conserve water/not dessicate, but need water to be able to feed;
turbulence increases food availability; ***[1 max]***
Accept other reasonable responses.

(d) *herbivory*: process of an animal eating a plant;
predation: process of an animal eating another animal; ***[2]***

(e)

Order	***Term***
Smallest 1	habitat
2	ecosystem
3	biome
4	biosphere;

[1 max]

*All four in correct order needed for **[1]** mark.*

3. (a) model B
corridor allows organisms to migrate between reserves / greater number of opportunities for mating with a wider population / greater genetic diversity because more individuals can mix; ***[1]***
No marks for stating model without reason.
Accept Model A if valid reason is given. e.g. separate reserves mean that if wildlife in one are wiped out/killed, others may survive.
Reasons must relate to genetic diversity.

(b) (i) living mass is large in the rainforest/tall trees / many layers of vegetation / large amounts of nutrients stored as there is a lot of biomass per unit area; ***[1]***

(ii) high levels of rainfall washing nutrients out of the soil / leaching results in infertile soil/loss of nutrients; ***[1]***

(iii) open because matter/nutrients (<u>and</u> energy) are freely exchanged outside the system; ***[1]***

(iv) *Strengths*:
simple to interpret/quantitative to some extent / pictorial so easy to compare with others;
Limitations:
no indication of quantities as numeric values/simplistic; ***[2]***

(c) found in parts of the world with high population density so pressure on the land to remove forest and grow food;
it takes a long time to recover from logging/destruction;
have biological hotspots with high biodiversity so many species affected;
valuable timber is removed and so forest damaged; ***[2 max]***
Do not accept acid rain (Brazil is low for acid rain).
Do not accept tourism/ecotourism unless tied to impacts on habitat(s).
Credit answers which either address reasons why this ecosystem is intrinsically fragile or reasons why people might destroy the habitat.

4. (a) (i) *Sustainable yield*: rate of increase is natural capital / resource that can be exploited/taken/harvested without depleting the original stock; ***[1]***
OWTTE.

(ii) *High:* 106 tonnes and *low:* 106 tonnes (*units required*); ***[1]***
*Both correct values required for **[1]**.*

(iii) $\left(\frac{48-24}{24}\times 100\right) = 100\%$ difference ***[1]***

(iv) low intensity;
because more fish are left in the sea to breed and increase stocks / the trend in low intensity is to have larger catch in year 4 compared with year 4 in high intensity; ***[2]***

(b) ignorance of how "in danger" a stock is;
miscalculation of how many are available;
short-term gain is more important than longer term growth of the industry;
if starving will break the law to catch food / hard for law-keepers to monitor catch;
oceans are huge/vast areas;
international boundaries make legislation difficult; ***[2 max]***
Accept other reasonable responses.

(c) *Terrestrial*:
most food harvested from lower trophic levels / as crops/plants/herbivores/ cattle *etc*. so less heat/respiratory losses / more efficient fixation of solar energy as does not have to get through water first / less efficient use of land area (efficiency in terms of space rather than energy);

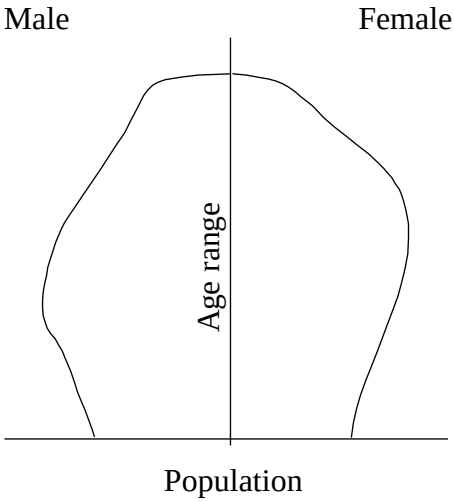
Aquatic:
most food from higher trophic levels/bigger fish/higher up food chain so much energy has been lost / energy conversions more efficient as fewer warm-blooded animals which use most energy to keep body temperature stable / more efficient use of land area (efficiency in terms of space rather than energy); ***[2]***

(d) fish farming / change fishing grounds / eat alternative food sources / new technologies to ensure immature fish not caught / less wastage / research into alternative fish species / monitoring population numbers carefully to check stocks/research in GM fish (suitable for aquaculture); ***[1]***
Accept other reasonable responses.

5. (a) *Crude death rate*: number of deaths per thousand individuals in a population per year; ***[1]***

(b) the share of global population is decreasing because the rate of increase is much higher in LEDCs; ***[1]***
Do not credit reasons why birth rates are decreasing.

(c) Award **[1]** for diagram which shows contracting population and large numbers of older people; *e.g.*



Award **[1]** for labels – male, female, population size on x axis, age ranges on y axis; ***[2]***

(d) (total fertility is) the (average) number of children per woman in her lifetime / her reproductive years; ***[1]***

(e) smaller footprint because: older people eat less/go out less/fly less/travel less;
are more aware of environmental impacts so use less energy;

larger footprint because: older people have more leisure time so fly/have more holidays / live in larger houses;
no longer care about saving energy/resources / consume the same as middle-aged adults whereas children consume less; ***[2 max]***
Accept other reasonable responses.

6. (a) *Natural income*:
yield/output that can be used by people without diminishing the capital / same as sustainable yield;

Natural capital:
natural resources that can produce goods and services / the natural stock/storage of a resource; ***[2]***

(b) it has no economic value / not easy to quantify;
value of resource usually measured in economic terms;
need to consider aesthetic or intrinsic value which is subjective;
views can be diverse and hard to assess; ***[2 max]***

(c) by acid deposition which kills conifers;
by tropospheric ozone damaging forests;
photochemical smog obscures the view;
atmospheric particulates obscure the view;
air pollution can cause breathing difficulties/produce bad smell which spoils experience of people at viewpoint;
chimneys/car parks may be built and are visual pollutants;
global warming changing vegetation and glaciers melting; ***[2 max]***