NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2021

LIFE SCIENCES: PAPER II

MARKING GUIDELINES

Time: 2 hours 100 marks

These marking guidelines are prepared for use by examiners and sub-examiners, all of whom are required to attend a standardisation meeting to ensure that the guidelines are consistently interpreted and applied in the marking of candidates' scripts.

The IEB will not enter into any discussions or correspondence about any marking guidelines. It is acknowledged that there may be different views about some matters of emphasis or detail in the guidelines. It is also recognised that, without the benefit of attendance at a standardisation meeting, there may be different interpretations of the application of the marking guidelines.

SECTION A

QUESTION 1

1.1 1.1.1 Population

1.1.2 Species

1.1.3 Carrying capacity

1.2 1.2.1 The ecological role of a species/organism
OR
Position/function/role of a species in the food chain/ecosystem/ habitat
OR
The interactions of a species with biotic and abiotic components in its ecosystem/habitat OR
Combination of biotic and abiotic factors allowing a species/organism to survive NOT environment
(*Candidates will word this in many different ways – consider each carefully)*

1.2.2 The adult and the young occupy different niches
Therefore, the young and adult do not compete for the same food higher chance of survival
More access to food Less/no competition
Butterfly/adult can fly, therefore disperse to new areas. less competition for food
If butterfly/adult and larvae are different then they have different predators. less competition
Chrysalis protects the larvae while developing into an adult.
Overwintering different habitats reduce competition for camouflage in different habitats/environments not all subject to predation
Options: *Any 3 good facts – 1 mark per fact OR*
One fact well explained and one listed
One fact well explained for 3 marks

1.3 A
Pattern of wings is that described in the text (white, brown on wings and hindwings) (or describe other wing patterns to show that they are NOT Pioneer Whites)
USE of/reference to Line scale to indicate a butterfly with a wingspan of 50 mm)
OR can show this via a calculation: length/length of line scale × number on line scale = answer ONLY MARK FIRST 2 REASONS
3 aspects for 3 marks: 1 – correct choice
1 – correct pattern
1 – line scale reference (no calculations needed)
OR
C with pattern description (1 mark only – as length is incorrect)

1.4 Emigration

1.5 Plant stays green in winter/evergreen /therefore:
- leaves with the eggs attached do not fall off; continuous food supply for larvae/caterpillars
- Immediate food source as soon as eggs/caterpillars hatch
- continuous food source for larvae
- Shade protects the eggs/larvae from sun/high temperatures /provides a cooler environment for eggs - enables survival

(MUST explain ONE CONCEPT, cannot just give 2 phrases)
If just a phrase – 1 mark only – ONLY MARK FIRST answer

1.6 ***Lower numbers of butterflies emigrating*** – (accept a scenario described by learners about a change in climate leading to the lower numbers)
less survive to emigrate
as less water/nutrients/more use of branches by farmers for fodder/use by other species
OR
less predators
therefore, less pressure to emigrate/as more butterflies survive

Higher numbers of butterflies emigrating – (accept a scenario described by learners about a change in climate leading to the higher numbers emigrating)
drier
therefore, less leaves on trees/more leaves eaten by other species/use of leaves by farmers for fodder
therefore, more pressure to emigrate
to get food/water
due to more competition (any 3 facts)
OR
more predators
therefore, more pressure to emigrate
Cannot give words/phrases not linked to a scenario
Scenario: (wetter, drier, hotter, colder)
Effect of scenario on numbers
Related to migrations

1.7 1.7.1 A method whereby an estimate/sample of a population is made of the population number instead of counting every individual /sample a few and extrapolate via calculation

1.7.2 A – best as quadrats are placed randomly/spread out
B not reliable as only one quadrat has been sampled/therefore not representative of the whole area/cannot get an average
C not reliable as quadrats were not placed randomly

1.8 1.8.1 A = Pioneer White/butterfly

1.8.2 As the rainfall decreases, there are less leaves on the trees – therefore less butterflies hatch/develop as there is less food
therefore, the numbers of robber flies are less as they have less food to eat (butterflies)
it's a limiting factor as it prevents further population growth of robber flies

1.9 There would be less leaves/damaged leaves/bare trees/less food for caterpillars/leaves are all covered in eggs/still enough leaves for food

1.10 Most of the butterflies fly more than 3 metres above the ground – therefore many will not be counted
Difficult to tell how many butterflies are on the windscreen as they may be spread out all over merging into one another/fall off
Public may not have the knowledge/not be trained to be able to identify the types of butterfly present
Other insects are present on the windscreen – not able to identify the correct species

Not everyone uses social media therefore biased
Method is unscientific
Butterflies are probably more prevalent in rural areas, and most won't be counted
Experiment is not repeatable
Relevant area is not given
Sampling was not conducted for long enough
Not everyone has cars therefore not getting a reliable answer

QUESTION 2

2.1 2.1.1 Pioneer

2.1.2 (Secondary) succession NOT primary

2.1.3 Climax

2.2 (12 × 50) = 600 g – don't need to give the unit

2.3 2.3.1 The different species/types of beetles
use the same resource (dung) in the same place/at the same time
The different types of beetles have different behaviours to try to gain maximum amounts of this resource and come into conflict/steal away with one another (e.g., kleptocoprids)

2.3.2 Beetles use the same resource (dung) in different ways and in different places.
More individuals from different species will be able to get dung to eat/in which to lay their eggs
therefore, there are fewer beetles in one place competing for places to bury/use the dung
as the different species of beetle do not all stay in the dung pile same move dung to other places Accept any ONE example of method of dung use from text

2.3.3 *Aphodius* is an endocoprid/paracoprid
– small beetle, push small dung
small legs with few serrations to push dung
small therefore don't push dung
and no shovel structure on the head to dig a tunnel
Kheper is a telecoprid/kleptocoprid
Kheper is a large beetle, push big dung
bigger legs with more serrations to push dung,
shovel shaped structure to dig a tunnel
MUST compare both beetles

2.4 (i) 1, 2, 5, 6

(ii) 3, 4

(iii) 7

2.5 2.5.1 ANY (e.g., termites, bees, wasps, ants)

2.5.2 Split roles between different individuals (caste differentiation, single reproductive caste
workers carry out work like collecting/cultivate food, looking after young, build nest
soldiers protect colony
Allows them to control their environment to a larger degree than if they were solitary,
strong communication skills to pass on information to other colony members

2.6 Dung beetles are important to clear dung from fields/remove dung in the summer,
Prevents flies breeding in the dung and therefore diseases and parasites
Nutrient recycling by burying dung in the soil
Aerate soil
Prevent carbon dioxide entering atmosphere/prevent global warming
Remove dung so plants can grow
Burying seeds in dung – spread seeds

2.7 They are small, so people do not always see them
People do not tend to like insects/gross; unpleasant
The fact that they live in dung means people tend not to like them /tend to think they are unhygienic /disease in dung
More focus on other insects like bees
Dung is not often studied
People do not know a lot about insects
No direct seen benefit to beetles
Large vertebras greater status
Dung beetles are not endangered

2.8 A larger beetle which uses a lot of dung /efficient use of dung
Not a kleptocoprid
Beetles that reproduce quickly
Must not be invasive
Must not eat native vegetation/marsupial dung
Must not transmit parasites
Must not disrupt food chains
Ensure that dung in Australia is suitable for them to breed in /cattle sheep dung
Must be able to travel well
Beetle must be adapted to live in the climate/environment of Australia

SECTION B

QUESTION 3

Traditional hunting practices are still a valid part of modern society.

YES – still a valid part of modern society	NO – not a valid part of modern society
TRADITIONS & CULTURE Represent values of a society (A) Artwork/literature linked to fox hunting (E) Fox hunting been around since 15th C (i.e., been around a long time) (E), same as Japanese/Danish hunt (F) Hold society together (A) Lots of traditions around fox hunting (E) Provide individuals with a feeling of belonging to a group (A) Integral part of culture – e.g., American heritage (D)/UK – fox hunt heritage) (E) (Danish/Japanese hunt) UN – all States must respect, promote and protect right of everyone to take part in cultural life (B) Human rights relate to cultural rights (B) SA Constitution – everyone has the right to cultural practises (B)/also in UK re fox hunting (E) Meat eaters do not have the right to be anti-hunting (E) and to enjoy their culture (B) Religious views – some agree with hunting in their culture (B) Some cultures do still use hunting and being a warrior as mark of manhood (C) Most traditions have disappeared NB to uphold it	**TRADITIONS & CULTURE** 'Values' should not include 'killing' (A) No single tradition holds societies together Traditions do not mean that suffering should be allowed (A) (E) e.g., FGM (A) Old traditions have disappeared in the past (A) Religious views – many are against hunting – therefore not in many cultures (B) Reform of traditions happens all the time (A) e.g. FGM (A) Manhood is not earned by being a hunter or a warrior anymore (C) Maasai have changed their traditional rite of passage (C)/Fishing changed – catch and release (G) Hunting was *originally* a rite of passage (C) *Historically* societies placed values on hunting (C)
IMPORTANCE OF HUNTING – SOCIAL Hunting is fundamental in the maturing process of a male. (C) Dr Eaton, Gurion & Rose qualified to comment on hunting issues (C) Teaches compassion (C), self-control, self-restraint, sound judgement (i.e., character-building life skills) (C) Would be a more peaceful world if more men hunted (C) Bonding experience (D)	**IMPORTANCE OF HUNTING – SOCIAL** Emotive arguing can use quotes Biased
IMPORTANCE OF HUNTING – ECOLOGICAL Instils a love of the outdoors and appreciation and respect for nature (D) Connection made between animals and food (D) learn about balance of nature and sustainable harvesting (C) e.g., Faroe Island hunt – only small number taken out of total (G) Most dolphins hunted in Faroe are not threatened (G) Japanese population is dropping, so less may need to be hunted (G) (e.g., Hunting foxes does not significantly decrease fox numbers (E) Promotes biodiversity conservation (E) Only sick/old foxes are hunted (E) Population control (e.g., foxes) (E) Environmental degradation avoided) (D) Numbers are kept below carrying capacity (e.g., foxes) (E)	**IMPORTANCE OF HUNTING – ECOLOGICAL** Fox numbers are not near carrying capacity (E) Fox numbers have fallen a lot (E) Hormonal methods can be used to control numbers (E) Foxes have had to be imported into England (E) Foxes are not significant pests /1 to 3% kill chickens and lambs (E) Hunting foxes does not significantly decrease fox numbers (E)/to small to contribute Love of the countryside should mean care for wildlife (E) Killing foxes allows rabbit numbers to increase (E) and rabbits are pests (E) Overfishing in SA has led to competitions being catch & release only (G) Bottlenose dolphins are rare and threatened

SA fishing – mostly catch and release (G) Pest control (E) foxes are a nuisance	
PUBLIC OPINION Ex UK prime minister is in favour of fox hunting (E) Quotes are anecdotal information (F) Most people in Faroe Islands believe it should be preserved as a part of culture (G)	**PUBLIC OPINION** Most of public oppose fox and deer hunting (E) Many people not in favour of hunting (F) Not a lot of people eat whale meat anymore (G) Partial ban in UK /banned in Scotland (E)
ECONOMY Difficult and waste of time to enforce anti-hunting law (E) Job creation (E) Hunting important to rural economy (E)	**ECONOMY** The hunting act is effective – prosecutions happen (E)
ETHICS Faroese government says killing method of whales is humane (G) License is now required to hunt in Faroe Islands	ETHICS Just because it is an old tradition it means a lot (E) Unethical – hounds are trained to kill foxes (E) Whales slaughtered with traditional knives – probably not painless (G) Whales often stressed (G) Not traditional to sell to aquariums (G)
FOOD Faroe Islands – valuable source of food (G) San food (hunter/gatherer idea	**FOOD** Whale meat can be replaced with other food – no longer subsistence society (G) Meat could be tainted (G)
OWN Black traditional cultural hunting – cows/goats slaughtered at wedding functions Inuit need to wear fur Much recreational fishing involves throwing fish back Hunting only done at certain time of the year (outside breeding seasons) People do not have the right to attack other's cultures Look out for lots of own info from source A Hunting brings in money/ecotourism/game farms	**OWN** Fur is a fashion – not a tradition Dolphins are social animals – cruel to kill one Bush meat/traditional Chinese wet markets Zoonoses – Covid Traditional medicine often does not work /rhino horn Impact of whale hunt on social pods Hunting causes the extinction of species Modern societies more gender neutral Look out for lots of own info from source A

Total: 100 marks

Note: Essay should be 2½ to 3 pages long.
Time allocation suggestion: Reading of sources 10 min.; Planning 10 min.; Writing essay 40 min.

	1 mark	2 marks	3 marks	4 marks	Possible mark (40)
Planning **× 2**	• Decision given • Key points present for and against the argument	• Decision given • Key points developed for and against the argument	• Decision given • Key points developed for and against the argument • Source references identified (e.g., Source A/own information)		6
Decision	• Vague • Changed position within essay	• Clear decision made			2
Use of knowledge from sources **× 2**	• Up to ¼ of potential detail in sources used to support argument	• Up to ½ of potential detail in sources used to support argument	• Up to ¾ of potential detail in sources used to support argument	• Source detail – very close to full potential used to support argument	8
Use of own knowledge	• Some facts given beyond the source to support argument	• Many facts given beyond the source to support argument	• Some facts given beyond the source to support argument • Facts integrated into the argument	• Many facts given beyond the source to support argument • Facts integrated into the argument	4
Content relevance	• Repetition mostly avoided • Some minor digression • Supporting argument relevant	• Repetition mostly avoided • Some minor digression • Supporting argument relevant • Quality of source extracts acknowledged			2

	1 mark	2 marks	3 marks	4 marks	Possible mark (40)
Quality of argument supporting decision × 2	• Writing consists of facts with little linkage or reasoning • Reasoning incorrect	• **Maximum if no clear decision in support** • Reasoning correct, but hard to follow • Ordinary: some linkage evident	• Supports the position • Reasoning is clear • Minor errors in flow • Linkage sometimes missed	• Strongly supports a clear position • Reasoning is very clear and succinct • Flow is logical • Compelling with regular linkage • Well-integrated argument	8
Fairness – counter opinions to decision	• One to two counter opinions given from the sources	• Three to four counter opinions given from the sources	• Integration of one to two counter opinions from the sources into argument	• Integration of three to four counter opinions from the sources into argument	4
Presentation	• Writing is almost unintelligible • Tone, language, terminology unscientific and very weak • Introduction **and/or** conclusion **not** present	• Tone, language, terminology weak • Introduction **and** conclusion present	• Tone is consistent and suited to scientific language • Good and appropriate language and terminology • Mostly appropriate paragraphing • Introduction and conclusion have merit	• Tone is mature and suited to scientific language • Excellent and appropriate language and terminology • Correct paragraphing with good transitions • Interesting introduction, satisfying conclusion	4
Scientific merit	Essay shows academic rigour, accurate reasoning, insight and cohesiveness.				2