



NATIONAL SENIOR CERTIFICATE EXAMINATION
SUPPLEMENTARY EXAMINATION – MARCH 2019

LIFE SCIENCES: PAPER I

MARKING GUIDELINES

Time: 3 hours

200 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.

QUESTION 1

1.1

	Column A		Column B
[L]	Giving birth to live young that have developed inside the mother's body.	A	K-strategy
[H]	An evolutionary development that allowed the first reptiles to lay their eggs on land.	B	Oviparous
[G]	Behaviour by which organisms select their partners for reproduction.	C	Asexual reproduction
[E]	Characterised by a high number of offspring and no parental care.	D	Copulation
[C]	No gametes are formed.	E	r-strategy
[B]	Embryo develops after egg laying.	F	External fertilisation
[F]	Fusion of male and female gametes outside the bodies of the reproducing individuals.	G	Courtship
[I]	Eggs hatch inside the body of the parent.	H	Amniotic egg
[J]	Breeding at different times of the year.	I	Ovoviviparous
[D]	When the male reproductive organ enters the female's reproductive tract to deposit sperm.	J	Reproductive isolation
		K	Parental care
		L	Viviparous

1.2

1.2.1	1.2.2	1.2.3	1.2.4	1.2.5
C	C	A	B	C

1.3 1.3.1

	Statement	A, B or C
(a)	Infertility is a bigger problem among women than men.	B
(b)	Almost two thirds of women receiving IVF were aged 37 years and younger.	A
(c)	Causes of infertility are sometimes unknown.	A
(d)	Women older than 45 years are less likely to need IVF as they already have children.	C
(e)	There is only ever one factor that causes infertility.	B

1.3.2 (a) upper third along fallopian tube

(b) fallopian tube/oviduct

- (c) endometrium
mitosis
 - (d) 2
- 1.3.3 (a) consists of sperm/male gametes and seminal fluid/ secretions
from male glands
- (b) $0,1 \text{ mm}/10 = 0,01 \text{ mm}$
 - (c) confirms identity of donor ensuring mistakes not made in
process
- 1.4 1.4.1 maintains endometrium during pregnancy thickens endometrium in
preparation for pregnancy decreases contractibility of uterine smooth
muscles during pregnancy development of mammary glands during
pregnancy suppresses FSH & LH
- 1.4.2 8,0–8,2 ng/ml (Check answer after printing)
- 1.4.3 ovulation/pregnancy/implantation
- 1.4.4 (a) cow B/B
- (b) progesterone levels do not decrease/remain high
- 1.4.5 larger in B/remain large in B shrink/smaller in A
- 1.5 1.5.1 natality mortality emigration immigration
- 1.5.2 decreasing birth rate growing population few survive to old age ratio of
male to female similar/AIDS not affected population size greatly.
(max 3)
- 1.5.3 female
- 1.5.4 decrease growth/birth rate decreased/smaller population; fewer
numbers of adults of reproductive age/large shaded area of people
with AIDS; smaller workforce/economy implications
- 1.6 1.6.1 A – anthers/stamen B – stigma C – ovary
- 1.6.2 place X on anthers **OR** on ovule/inside ovary
- 1.6.3 (a) female
- (b) has ovary/ovules
- 1.6.4 insects for pollination transferring pollen from male flower/stamen to
female flower/stigma male flowers have pollen/male gametes and
female flowers have ovules fusion/fertilisation required for sexual
reproduction/fruit formation/seed production (max 4)
- 1.6.5 (a) ovule
- (b) provides food for developing embryo

1.6.6 make clones ensuring advantageous/desirable characteristics are passed onto offspring; faster as do not have to wait for parent plants to be sexually mature; only requires one parent plant. (max 2)

1.6.7 (a) X – promote shoot formation

(b) Y – promote root formation

1.7

Item	Term	Answer
1. Evolution by acquired characteristics 2. Visited Galapagos Islands	Lamarck	A
1. Evidence of common ancestor 2. Divergent evolution	Pentadactyl limb	C
1. Study of embryology 2. Evidence for evolution	Biogeography	B
1. Occurs due to geographical barriers 2. Gene flow occurs between populations	Sympatric speciation	D
1. Modification by descent 2. The Origin of Species	Darwin	C

1.8 1.8.1 protects starlings safety in large numbers falcon more likely to suffer injury if attacking group of flocking starlings difficult to target one in a flock

1.8.2 (a) predator kills and eats another species/prey species eaten is prey.

(b) A

(c) numbers larger/B lags behind A

QUESTION 2

- 2.1 2.1.1 Group of organisms with similar characteristics/living in close contact/same area capable of interbreeding and producing fertile young
- 2.1.2 Different sized/shaped beak
- 2.1.3 Rosefinches inhabited different islands different ecological niches different sources of food available geographical isolation genes for suitable beak specialisation selected more often beak shapes changed over time changes resulted in reproductive isolation. (max 5)
- 2.1.4 Use seawater/salt water place groups of bean seeds into sea water/allowed to soak for different periods of time remove seeds from water and allow to germinate measure germination/how quickly germinated/how many germinate (max 5)
- 2.1.5 Primary started with bare rock/rock with no soil/no plants
- 2.1.6 Heading:
Table showing differences between climax and pioneer communities

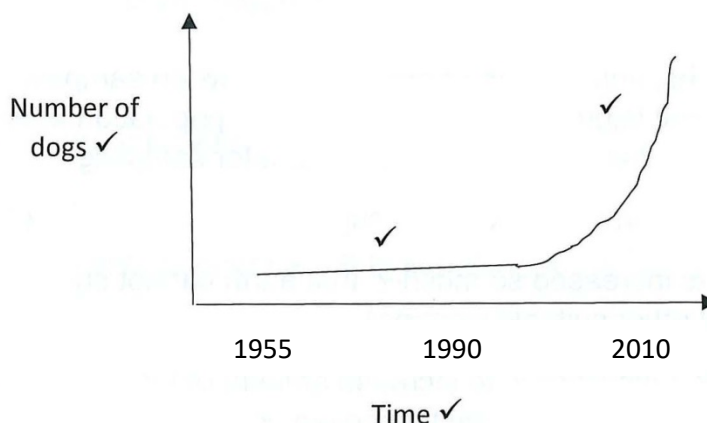
Pioneer	Climax (column headings)
First stage	Last stage
Short living	Longer living/more stable
Lichens/fungi	Climax veg of biome
Low Biomass	High biomass

Any 2 comparisons

- 2.2 2.2.1 interspecific
- 2.2.2 avoided competing for living space and food by spending different amounts of time in sun and shade lived at different heights /lived on different thickness of branches ate different size food (max 4)
- 2.2.3 (a) $27 \times 14 \div 5 = 76/75$
- (b) no births, deaths, immigration or emigration between samples marking must not injure lizard mix freely with population after marking (accept other suitable precautions for sampling)
- 2.3 2.3.1 number of organisms an ecosystem can support
- 2.3.2 human population has increased so much that earth cannot support numbers (accept other suitable wording)
- 2.3.3 improved methods of agriculture to increase amount of food produced improved life span by better medical technology more people can live in same area due to high rise building
[name explain] $\times 2$ (accept other correct explanations)

QUESTION 3

- 3.1 3.1.1 excretion of oestrogen by women on the pill plastics crop fertilisers
livestock given oestrogen
- 3.1.2 Graafian follicle/ovary (adipose tissue)
- 3.1.3 prevents ovulation preventing pregnancy /high levels of oestrogen
prevents release of FSH
- 3.1.4 at night
- 3.1.5 to attract females for mating
- 3.1.6 (a) The higher the concentration of oestrogen the shorter the call
duration of frogs
- (b) less likely to attract females reproduction rate would decrease
- 3.1.7 record sounds count how long/how many females approach males
for each call length
- 3.1.8 Stricter laws to reduce plastic pollution
use less fertilizer to prevent runoff into water bodies
improved water purification system to remove hormones from water
outlaw hormone use in livestock to reduce ingested and excreted
hormones
[name and explain] × 2
- 3.1.9 (a) produce sperm/male gametes produce testosterone
- (b) pathway for sperm to leave testes
- 3.2 3.2.1 Heading, i.e. Graph showing population increase in Icelandic
Sheepdogs from 1955 to 2010



- 3.2.2 no crossing with other breeds/only breeding with same type no gene
flow into population

- 3.2.3 loss of hybrid vigour increased chance of homozygosity of harmful recessive genes increase in harmful genetic abnormalities decrease in fertility (max 3)
- 3.2.4 artificial selection uses human selection rather than environmental factors driven by man rather than nature
change is faster as specific traits selected for by man
end result is less variation as man is selecting for specific traits
results in improved livestock and crops rather than best adapted for environment [name explain] × 3

QUESTION 4

- 4.1 4.1.1 B and C
- 4.1.2 broader pelvis femur angled under pelvis
- 4.2 4.2.1 large cranium to house larger brain;
smaller jaw as smaller chewing muscles/smaller teeth owing to eating cooked food/use of tools
less prognathism as smaller chewing jaw muscles;
more pronounced chin space for development of speech sounds;
less pronounced brow ridges smaller attachment for smaller jaw muscles required
(identity explanation) × 3 (max 6)
- 4.2.2 between gorilla and *Homo erectus* many apelike features (accept examples of Australopithecine feature as less advanced than *Homo* spp)
- 4.3 4.3.1 *Australopithecus africanus*/Mrs Ples *Australopithecus sediba*
(*Paranthropus robustus*, *Homo ergaster*)
- 4.3.2 belonged to another genus/*Australopithecus*/*Homo erectus* disputed area was a burial site
- 4.3.3 Other palaeontologists study fossil allows for peer review/sharing of information/more understanding of human evolution encourages interest in students may choose as a career increase knowledge of general public shows evolution is a scientific theory shared knowledge quicker discovery of human origins.
- 4.4 4.4.1 Keeping internal environment constant
- 4.4.2 (a) pituitary gland secretes TSH transported in blood to thyroid gland secretes thyroxin
(b) thyroxin levels increase to normal
(c) thyroid gland slows down secretion of thyroxin/pituitary gland secreted less TSH

- 4.5 4.5.1 pancreas/Islets of Langerhans
- 4.5.2 increase in blood sugar
- 4.5.3 increased thirst; glucose in urine; fatigue/frequent urination; blurred vision; slow healing wounds; tingling or numbness in hands (any 3)
- 4.5.4 healthy option as blood glucose stays constant for many days
patient does not need to take insulin injections no need to check
blood glucose levels constantly/every day less likely to suffer long
term effects on uncontrolled diabetes (max 4)
- 4.5.5 mice are mammals, so similar to humans test any adverse effects
can be corrected before trying on humans check to see if it works
phase of clinical trials (max 2)

Total: 200 marks