NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2012

LIFE SCIENCES: PAPER II

REVISED MARKING GUIDELINES

Time: 2½ hours 150 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
[J]	Development of male secondary sexual characteristics	A	Hypothalamus
[H]	Endocrine glands found in the pancreas	B	Growth Hormone
[K]	Lowers the blood glucose level	C	LH
[A]	Produces a hormone that increases the permeability of the walls of the nephron	D	Glucagon
[L]	Regulates the metabolic rate	E	FSH
[G]	Increases the flow of blood to the muscles and increases the heart rate	F	TSH
[E]	Stimulates the development of the sperm in the testes	G	Adrenalin
[C]	High levels of this hormone causes ovulation	H	Islets of Langerhans
[F]	Stimulates the production of thyroxin	I	Oestrogen
[B]	Over secretion of this hormone in adults causes enlarged bones of the face and hands	J	Testosterone
		K	Insulin
		L	Thyroxin

(10)

1.2

Statement	True	False	Correction
Predation is a density-dependant factor which affects population size.	x		
Intraspecific competition increases the size of a population.		x	DECREASES
In an area, grass, giraffe and acacia trees form a population.		x	COMMUNITY

(5)

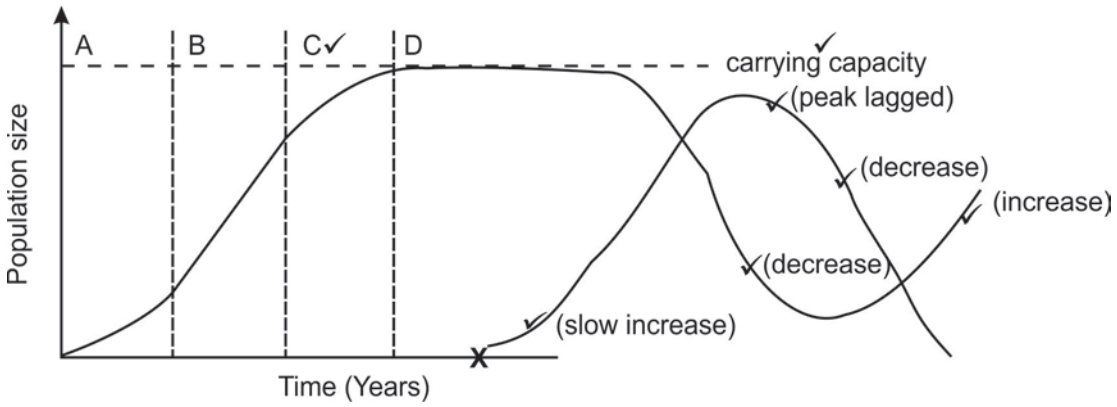
1.3

Question	1.3.1	1.3.2	1.3.3	1.3.4
Answer	**C**	B	C	A

(7)

1.4

1.4.1



(2)

1.4.2 The maximum number of individuals that a habitat/ecosystem can supply with resources (2)

1.4.3 The springbuck are getting accustomed/settling into the new environment /low population density so more difficult to find mates/the number of reproducing individuals is small. (1)

1.4.4 C
D
B (3)

1.4.5 Drought/fire/drought reduces grazing or other (2)

1.4.6 If a pride of lions moved into the same area as the springbuck in the year **X** on the graph:

(a) continue drawing the expected graph line of the springbuck population showing the effect of the lions in the area over time on the graph above. (2)

(b) draw in the expected line on the graph above to show the lion population over time. (3)

(c) What type of relationship exists between the springbuck and the lions?

Prev –Predator/Predation (1)

(d) Will the presence of the lions affect the carrying capacity of the area? Justify your answer.

Yes – by preying on the springbuck numbers are reduced

preventing overgrazing

No – and logical reason (2)

[40]

QUESTION 2

2.1

2.1.1 (Change in) temperature (1)

2.1.2 Amount of water in test tube – measure x ml/ with a syringe and place it in tt / measure same amount of water in both tt. Mass of the seeds – weigh the seeds/use a balance to have equal amounts or when using a thermometer place it at the same position in the test tube or distance from tt –hold burning food at same distance from the tt or moisture levels of both seed equal by drying with a fan. (4)

2.1.3 Wheat releases more energy than peas as the temperature increases more - referring to values on table. (3)

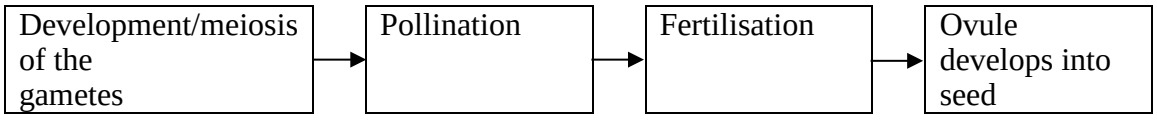
2.1.4 Wheat is used to make bread/cereals; seeds contain food/energy/starch reserves; the seeds contain minerals(or one of the following: vitamins, nutrients, fibre); peas provide proteins; and energy wheat is a staple diet (cheap and easy to produce). (2)

2.2

2.2.1 The offspring produced are genetically different to the parents so that some have a chance to survive habitat changes/diseases or zygote is protected in some way and can survive unfavourable conditions. (or better chance of survival/better adapted to the environment) (2)

2.2.2 Chances of reproduction taking place is reduced/requires more effort/ energy since two individuals are usually needed or it is a slow process so may not be suitable to economic processes (other reasonable answer) (2)

2.3



Draw boxes and arrows correct sequence – there will be several variations of this but only the first four are accessed. (6)

2.4

2.4.1 A anther; to produce pollen/male gamete
B stigma; germination/receiving of the pollen
C ovary (5)

2.4.2 wind (1)

2.5 Yes – seed banks provide national and international means of storing and protecting seeds for propagation if a species becomes extinct in a region. It serves as storage of genetic material for plants for diversity preservation to compare the possibility of mutations/to be used for research/medical cures. Seed banks do not require a lot of land space comparatively / preservation of food crop seeds for the future. Any 4

No – extinction is a natural process and different species will take their place naturally so why waste money when it could feed starving people by being used to support GM or other reasonable argument. (4)

[30]

QUESTION 3

3.1

3.1.1 'Infertile' means an organism cannot reproduce (1)

3.1.2

Social Organisation	Bees	Termites	Wild dogs
Similarity	All these species have social organisation of different jobs/communication systems/hierarchy systems for survival. Or they all have co-operative care of the young or other reasonable answer		
Differences	1. Dominant queen 2. One reproductive queen in a hive /workers, drones, queen/ /worker bees change their job as they age/ male dies after mating/polygamous	1. Dominant king + queen 2. Many reproductive pairs in a colony / workers, king, queen, soldiers, reproductive (alates)/maintain one job through life/male dies after mating/polygamous	1. Alpha male + female 2.1 Breeding pair per pack / pups, adolescents, hunters, alpha pair/ job may change with age of dog/male does not die after mating/ monogamous

(2 + 6)

3.1.3 The wild dogs work together to hunt and kill the prey which greatly improves the chance of a successful hunt. Cooperative tactics include one dog standing visible to the prey which causes it to run in a certain direction towards other waiting dogs; prey is tired but the hunters are rested so greater chance of a kill. / Dogs take turns leading the hunt to ensure that the lead dog is fresh since the leader uses some energy in the chase/ once prey is down a few dogs attack together making it more difficult for prey to escape and decreasing the chance of a dog being injured. Numbers of animals protect the kill from theft. Alpha female can remain at den and look after pups. Pups feed first improving the survival rate. Vocal communication during the hunt improves the kill rate. Any 4 (4)

3.1.4 Low mortality in the young other adults feed the pups / parental care is high / with few pups for cooperative group to protect so young survive. (Makes reference to graphand give a reasonor make two references to graph .) (2)

3.2

3.2.1 (a) Census involves the counting of all individuals in a particular area on a certain day by answering a set of questions on a census questionnaire /by recording data administered by census officials
First point + one other (2)

(b) Honesty of individuals respondents/data collectors / rural areas may not be accessible so people not counted/ costly+time consuming exercise/ large gaps between census and result release/fear or major apathy at census time (2)

3.2.2 developing (1)

3.2.3 Population at x age consists of less/more men than women; the women live longer than the men; or population is increasing in numbers at x point any other answer supported by data (4)

3.3 Agricultural development increasing food production
Proper housing which brings protection from weather
Development of the medical services reducing infant death/improving life expectancy or
Technological development increasing access to resources
Industrial development improving processing of raw materials
Use of penicillin and antibiotics (3)

3.4 The population size would increase since the number of surviving reproductive adults would increase (3)
[30]

QUESTION 4

4.1

4.1.1 Menstruation is a cyclic shedding of endometrium and the discharge of a bloody fluid from the uterus / out of vagina (any 2 points) (2)

4.1.2 Days 19 to 23 (with 1 point leeway on either side) (2)

4.1.3 A Graafian follicle B corpus luteum/yellow body (2)

4.1.4 C umbilical cord
D vagina wall / cervix
E placenta which functions to provide nutrients and oxygen to the foetus/ remove waste products/ provides immunity (4)

4.1.5 A single large cell (larger than the sperm); large nucleus; 23 chromosomes; cytoplasm contains yolk; surrounded by a jelly coat; cell membrane has many microvilli ; has more cytoplasm than sperm ; surrounded by follicle cells ; round cell (any 2) (2)

4.1.6 Change in hormones oestrogen levels are very high which causes oxytocin / prostaglandins to be released / pressure of the head on the cervix <u>that stimulate the uterus wall contraction</u> (any 1 + 1) (2)

4.1.7 (a) (i) Rhythm method – sexual intercourse only during time of menstrual cycle when it is believed that fertilisation does not occur (other reasonable answer) (1)

(ii) IUD method – prevents implantation of the embryo (1)

(b) State the choice (rhythm/IUD)
Reason, e.g. rhythm since the IUD causes very early abortion which is against beliefs (3)

4.2

4.2.1 Control – sperm kept away from laptop
Why? – fair testing/ making a comparison possible (2)

4.2.2 The tail of the sperm doesn't move because the DNA is faulty / electromagnetic radiation (affects the tail) of the sperm/causes it to die. (1)

4.2.3 Mutation of the DNA or description of this (1)

4.2.4 Stop sitting with the laptop in the lap (2)

4.2.5 YES – research was reported in a journal *Fertility and Sterility* and used a control
OR
NO – the sample size was very small so conclusions are questionable / reported in a non-scientific popular magazine/ age of the men not controlled/only Argentinean men used (2)

4.3

4.3.1 Testis (1)

4.3.2 C / A (1)

4.3.3 The cells (sperm) need the nutrient to grow/move (1)

[30]

QUESTION 5

The IEB standard rubric will be used to assess the responses to the question – which is open ended.
The following are guidelines to the content and sources relevant to either argument.

Rubric reference	**I DO think it is OK to take steroids ...**	**I DO NOT think it is safe to take steroids ...**
Content: Thoroughness		
Support argument	Source A Source B – selected pieces Source E	Source B – selected pieces Source C Source D
Argument against noted	Source C Source D	Source A Source E

[20]

Total: 150 marks

QUESTION 5 RUBRIC

	1 mark	2 marks	3 marks	4 marks
Content: Thoroughness	• Up to 1/3 of potential detail in sources cited (**2** facts of which only two medical facts will be accepted throughout essay)	• About half of potential detail in sources cited (**4** facts from sources)	• All main topics in sources covered • About ¾ of potential detail in sources cited (**5** source facts) • **One** instance of significant information beyond the sources.	• All main topics covered • Source detail very close to full potential • At least (x) significant instances of information beyond the sources (**e.g**. 6 facts; 2 must be original & beyond the sources)
Content: Relevance	• Mostly digression and/or repetition	• Around half is digression and/or repetition	• Repetition mostly avoided • Some minor digression • Argument relevant	• Isolated incidences of minor repetition • No digression. • Argument relevant
Supporting Argument, i.e. <u>for</u>	• Writing consists of facts with little linkage or reasoning • Reasoning incorrect	• **<u>Maximum if no clear decision to support</u>** • Reasoning correct, but hard to follow • Ordinary; some linkage is evident	• Supports the position • Reasoning is clear • Minor errors in flow • Solid but not compelling; linkage sometimes missed	• Strongly supports a clear position • Reasoning is very clear and succinct • Flow is logical, showing evidence of clear planning • Compelling with regular use of linking language
Fairness, i.e. Argument <u>against</u>	• One counter opinion given.	• Two counter opinions given	• Three or more counter opinions given	
Position	• **<u>Clear decision made</u>**			
Presentation	• Writing is almost unintelligible • Tone, language and terminology unscientific and exceptionally weak • Introduction **and/or** conclusion **not** present	• Tone, language and terminology is weak • Attempts at correct paragraphing • **Introduction** and **conclusion** present, no matter how weak	• Tone is consistent and suited to scientific argument • Good and appropriate language and terminology • Mostly appropriate paragraphing • **Introduction** and **conclusion** have merit	• Tone mature and suited to scientific argument • Excellent and appropriate use of language and terminology • Correct paragraphing with good transitions • Interesting **introduction**, satisfying **conclusion**