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GRADE 12

SEPTEMBER 2021

**LIFE SCIENCES P1
MARKING GUIDELINE**

MARKS: 150

This marking guideline consists of 11 pages.

PRINCIPLES RELATED TO MARKING LIFE SCIENCES

1. **If more information than marks allocated is given**
Stop marking when maximum marks are reached and put a wavy line and 'max' in the right-hand margin.
2. **If, for example, three reasons are required and five are given**
Mark the first three irrespective of whether all or some are correct/incorrect.
3. **If whole process is given when only a part of it is required**
Read all and credit the relevant part.
4. **If comparisons are asked for, but descriptions are given**
Accept if the differences/similarities are clear.
5. **If tabulation is required, but paragraphs are given**
Candidates will lose marks for not tabulating.
6. **If diagrams are given with annotations when descriptions are required**
Candidates will lose marks.
7. **If flow charts are given instead of descriptions**
Candidates will lose marks.
8. **If sequence is muddled and links do not make sense**
Where sequence and links are correct, credit. Where sequence and links are incorrect, do not credit. If sequence and links become correct again, resume credit.
9. **Non-recognised abbreviations**
Accept if first defined in answer. If not defined, do not credit the unrecognised abbreviation, but credit the rest of the answer if correct.
10. **Wrong numbering**
If answer fits into the correct sequence of questions, but the wrong number is given, it is acceptable.
11. **If language used changes the intended meaning**
Do not accept.
12. **Spelling errors**
If recognisable, accept the answer, provided it does not mean something else in Life Sciences or if it is out of context.
13. **If common names are given in terminology**
Accept, provided it was accepted at the national memo discussion meeting.
14. **If only the letter is asked for, but only the name is given (and vice versa)**
Do not credit.

15. **If units are not given in measurements**
Candidates will lose marks. Memorandum will allocate marks for units separately.
16. **Be sensitive to the sense of an answer, which may be stated in a different way**
17. **Caption**
All illustrations (diagrams, graphs, tables, etc.) must have a caption.
18. **Code-switching of official languages (terms and concepts)**
A single word or two that appear(s) in any official language other than the learner's assessment language used to the greatest extent in his/her answers should be credited, if it is correct. A marker that is proficient in the relevant official language should be consulted. This is applicable to all official languages.

SECTION A

QUESTION 1

- 1.1 1.1.1 D ✓✓
 1.1.2 A ✓✓
 1.1.3 B ✓✓
 1.1.4 A ✓✓
 1.1.5 A ✓✓
 1.1.6 C ✓✓
 1.1.7 C ✓✓
 1.1.8 A ✓✓
 1.1.9 C ✓✓
 1.1.10 A ✓✓ (10 x 2) (20)
- 1.2 1.2.1 Meninges ✓
 1.2.2 Peripheral ✓ nervous system
 1.2.3 Dendrite ✓
 1.2.4 Geotropism ✓
 1.2.5 Round window ✓
 1.2.6 Thyroxin ✓ / adrenalin
 1.2.7 Adrenal gland ✓
 1.2.8 Vagina ✓ (8 x 1) (8)
- 1.3 1.3.1 B only ✓✓
 1.3.2 Both A and B ✓✓
 1.3.3 B only ✓✓ (3 x 2) (6)
- 1.4 1.4.1 D → C → A ✓✓ (2)
 1.4.2 To protect ✓ / minimise injury to the body (1)
 1.4.3 - Muscle ✓
 - Gland ✓ (Any 1 x 1) (1)
(Mark first ONE only)
- 1.4.4 (a) C ✓ – Interneuron ✓ / connector neuron (2)
 (b) B ✓ – Ventral root ✓ (2)
 (c) A ✓ – Motor neuron ✓ (2)

- | | | | | |
|-----|-------|-----|-------------------------------------|-----|
| 1.5 | 1.5.1 | (a) | Thyroid gland ✓ | (1) |
| | | (b) | Testes ✓ | (1) |
| | 1.5.2 | (a) | Pituitary ✓gland / Hypophysis | (1) |
| | | (b) | TSH ✓ / Thyroid stimulating hormone | (1) |
| | | (c) | Adrenal gland ✓ | (1) |
| | 1.5.3 | A | ✓ | (1) |

TOTAL SECTION A: 50

SECTION B

QUESTION 2

- 2.1 2.1.1 External ✓ fertilisation (1)
- 2.1.2 - The eggs are fertilised in the external structure ✓ of male (brood pouch) / eggs are not fertilised in the female reproductive tract (1)
- 2.1.3 - A large number of eggs are deposited ✓ into the pouch in order to increase the chances of fertilisation ✓
 - Fertilisation occurs inside the pouch ✓ to increase the chances of fertilisation ✓
 - The development of larvae/embryo takes place inside the pouch, ✓ therefore they are protected from predators ✓ / any environmental factors (Any 2 x 2) (4)
- 2.1.4 - The development of the embryos takes place in the male pouch ✓
 In vivipary it takes place in the uterus ✓
 - The embryos are nourished by the yolk of the egg ✓ in seahorses
 In vivipary the embryos are nourished by the placenta ✓
 - Fluid secreted inside the pouch facilitates excretion and gaseous exchange ✓
 In vivipary the placenta facilitates excretion and gaseous exchange ✓
(Mark first ONE only) (Any 1 x 2) (2)
- 2.2 2.2.1 Period of development of an embryo ✓✓ / foetus between conception and birth (2)
- 2.2.2 22 days ✓ (1)
- 2.2.3 Amount of progesterone ✓ (1)
- 2.2.4 Same:
 - Species of rats ✓
 - Concentration of progesterone injected ✓
 - Type/brand of progesterone ✓
 - Level of activity of the rats ✓
 - Health condition of rats ✓
 - Type of food ✓ (Any 2 x 1) (2)
(Mark first TWO only)
- 2.2.5 - Ovary releases progesterone ✓ therefore,
 - removal of ovary enables the investigator to administer different amounts of progesterone ✓
 - to compare its effect on gestation period ✓ (3)

- 2.2.6 - The number of rats who completed gestation was divided by the total number of rats in each group ✓
 - and multiplied by 100 ✓ (2)
- 2.2.7 - To serve as a control ✓
 - so that it can be compared ✓ with the other groups
 - to determine if progesterone affect the successful completion of gestation ✓ (Any 2 x 1) (2)
- 2.3 2.3.1 (a) **A** – Suspensory ligament ✓ (1)
 (b) **B** – Iris ✓ (1)
- 2.3.2 Protects the eye ✓ (1)
- 2.3.3 - Ciliary muscles relax ✓
 - Suspensory ligaments become taut ✓
 - Tension on the lens increases ✓
 - The lens becomes flattened ✓ / less convex
 - The refractive power of the lens is decreased ✓ / light rays are bent less
 - light rays are focused on the retina ✓
 - To form a clear image (Any 4 x 1) (4)
- 2.3.4 - No impulse will be transmitted ✓
 - to the cerebrum ✓
 - resulting in loss of vision ✓ (3)
- 2.4 2.4.1 A mechanism that maintains constant internal environment ✓✓ (2)
- 2.4.2 - (Cold) receptors / thermoreceptors in the skin are stimulated ✓
 - to transmit an impulse to the hypothalamus ✓
 - the hypothalamus send impulses to the
 - blood vessels of the skin
 - and sweat glands ✓
 - The blood vessels of the skin constrict ✓ (vasoconstriction)
 - Less blood flows to the surface of the skin ✓ and
 - less heat is lost ✓ from the body
 - Less blood also sent to the sweat glands
 - less sweat is produced ✓ and
 - less heat is lost by evaporation ✓ of sweat
 - The core temperature of the body rises and is maintained (Any 7 x 1) (7)
- 2.4.3 - Enzymes become inactive ✓
 - causing all metabolic processes to stop ✓/ slow down
 - leading to multiple organ failure ✓/ no respiration / no release of energy (3)

- 2.5 2.5.1. Prostate gland ✓ (1)
- 2.5.2 Transport semen and urine ✓ (1)
- 2.5.3
- The testes require 2 °C less than the temperature of the body ✓
 - to produce normal and healthy sperms ✓
 - Therefore, on a hot day, the scrotum relaxes in order to pull the testes away from the body ✓
 - to avoid direct contact with the body ✓
 - to maintain a lower temperature ✓ (Any 3 x 1) (3)
- 2.5.4
- Only one of the vas deferens was blocked by the surgery ✓
 - therefore, semen with sperm was still transported by the other side ✓ / sperms came from the other testis (2)
- [50]**

QUESTION 3

- 3.1 3.1.1 Auditory nerve ✓ (1)
- 3.1.2 Equalises pressure on either side of the tympanic membrane ✓ (1)
- 3.1.3 (a) Pinna ✓ (1)
- (b) Organ of Corti ✓ / Cochlea (1)
- 3.1.4 (a) - The ossicles will not vibrate ✓
 - therefore, vibrations will not be transmitted to the oval window ✓
 - and pressure waves will not be created in the inner ear ✓/
 - Organ of Corti will not be stimulated to generate impulse ✓/
 no impulse will be sent to the brain for hearing to occur
 (Any 3 x 1) (3)
- (b) - Part D / tympanic membrane will not be able to create vibrations ✓
 - No vibrations will be sent to ossicles ✓ / oval window
 - Therefore, no pressure waves will be created in the inner ear ✓
 - Organ of Corti will not be stimulated to generate impulses ✓
 / no impulses will be sent to the brain for hearing to occur
 (Any 3 x 1) (3)
- 3.1.5 - The cristae are stimulated ✓
 - to convert the stimulus into an impulse ✓
 - which is transmitted through the auditory nerve ✓
 - to the cerebellum ✓ where they are interpreted
 - The cerebellum send impulse to skeletal muscles ✓ to restore balance
 (Any 4 x 1) (4)
- 3.2 3.2.1 (a) - To remove the auxins ✓ produced at the apical bud (1)
- (b) - To allow the auxins to diffuse into the block of agar ✓ (1)
- 3.2.2 - The auxin will diffuse into the right side ✓ of the stem
 - There will be high concentration of auxins on the right-side ✓ of the stem
 - High concentration of auxins will stimulate cell elongation ✓ /growth mainly on the right-side
 - This uneven growth ✓
 - will cause the stem to bend to the left side by bending of stem tip towards the left-hand side ✓*
 *1 Compulsory + Any 3 (4)

- 3.2.3
- The auxin will diffuse to the lighter side ✓ (left-hand side)
 - and move to the darker side ✓ (right hand side)
 - High concentration of auxins at darker side stimulates cell elongation ✓ / growth than the cells at the lighter side
 - This uneven growth ✓
 - causes the stem to bend to the left side towards lighter side ✓* (left hand side) ***1 Compulsory +Any 3** (4)
- 3.2.4
- More lateral branches develop ✓ increasing the yield ✓
 - Fruit will be accessible from the branches enabling easier harvest ✓ (Any 1 x 2) (2)
- (Mark first ONE only)**
- 3.3 3.3.1 (a) Insulin ✓ (1)
- (b) Pancreas ✓ (1)
- 3.3.2 Negative feed-back ✓ mechanism / homeostasis (1)
- 3.3.3 During fasting no food is consumed therefore
- The glucose level drops below normal ✓
 - The pancreas will not be stimulated to secrete insulin ✓ / less will be secreted / the level of insulin will drop (2)
- 3.3.4
- When the level of glucose decreases below the normal levels ✓
 - the pancreas is stimulated to secrete more glucagon ✓ / hormone **B**
 - which stimulates the conversion of glycogen to glucose ✓
 - raising the levels of glucose ✓ back to normal (4)
- 3.4.1 (a) Amniotic fluid ✓ (1)
- (b) Chorion ✓ (1)
- 3.4.2 Umbilical vein ✓ (1)
- 3.4.3
- Serves as an attachment of embryo to the mother ✓
 - Allows the diffusion of dissolved food from the mother to the foetus ✓
 - Allows the diffusion of oxygen from the mother to the foetus ✓
 - Allows for the diffusion of carbon dioxide from the foetus the mother ✓
 - Allows for the diffusion of nitrogenous excretory wastes from the foetus to the mother ✓
 - It secretes progesterone ✓ which maintains pregnancy
- (Mark first TWO only)** (Any 2 x 1) (2)

- 3.4.4 - The zygote divides by mitosis ✓
- To form a (solid) ball of cells ✓
- called morula ✓
- which further divides to form a hollow ball of cells ✓
- called blastocyst ✓ / blastula
- The blastocyst/blastula implants in the endometrium ✓ / This is called implantation
- The outer layer of the embryo becomes a chorion ✓ and
- inner layer becomes an amnion ✓
- with the amniotic fluid inside ✓
- After the implantation the chorion develops many finger-like outgrowths ✓
- called chorionic villi ✓
- The endometrium together with the chorionic villi forms the placenta ✓ (Any 8 x 1) (8)
- 3.4.5 - Hollow cavity ✓
to accommodate the developing foetus ✓
- Muscular ✓
to contract and relax to facilitate childbirth ✓
- Elastic ✓
to stretch to accommodate the developing foetus ✓ (Any 2 x 1) (2)
- [50]**

TOTAL SECTION B: 100
GRAND TOTAL: 150