

# LRN GCSE BIOLOGY EXAM PAPER 2 June 2023

## Marking Scheme

### MCQs

1. C
2. C
3. A
4. C
5. B
6. B
7. A
8. D
9. D
10. A
11. C
12. C
13. A
14. A
15. B
16. A
17. B
18. D
19. C
20. C
21. D
22. A
23. C
24. D
25. D

Extended Theory Mark scheme:

1a) Reflex arc [1] (ignore reflex action / reflex)

b)

Letter:	Description
A	If this structure is damaged, you would lose the ability to detect changes in environment.
D	Region which is described as having neurones without myelinated axons.
E	Promotes unidirectional transmission of electrical impulses.
E	Diffusion of neurotransmitters occurs here.

c) Contain myelin sheaths [1]

Speed up conduction/transmission [1] / Accept protects the neurone [1]  
of electrical impulses [1] Reject messages / signals

d)

Cream will diffuse/Diffusion into the skin/absorb by skin pores [1]

Drug/painkiller is complimentary to receptors [1]

Drug/painkiller binds to receptors [1]

Preventing neurotransmitters from binding [1]

No new impulse generated [1]

2a) Gestation period [1]

b)

Sperm penetrate / digest outer layer / jelly coat of egg [1] (Reject digest cell membrane)

Fusion of gametes nuclei [1]

Zygote formed [1]

Zygote divides by mitosis to form embryo [1]

Continues to divide to form ball of cells / blastocyst [1]

Moves along oviduct by cilia wafting / peristalsis of oviduct [1]

To the uterus [1]

2ci) FSH / Follicle stimulate hormone [1]

cii)

MP1

Leads to multiple follicles developing / maturing [1]

OR

Multiple eggs released during ovulation [1]

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MP2

If multiple eggs present, then multiple sperm can fertilize each egg [1]

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MP3

Multiple zygotes formed [1]

Or

Multiple embryos formed [1]

MP4

Multiple implantations/placentas/fetus formed/occur [1]

ciii)

MP1

- IVF OR Surrogacy

MP2

- Sperm / egg cells collected from mother and father

MP3

- external fertilisation / sperm introduced to egg in petri dish / accepted appropriate as described.

MP4

- Embryos then inserted into uterus of mother / mother / another female / surrogate

Note: MP4 is different to MP1 needs to clearly emphasis the idea of embryo.

Q3)

- a) Named cycle but must be correct named for correct images[No mark]

1 mark for correctly naming both processes

1 mark for correctly naming both substances in living things and atmosphere

Nitrogen cycle:

- a) Nitrogen
- b) Nitrogen fixation
- c) Amino acids / proteins / DNA / Chlorophyll
- d) Denitrification

OR

Carbon cycle:

- a) Carbon dioxide
- b) Photosynthesis
- c) Glucose / cellulose / glycogen / any correctly named carbohydrate found in or produced by organisms.
- d) Respiration (accept decomposition)

OR

Water cycle:

- a) Water vapour (do not accept water by itself) (Accept clouds)
- b) Precipitation / Condensation
- c) Glucose / liquid water / plasma / synovial fluid accept appropriate use of water of organism.
- d) Evaporation / transpiration / evapotranspiration

Note do not accept reverse processes, must follow arrow directions of change.

b)

Guidance 4 correct answers 2 marks

2 correct answer = 1 marks

- Combustion / burning
- Carbon dioxide
- Climate change
- Kyoto Protocol / Paris Climate Change

ci)  $5 \times 10^7$  million years

cii) Natural Selection [1]

Individuals with better adaptations / less digits on feet [1]

Survive and reproduce [1]

Pass on their alleles [1]

Occurs over several generations [1]

4ai)

$8045311447 - 7250593370 = 794,718,077$  [1]  
 $(794,718,077 / 7250593370) = [1]$  Evidence of  
Answer \* 100 = 11% / 10.96% [1] **Reject 10.9%**

4aii)

2 marks for each strategy + explanation

Explanations should attempt to suggest how to promote survival or prevent death or increase population numbers.

MAX 3 marks if strategies listed but not explained.

Strategies: Zoo

Explanation:

- Protection of endangered organisms to not be poached / killed
- Medical support can be provided in zoo's
- Breeding programs can be used in zoo's increase populations. (Note do not double award this marking point / accept only once in students answer)

Strategies: National parks [1] / nature reserves [1] (Can accept for different MP's if not duplicated / repeated answers for 4 marks)

- Protection of natural habitat increasing survival
- Protection from poachers / Government protection support
- Can be monitored by humans in case of need of medical interventions

Strategies: Seed banks [1]

- Provides genetic resource / in event of extinction event

Strategies: NGO's

- Charity monitoring / protection / shelters

Strategies: Education / Community programs

- To promote awareness / eco-tourism to prevent killing / loss of organisms
- Education sites / habitats are protected and monitored.

## Practical Theory:

1a) Tropisms [1 mark] Reject named Photo / geo tropisms]

1bi) Any two from

- Water
- Oxygen
- Warm temperature

Max 1 mark if light is mentioned.

Bii)

Method marks:

MP1 – Using a box (with hole) to create a directional stimulus.

OR

MP1 Place a lamp in a fixed location near the seedlings (do not accept directly above)

(Accept description of allowing light from a specific direction)

MP2 leaves the seedlings for a period or named period greater than 1 day.

MP1 + MP2 Accept use of a Clinostat

Control variables:

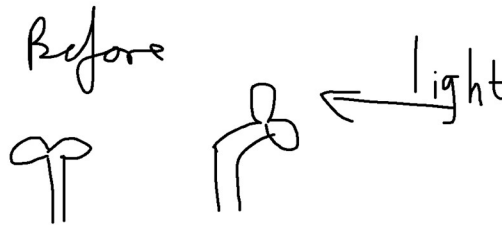
MP3 Same volume of water added.

MP4 Same temperature

Biii)

MP1 showing before and after image of seedling.

MP2 must show growth or arrow of light plant growing towards light.



c)

- MP1 Auxin made by shoot tip
- MP2 diffuses / accumulates on shaded side.
- MP3 causes cell elongation in stem on the shaded side.
- MP4 Leaves face the direction of light.

Advantage:

- MP5 to absorb more light for photosynthesis.

Q2) 1 mark per correct row

	Identify the correct variable?	Apparatus used in the experiment
Independent variable	Temperature	Water bath
Dependent variable	Time taken for colour to change.	Stopwatch Or Colorimeter
Control Variables	1. Volume of milk 1. Volume of enzyme 1. Volume of sodium carbonate -----  2. Type of milk -----  3. Concentration of milk / enzyme / solution	1. Syringe 1. Measuring cylinder -----  2. Use the same batch / carton of milk -----  3. Acceptable method of making solutions.

Aii) Pink

Aiii) Colourless

Aiv) To calculate the average [1 mark]

To remove anomalies [1 mark]

bi)

MP1 Linear scale on both x and y axis 1 mark

MP2 Correct plotting including the 0 plot 1 mark. No 0 plot then no mark.

MP3 Occupy at least half the grid 1 mark

MP4 Connecting points with straight lines using a ruler 1 mark. Reject if smooth curve.

Bii)

Description Max 2 marks

MP1 Mass decreased from 10kg to 4kg in 25 days then stayed constant.

MP2

Slow decrease in mass in first 5 days of 0.5kg followed by 1.5kg decrease from 5 till 20 days, then 1kg decrease from 20-25 days.

Explanations: Max 3

MP3 Mass decrease slow at start due to population of decomposers low / growing.

MP4 Constant rate of decomposition due to max decomposer population

MP5 Reduced mass as less biomass available for decomposers.

MP6 Mass stops at 4kg/no further decomposition as no organic matter left / only bones.

MP7 Accept alternative valid points.