

**LRN GCSE BIOLOGY EXAM PAPER 1 June 2023**

**Mark Scheme**

MCQ:

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

Extended Theory answers:

1a)

- Undifferentiated/unspecialized cells [1]
- Capable of differentiating/specializing into other body cells [1]

b) Mitosis [1]

c) Transmit electrical impulses [1] Reject messages /signals

di)

- Fatigue / tiredness
- Pale
- Increased chance of blood clots
- Pale or yellowish skin.
- Irregular heartbeats.
- Shortness of breath.
- Dizziness or lightheadedness.
- Chest pain.
- Cold hands and feet.

Any two, both needed for 1 mark.

dii) **embryos advantages**

- can create many embryos in a lab
- painless technique
- can treat many diseases / stem cells are pluripotent / can become any type of cell (whereas bone marrow can treat a limited number)

**embryos disadvantages**

- *harm / death to embryo*
- *embryo rights / embryo cannot consent*
- *unreliable technique / may not work*

**Adult stem cells advantages**

- no ethical issues / patient can give permission
- can treat **blood** diseases
- procedure is (relatively) safe / doesn't kill donor
- tried and tested / reliable technique
- patients recover quickly from procedure

**Adult stem cell disadvantages**

- *risk of infection from procedure*
- *can only treat a few diseases*
- *procedure can be painful*

**both procedures advantage**

- can treat the disease / problem

***both procedures disadvantages***

- *risk of transfer of viral infection*
- *some stem cells can grow out of control / become cancerous*

*Note: To gain full marks must include at least 2 advantages and disadvantages of both ASC and ES to gain full marks.*

*Max 3 marks if only one type of stem cell discussed advantages and disadvantages.*

2ai) Hypertonic solution

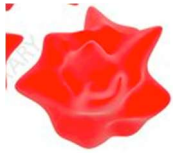
Aii) Plasmolyzed

Aiii)

- Correction description of turgid [1]
- Explanation – 3 marks
- Osmosis [1]
- Water moves into the cell / down the water potential gradient [1]
- Across a semi-permeable membrane [1]

2bi)

MP1 1 mark for appearance of crenated red blood cell. Reject if nucleus drawn.



example appearance accept variants or 2D sketches.

MP2: mark labelling at least 2 of the following:

- Cell membrane
- Cytoplasm
- Haemoglobin

Can still achieve MP2 even no MP1 ignore labelled nucleus, do not penalize twice.

2bii)

MP1 Does not have cell wall

MP2 to maintain cell shape.

3a)

Protease	Site of production	Site of digestion
Pepsin	Stomach	Stomach
Trypsin	Pancreas	Small intestine.

Bi)

Reading from left to right

bottom left: Enzyme / Protease / named protease

Top left: Substrate / protein

Bottom right: Enzyme substrate complex (accept ESC)

Top right: Products / amino acids

1 mark for enzyme substrate complex

1 mark for other 3 correctly labelled.

Bii) MP1 Rate of reaction is less (stand alone mark)

Max 3 from any of the following:

MP2 Less kinetic energy

MP3 less successful collisions / successful binding between Substrate and enzyme

MP4 less Enzyme substrate complexes formed

MP5 Less products made

Ignore reference to denaturation

Do not award MP3/4/5 if talking about pH. If talking about pH descriptions MAX 1 mark.

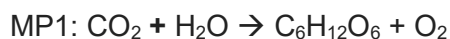
3biii)

MP1: Use of Buiret solution / Universal Indicator

MP2: Change from purple to blue / from Green to yellow/orange/red

Mp3: Over time / given time taken / observed.

4a.) Reject word equation / Reject mix between word and chemical formula



MP3: Light or Chlorophyll on the arrow (can still be awarded if on the arrow of word equation)

4b) Sucrose, amino acids, water, auxin, Accept hormones

4bii) MP1 Diffusion / transpiration of water vapour. Accept Excretion

Ignore gas exchange which process identified.

MP2 Movement from high concentration to low concentration

MP3 Accept named substance

Example: Water vapour is lost by diffusion, is worth 2 marks.

Gas exchange takes place between oxygen and carbon dioxide, is worth 1 mark.

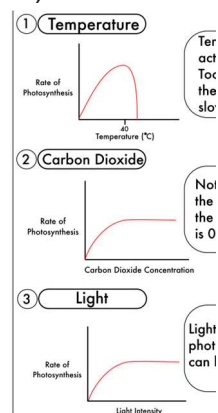
Biii) MP1: Spongy mesophyll layer

Structural features and explanation:

MP2: Large air spaces

MP3: Promote diffusion of gases

ci) 1 mark for both sketches



cii)

Description 1 mark: As light intensity increases the rate of photosynthesis increase UNTIL a certain point then remains constant. [1 mark] No marks awarded for just saying as light increases photosynthesis increases.

Explanation 2 marks:

1. More light, light is required for photosynthesis/means more photosynthesis
2. Chlorophyll can only absorb so much light
3. Another limiting factor is present / named limiting factor as described.

Practical component:

1a.)

A: Ocular / eye piece lens – Ignore lens by itself

B: Objective lens – ignore lens by itself

C: Stage – Accept platform

All 3 need to be correct for 1 mark.

Bi) Methylene blue / toluidine blue 1 mark

Bii) To make the non-visible cells become visible [1 mark]

Accept cells are colorless and stain is need to make them visible / be seen.

c) Guidance max 2 marks equipment **E**, Max 3 marks Method **M**, 1 mark safety **S**

1. Sample taken from inside of cheek using cotton bud. **E/M**
2. Place on slide / dab on slide **M**
3. Add stain (accept stain named in bi) as ECF **E/M**
4. Add cover slip **E/M**
5. Use tissue to clear off excess stain **M / S**
6. Place slide / specimen on stage **M**
7. Fasten using stage clips **M**
8. Microscope should be on lowest power/X4 objective lens **M**
9. Using coarse focus / focus knob to raise the stage **M**
10. Use fine focus to produce clear focused image **M**
11. Handle slide / cover slip with care to avoid cut **S**
12. Wash hands if any stain on skin **S**
13. Do not have light on to high intensity **S**

di) Air bubbles

dii) Apply pressure to cover slip to remove bubble. Ignore use tissue as this is a prevention method not correction.

e.) Appropriate use of Magnification equation.

1 mark for  $I = M \times A$  /  $I = 38 \times 2500$

1 mark for answer 95000/95/9.5 (accept correct answer depending on units used of calculation)

1 mark for using mm / cm as final answer unit

95mm (3 marks)

9.5 cm 3 marks

9500um only 2 marks

Q2)

a) Valve / tricuspid valve

Aii) Prevent mixing of deoxygenated and oxygenated blood

Ignore prevent mixing of blood (too vague)

Aiii)

C has thinner muscle [1 mark] Accept E has thicker muscle than C

As only pumped blood to the lungs [1 mark]

Do not accept as E pumps blood to body, question is focusing on why C is thinner, not why E is thicker.

b) Ignore use carefully

Always cut downwards and away from body [1 mark]

c)

MP1 Place finger on neck / wrist / artery of body

MP2 Count the number of "pulses" in a min

MP3 Relevant calculation

E.g. count for 15 seconds and multiple value by 4 to work out beats per minute.

MP4 Repeat 3-5 times can calculate the average.

di)

MP1 Independent variable / concentration % of drug should be in left column.

MP2 Values not to same number of decimal places (Accept description / examples)

MP3 Anomaly of 55 not excluded when calculating the mean.

dii)

1. Correct axis orientation labels with units x axis concentration of drug / y axis Mean heart rate arbitrary units / au [2]

2. Linear scaling

3. At least half the graph occupied

4. Correct plotting [1]

5. Suitable line of best fit / accept dot to dot

Max 3 marks is bar graph drawn.