Practice Question Set For GCSE
Subject : Biology
Paper-1 Topic: B4 Bioenergetics

Merit Minds
www.merit-minds.com
Exam Preparation and Free Resources

Name of the Student:_____
Max. Marks : 29 Marks **Time : 29 Minutes**

Mark Schemes

Q1.

(a) $6CO_2 + 6H_2O \longrightarrow C_6H_{12}O_6 + 6O_2$

1

(b) endothermic

1

(c) measure the volume of gas released

allow use a measuring cylinder / capillary tube / (gas) syringe

1

increase length of time

allow sensible length of time

allow video the investigation so you could re-count the bubbles later

*allow repeat the measurement at each distance several times **and** calculate a mean*

ignore references to using other distances

1

(d) temperature affects **rate** of photosynthesis
or
temperature affects **rate** of bubble production

allow correct description of effect of temperature on rate

1

(because) reaction / photosynthesis is controlled by **enzymes**

allow high temperatures denature enzymes

enzymes being denatured must be linked to high temperature

1

(e) evidence of squaring for **two** distances that double:
25 **and** 100
or
100 **and** 400

1

calculate $1/d^2$ for **two** distances that double:
0.04 **and** 0.01
or
1/25 **and** 1/100
or

Downloaded from www.merit-minds.com

0.01 **and** 0.0025
or
1/100 **and** 1/400

*allow **2** marks for these calculations without working*

ignore calculations for a third distance as long as two where the distance doubles are correct

1

(therefore as distance doubles) light intensity is quartered

1

(f) 2 (bubbles would be produced)

1

(as) very little light / energy for photosynthesis to occur

*do **not** accept no light*

1

*allow **2** marks for a quarter of the bubbles are produced as light distance doubles so 2 bubbles would be expected*

(g) (independent variable)
use different concentrations of sodium hydrogencarbonate solution

allow three concentration values

ignore different concentrations of carbon dioxide

1

(control variables)

***max 2** marks for control variables*

any **two** from:

- distance from light source

  allow light intensity
  ignore light unqualified
  ignore same lamp

- temperature of solution
- same plant

  allow type / size of plant

- time for plant to equilibrate

  allow time for plant to adjust to different solution
  ignore time unqualified

2

[14]

Downloaded from www.merit-minds.com

Q2.

(a) one X and one Y chromosome and 9 pairs of other chromosomes

1

(b) any **three** from:

- (called) meiosis

  correct spelling only

- DNA / chromosomes replicate
  or
  DNA makes a copy
- two divisions to form 4 cells
- so only 1 set of chromosomes per cell

  allow cells are haploid
  ignore half the DNA

- (daughter cells / gametes) are all genetically different

  *if no other mark awarded allow **1** mark for forms gametes / cells which are all different*
  ***or** only happens in testes and (embryonic) ovaries*

3

(c) (meiosis will not work because) number of chromosomes cannot halve

allow chromosomes cannot form pairs
allow chromosomes cannot split up evenly

1

(d) do not use energy in reproduction

1

so more (energy) available to synthesise proteins

allow other correct molecules or cell components

1

allow converse if clearly describing diploid oysters

(e) any **two** from:

- global warming may be raising temperature of water and killing oysters
- pollutants in the water may be toxic and kill the oysters
  or
  increased acidity of the oceans is killing oysters

  allow correctly named pollutant with reason

- new competitors / triploid oysters are using up the normal food source
- new pathogens may be causing diseases
- new predators eating oysters

  ignore over harvesting

2

(f) **Level 3:** A judgement strongly linked and logically supported by a sufficient range of correct reasons is given.

5–6

Level 2: Some logically linked reasons are given. There also may be a simple judgement.

3–4

Level 1: Relevant points are made. They are not logically linked.

1–2

Downloaded from www.merit-minds.com

No relevant content

Indicative content

for:
- oysters are available to eat all year **so** eating oysters has become very popular
- cheaper to produce **so** more food for expanding population
- oysters grow faster **so** more oysters for supermarkets / restaurants or more profit for farmers
- stocks are replenished each year **so** more sustainable fishing
- they can harvest / sell all year **so** more stable and profitable for oyster farmers

against:
- carcinogen put into environment / oysters **so** may enter the food chain or cause cancer in humans
- bigger triploid oysters may outcompete the smaller native diploid oysters **so** upset balance of the ecosystem / cause extinction
- people may not buy / eat them because they have used a carcinogenic chemical **so** reduced profit for farmers / suppliers / supermarkets / restaurants
- farmers have to buy new seed oysters every time **so** more expensive

other content:
- shouldn't be eating the oysters until they are thoroughly tested
- should be looking for alternative ways to get triploid oysters
- should stop using triploid oysters until the effect on the (marine) environment is known
- would replace lost oyster beds **but** could change the ecosystem
- oysters available to eat all year **but** probably do not taste the same or have the same flavour

[15]

Downloaded from www.merit-minds.com