

GCSE BIOLOGY

Topic Paper: 1.1 Cell structure
Part 1 & 2 Mark Scheme

MARK SCHEME



66 Marks



M1.	A – cell membrane	1	
	B– cytoplasm	1	
	C– genes / genetic material / chromosome	1	
	D – cell wall	1	[4]

M2.	(a) B		
	<i>no mark for “B”, alone</i>		
	large(r) surface / area or large(r) membrane		
	<i>accept reference to microvilli</i>		
	<i>accept reasonable descriptions of the surface</i>		
	<i>do not accept wall / cell wall</i>		
	<i>ignore villi / hairs / cilia</i>	1	
	(b) (i) any one from:		
	insulin / hormone		
	<i>if named hormone / enzyme must be correct for pancreas</i>		
	enzyme / named enzyme	1	
	(ii) <u>many</u> ribosomes	1	
	(ribosomes) produce protein		
	<i>accept insulin / hormone / enzyme named is (made of) protein</i>		
	or		
	allow <u>many</u> mitochondria (1)		
	provide energy to build protein or to make protein (1)		
	<i>accept ATP for energy</i>	1	[4]



M3. (a) B

no mark for "B" alone, the mark is for B and the explanation.

large(r) surface / area **or** large(r) membrane

accept reference to microvilli

ignore villi / hairs / cilia

accept reasonable descriptions of the surface eg folded membrane / surface

do not accept wall / cell wall

1

(b) (i) any **one** from:

(salivary) amylase

carbohydrase

1

(ii) many ribosomes

do not mix routes. If both routes given award marks for the greater.

1

ribosomes produce protein

accept amylase / enzyme / carbohydrase is made of protein

or

(allow)

many mitochondria (1)

mitochondria provide energy to build / make protein (1)

accept ATP instead of energy

1

[4]

M4. (a) (i) release energy

allow provide / supply / give energy

do not accept produce / create / generate / make energy

do not allow release energy for respiration

1

(ii) contain half the (number of) chromosomes **or** contains one set of chromosomes **or** contains 23 chromosomes

allow genetic information / DNA / genes / alleles instead of chromosomes

accept haploid

1



(b) any two from:

(stem cells) are unspecialised / undifferentiated
allow description eg 'no particular job'

are able to become differentiated
or can form other types of cell / tissue / organ

stem cells can / able to divide / multiply

2

[4]

M5. (a) (i) makes / produces / synthesises protein / enzyme

1

(ii) plant cell has nucleus / vacuole / chloroplasts / chlorophyll
or plant cell is much larger

'It' = plant cell

allow correct reference to DNA or chromosomes

allow plant cell has fewer ribosomes

allow cellulose (cell wall)

1

(b) (i) 200

correct answer with or without working gains 2 marks

*if answer incorrect, allow 1 mark for $\frac{2 \times 50,000}{500}$ **or** $\frac{100,000}{500}$
or 100*

2

(ii) bacterial cell is too small / bacterial cell about same size as a
mitochondrion / 'no room'

ignore references to respiration

1

[5]

M6. (a) (i) A = (cell) wall

ignore cellulose

1

B = cytoplasm

1



(ii) any **one** from:

accept has DNA instead of a nucleus, but not just has DNA

bacterial cell / it has no nucleus

allow no mitochondria

DNA free in cytoplasm

ignore size

has no vacuole / no vesicles

ignore strands of DNA

1

(b) (i) yeast grows best / better / well **or** optimum temperature for yeast / more yeast present

allow yeast works best / better / well

1

(yeast) makes CO₂ **or** respire / respiration

allow fermentation

1

(ii) bacterium grows best / better / well / more bacteria present **or** optimum temperature for bacterium

ignore microorganisms / microbes

allow works / respire best / better / well

1

(bacterium) makes (lactic) acid

*do **not** allow wrong acid*

1

[7]

M7. (a) xylem **and** phloem

either order

allow words ringed in box

allow mis-spelling if unambiguous

1

(b) (i) movement / spreading out of particles / molecules / ions / atoms

ignore names of substances / 'gases'

1

from high to low concentration

accept down concentration gradient

ignore 'along' / 'across' gradient

ignore 'with' gradient

1



(ii) oxygen / water (vapour)

allow O_2 / O_2

ignore O^2 / O

allow H_2O / H_2O

ignore H^2O

1

[4]

M8. Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also apply a 'best-fit' approach to the marking.

0 marks

No relevant content.

Level 1 (1 – 2 marks)

An example is given of a named substance

or

a process

or

there is an idea of why diffusion is important eg definition.

Level 2 (3 – 4 marks)

At least one example of a substance is given

and

correctly linked to a process in either animals or plants.

Level 3 (5 – 6 marks)

There is a description of a process occurring in either animals or plants that is correctly linked to a substance

and

a process occurring in the other type of organism that is correctly linked to a substance.

examples of points made in the response

Importance of diffusion:

to take in substances for use in cell processes
products from cell processes removed

Examples of processes and substances:

for gas exchange / respiration: O_2 in / CO_2 out
for gas exchange / photosynthesis: CO_2 in / O_2 out
food molecules absorbed: glucose, amino acids, etc
water absorption in the large intestine
water lost from leaves / transpiration
water absorption by roots
mineral ions absorbed by roots

extra information

Description of processes might include:

*movement of particles / molecules / ions
through a partially permeable membrane
(movement of substance) down a concentration gradient
osmosis: turgor / support / stomatal movements*



M9. (a) stomach is acidic / has low pH

allow any pH below 7

ignore stomach is not alkaline

1

lactase works best / well in alkali / high pH / neutral / non-acidic conditions

allow any pH of 7 and above

accept works slowly in acid conditions

*allow figures from table with a **comparison***

ignore reference to temperature

1

(b) any **three** from:

(below 40(°C)) increase in temperature increases rate / speed of reaction

reference to molecules moving faster / colliding faster / harder / more collisions

enzyme optimum / works best at 40°C

allow value(s) in range 36 – 44

ignore body temperature unless qualified

high temperatures (above 40°C) / 45°C / 50°C enzyme denatured

*allow synonyms for denaturation, but do **not** allow 'killed'*

*denaturation at high and low temperature does **not** gain this mark*

ignore references to time / pH

3

(c) any **two** from:

acid neutralised or conditions made neutral / alkali

accept bile is alkaline

(allow) emulsification / greater surface area (of lipid / fat)

*allow description of emulsification eg fat broken down / broken up
into droplets*

*do **not** accept idea of chemical breakdown*

lipase / enzymes (in small intestine) work more effectively / better

allow better for enzymes

ignore reference to other named enzymes

2

M10. (a) both parents **Aa**

*accept other upper and lower case letter without key **or** symbols
with a key*

allow as gametes shown in Punnett square

1



aa in offspring correctly derived from parents

or

aa correctly derived from the parents given

ignore other offspring / gametes

for this mark parents do not have to be correct

1

offspring **aa** identified as having cystic fibrosis

*may be the only offspring shown **or** circled / highlighted / described*

1

(b) (i) any **one** from:

accept converse if clear, eg if you (only) took one it might have cystic fibrosis / might not be fertilised

(more) sure / greater chance of healthy / non-cystic fibrosis egg / embryo / child

accept some may have the allele

reference to 'suitable / good embryo' is insufficient

greater chance of fertilisation

1

(ii) **advantages**

to gain 3 marks both advantage(s) and disadvantage(s) must be given

max 3



any **two** from:

ignore references to abortion unless qualified by later screening

greater / certain chance of having child / embryo without cystic fibrosis / healthy

child with cystic fibrosis difficult / expensive to bring up

cystic fibrosis (gene / allele) not passed on to future generations

disadvantages

any **two** from:

operation dangers / named eg infection

ignore risk unqualified

ethical or religious issues linked with killing embryos

accept wrong / cruel to embryos accept right to life argument

ignore embryos are destroyed

(high) cost of procedure

possible damage to embryo (during testing for cystic fibrosis / operation)

plus

conclusion

a statement that implies a qualified value judgement

eg it is right because the child will (probably) not have cystic fibrosis even though it is expensive

or

eg it is wrong because embryos are killed despite a greater chance of having a healthy baby

***note:** the conclusion mark cannot be given unless a reasonable attempt to give both an advantage and a disadvantage is made*

*do **not** award the mark if the conclusion only states that advantages outweigh the disadvantages*



(c) any **three** from:

osmosis / diffusion

*do **not** accept movement of ions / solution by osmosis / diffusion*

more concentrated solution outside cell / in mucus

assume concentration is concentration of solute unless answer indicates otherwise or accept correct description of 'water concentration'

water moves from dilute to more concentrated solution

allow correct references to movement of water in relation to concentration gradient

partially permeable membrane (of cell)

allow semi / selectively permeable

3

[11]

M11. (a) **award one mark for each key idea**

energy released **or** energy transferred **or** respiration

*allow provides **or** gives*

*do **not** allow produces **or** makes*

3

near to the site of movement **or**
energy available quickly **or** more
energy

accept allows more mitochondria to fit in

(mitochondria) packed (around
filament) **or** efficient arrangement **or**
spiral arrangement

(b) contains chromosomes **or** genes **or**
DNA

***not** genetic material*

1

(which) contribute half (the genes) to
the fetus **or** offspring

*23 chromosomes **or** half the genes*

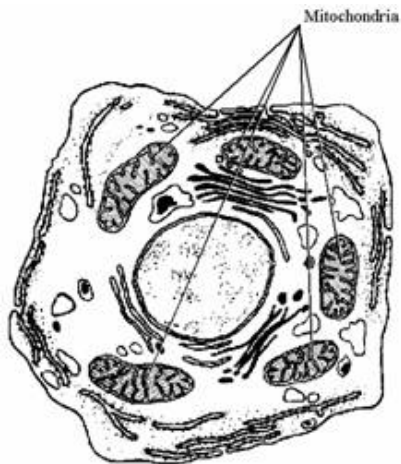
***or** reference to X,Y chromosome determining sex (if the notion of
halfness is there)*

nucleus contains half genes for the offspring = 2 marks

1

[5]

M12. (a) (i)



award 1 mark for any of the mitochondria correctly labelled if a number are labelled and one is incorrect award 0 marks

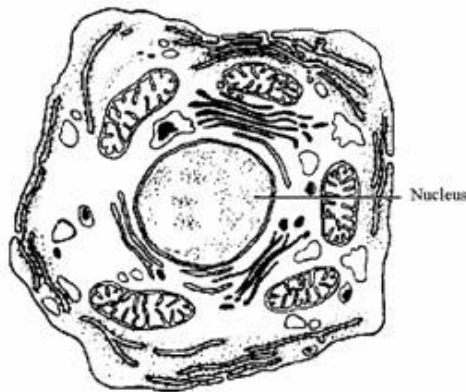
1

(ii) respiration **or** the release **or** transfer of energy **or** it contains the enzymes for respiration

do not accept energy produced

1

(b) (i) nucleus (named and correctly labelled)



arrow **or** line must touch **or** go inside the nuclear membrane

1

(ii) DNA **or** genes **or** nucleic acids

*accept protein **or** histones **or** nucleotides **or** ATGC*

1

(c) enzymes **or** nucleus

*do not accept factors that affect the rate rather than control it eg pH **or** temperature*

1

[5]