2016 SEM 1 ATAR YEAR 11
SECTION ONE

1	B	11	D	21	B
2	A	12	B	22	D
3	C	13	A	23	C
4	D	14	A	24	C
5	C	15	C	25	A
6	A	16	D	26	C
7	B	17	A	27	A
8	D	18	D	28	B
9	A	19	C	29	B
10	A	20	D	30	B

SECTION TWO
Question 26a.

- Heading loss of water from stomata/leaves (-1/2) at various light intensities (1)
- Correct labels on axes with units
- Independent (light intensity, kilolux
- Dependent (loss of H_2O, g/hr) (2)

- Even axes calibrations, starting from
- Key A & B
- Clear correct data points
- Pencil
- Incorrect graph

-1 or above

26b.

- As light intensity increases (1/2)
- the amount of H_2O loss from he plant also increases (1).
- Until it reaches light intensity 30 (or 22g/L) then it plateaus. (1/2)

26c.

- Maximum H_2O loss (22g/hr) by plant. (1)

26d.

- Apparatus B is the control (1)
- Need to have data to compare the independ/experimental variable data against. (1)

26e.

- H_2O loss is due to process of evaporation (1).
- ↓ temperature will ↓ rate of evaporation (1).

26f.

- prevent evaporation of H_2O from flasks (Plant/porous pot only route for H_2O loss). (1)

26g.

- Repeat experimental procedure (1)

26h.

- Cohesion – water molecules stick together (tensile strength) and so move as a continuous column.
- Adhesion – water molecules stick to sides of vessels
- Transpiration – evaporation of water from air spaces in leaf and out stomata pulls water up xylem.
- Root [Osmotic] pressure – water constantly moving from region of high water concentration to low water concentration thus pushing water into xylem vessels.
- Capillarity – polar nature of water molecule

Any 3 above

Question27a

- i. mitosis (1)
- ii. A. Aerobic (1) respiration (1/2)
- ii. B Anaerobic / alcohol fermentation (1)
- iii.

	A	B
Inputs	O_2, glucose **(1)**	Glucose **(1)**
Outputs	CO_2, H_2O, 36 ATP **(2)**	CO_2; ethanol 2ATP **(2)**
Sites	Cytoplasm, mitochondria (matrix, cristae) **(1)**	Cytoplasm **(1)**

- iv. presence of O_2 means more energy released in aerobic resp'n [1] so more ATP for cell synthesis, such as cell reproduction/mitosis [1]
- v. A, as in B increase ethanol will lead to death of cells.

27b.

- i. glucose [1] and sugar (1/2)
- ii. Photosynthesis [1] uses CO_2 plus water with energy from light [1] to release O_2 (from water) [1]
- iii. increase in O_2 rate of production [1] as increase in CO_2 conc'n [1] so increased rate of photosynthesis [1]

Question 28a

- i. long, thin or flat (cell shape) (1) rectangular (1/2)
- ii. Spherical shape (1)
- iii.High SA:V increases efficiency of nutrients (O_2 (1/2))(1) and removal of wastes (1) (CO_2 (1/2))
- greater exchange of materials across the membrane (internal and external environmts)

28b

- i. Active transport required ATP(1) where passive transport does not require ATP (1)
- ii. exocytosis, endocytosis (pinocytosis and phagocytosis) & active transport (2)

28c

- Adenosine triPhosphate (1) ATP (1/2)
- ATP is a renewable energy source (1)
- High energy last phosphate bond broken, releasing stored energy (1) Adenosine diphosphate
- ADP/ATP cycle is a way of moving energy btn rxns
- Diagram of cycle indicating energy out with P bond broken, energy in (from P/S and Resp) with addition of P
- Provides cell with an efficient linking or coupling of energy – yielding processes to energy requiring processes within the cell by conserving, transferring & releasing energy

Question 29a

- transport sugars (up and down)
- from leaves to all parts around the plant
- 2 way movement, source ⇔sink

29b

- sieve plates between elements
- allow continuous flow of contents
- absence of nucleus in sieve tubes
- allows > open space for flow of strands
- many sieve tubes/elements
- joined end to end
- makes a long tube for transport throughout plant
- companion cells process cellular activities for sieve tube(no nuclei) as they posses nuclei
- sieve plates provide rigidity and continuous flow of substances along sieve tubes

29c

A= palisade mesophyll
C= Stomata (stoma + guard cells)
(-1/2) deducted for failure to state A or C

29d

- A – densely packed with chloroplasts as main site of P/S & structural support for leaf
- A – Close to the surface, allows for light penetration, required for P/S

- C – pores in the leaves that absorb & release gases O_2 / CO_2
- C - possess chloroplasts to undergo P/S (when water is low)
- C - Thicker inside membrane of paired crescent shaped guard cells to aid closure
- C- control water movement (turgid/flaccid) guard cells
- C – location of stomata, underside of leaf to reduce water loss via transpiration stream

Question 30

i oxygen and Carbon dioxide (2)
ii Incorrect question (not plural**)** accepted
Diffusion (1)
X = breathing Y = respiration (1)
iii

- large SA
- moist surface
- thin membranes
- large supply of blood vessels close to gas exchange site
  Any 2 above

Question 31a(i)

- A = Ocular lens / eyepiece (1/2)
- B = Objective lens (1/2)

31a (ii)

- C= Stage clips (no marks)
  - Hold specimen / slide in place
- D = (course) Focus Knob (no marks)
  - Used to move the objective towards or away from the specimen.
  - fine tune the focus on the specimen. It is also used to focus on various parts of the specimen. Generally, one uses the coarse focus first to get close then moves to the fine focus knob for fine tuning.

31b(i)

- light rays need to travel 'through' / examine specimen

31b(ii)

- Low power
- Allows for a greater FoV which then leads to focusing on specific details at x10, x40
- Centre specimen

31c(i)

- Multiply ocular lens (x10)
- By low or x4 objective lens
- To obtain total magnification (x40)

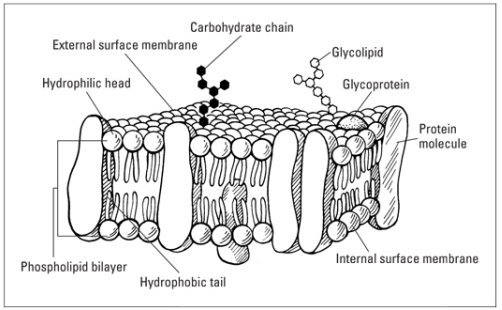
31c(ii)

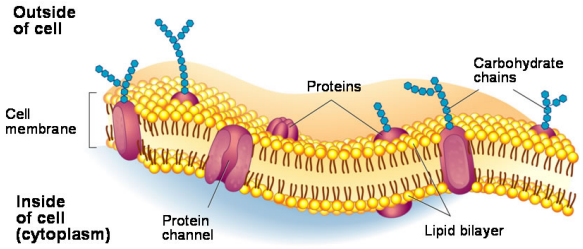
- Place a 1cm grid slide on stage under low objective
- Calculate # of viewed squares across the diameter
- Convert mm to μm

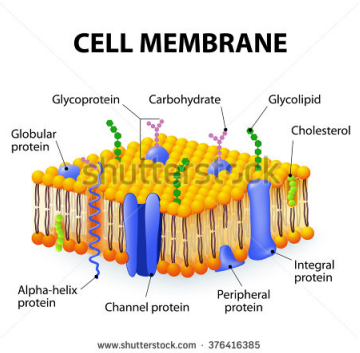
SECTION THREE

Question 32

Structure: (Cell /Plasma membrane diagram + correct labelling of flexible lipid bilayer, protein channel or carriers, integral protein/cholesterol molecules; carbohydrate chains on protein (glycoproteins) and lipids (glycolipids)
3 marks includes labelled diagram and description) (diagram – phospholipid bilayer embedded with proteins)







Function:
Forms a boundary between the cell and its external environment.
Controls the movement of substances in and out of the cell, selectively permeable
1 mark

Particles transported:

- lipid – soluble, small & non-charged molecules <u>diffuse</u> through lipid bilayer of cell membrane: eg gases, carbon compounds (not ions) and liquids – O_2 CO_2 H_20 <u>(osmosis)</u>

- <u>Facilitated diffusion</u> possible down a conc gradient for molecules with special transport/channel and carrier protein (bind to specific molecule on one side of the membrane, change shape and release the substance on the other side)
  Eg: large molecules, starch, glucose, amino acids (<u>Carrier/ transport</u>)
  Eg: ions Na^+ Cl^- (<u>Channel</u>)

- Hormones bind to <u>receptor proteins</u>

- <u>Endocytosis</u> (active vesicular transport) white blood cell engulfing bacteria (phagocytosis), very large particles or whole cells

- Exocytosis large molecules (hormones, mucus, milk proteins, enzymes) held in vesicles within the cells are transported to the external environment

- Large or charged particles: move only through <u>active transport</u> (attach to carrier proteins)

NO

- Recognition proteins as they have glycoproteins attached which act as markers/ antigens for immune response (self/non self) cellular communication

6 marks

SECTION THREE CONTINUED
Question 33a

- flow of blood over the gill lamellae (gill lamellae at right angles to gill filaments, which increase SA) and
- the flow of blood within them are in opposite direction
- Water is taken in through the mouth and forced over the gills and out through the opening on each side of the body
- It is important for ensuring that the max possible gas exchange is achieved (if the water and blood flowed in the same direction, far less gas exchange would tale place) *4 markS*

Question33b

- Blood that is already well loaded with oxygen meets water, which has is max concentration of oxygen. Therefore diffusion of oxygen from water to the blood takes places.

- Blood with little or no oxygen in it meets water which has had most, but not all, of its oxygen removed. Again, diffusion of oxygen from the water to blood takes places.
- Therefore a fairly constant rate of diffusion across the entire length of the gill lamellae/
- There is a diffusion gradient favouring the diffusion of oxygen from water into the blood all the way across the gill lamellae. Almost all the oxygen from water diffuses into the blood
  4 marks

Question 33c

- Less energy is required
- Because the flow does not have to be reversed
- (important) as water is dense and difficult to move

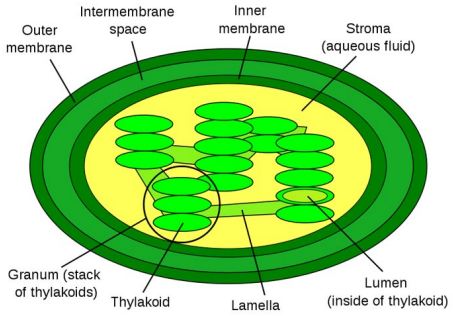
2 marks

Question 34

	Light Dep	Light Independ
Site Chloroplasts (1/2)	Thylakoid membranes / grana (1/2)	Stroma (1/2)
Requirements	Water (1/2) energy from (red and blue) light (1/2) which is absorbed by chlorophyll (1/2)	Uses energy from light dependent rxn takes H^+ ions [1/2] adds CO_2 which diffuses in (via stomata of leaf) [1/2]
Products	Splits water into H^+ ions [1] and O_2 gas [1]	to make glucose [1]

7 marks

Labelled diagram



3 marks
Stroma (1) Grana or Thylakoid membranes (1)
Outer membrane (1/2)
Inner membrane (1/2)

NAME_____

A self appraisal of my exam performance

My greatest strengths in content knowledge were…

Content areas I still need to work on are…

The style of question I handled really well include…

The style of question I still need to work on include…

Aspects of exam technique that I used really well include…

Aspects of my exam technique I need to work on before my next exam are….