

Q1.

- (c) osmosis/diffusion;
down water potential gradient/from high/less negative to low/more
negative water potential/AW; (R. osmotic potential/conc. gradients/
less or more) through partially/selectively/differentially permeable
membrane; R. semi-permeable **max 2**

Q2.

- (c) *oxygen*
diffuses, down concentration gradient / from high concentration to low concentration;
through, phospholipid bilayer; R protein channels
- glucose*
(pressure) filtration / AW; e.g. 'forced out by blood pressure'
through pores, in capillaries / between capillaries;
- facilitated diffusion;
through channel proteins / idea;
through cytoplasm; **[max 3]**

Q3.

- 6 (a) 7.0 nm ; [1]
- (b) **K** permits movement of, ions/(small) water soluble molecules/
charged/polar/hydrophilic/any e.g. ;
facilitated diffusion/active transport ; [max. 1]
- L** cell recognition/(surface) antigen/receptor/cell adhesion/cell marker/ binding site ;
forms hydrogen bonds with water to stabilize membrane structure ; [max. 1]
- M** barrier to, water soluble compounds/ions ;
allows passage of lipid soluble substances / named e.g. ;
ref hydrophobic interactions with integral proteins ;
ref structure of fatty acid tails maintains fluidity ; [max. 1]
- N** regulates, fluidity/stability ;
storage ;
restricts movement of phospholipids ;
influences permeability of membrane ; [max. 1]
[4]

- (c) idea of large molecule ;
polar ;
water soluble/not lipid soluble ; **A** hydrophilic
A not able to pass through phospholipid bilayer / AW [max. 2]
- (d) *facilitated diffusion because* the rate of uptake increases with increasing glucose concentration, up to a plateau/constant rate ; **A** figs to explain because no more proteins available/all proteins in use ;
if passive diffusion rate would continue to rise ;
cannot be active transport as rate would be independent of concentration (except at low concentration) ; [max. 2]
- (e) (active transport) uses, energy/ATP, to move (substance) against a concentration gradient ; *ora* [1]

[Total: 10]

Q4.

- (d) (i) general trend described linking temperature and percentage transmission ;
A negative correlation (with link) **R** inversely proportional
use of comparative figures (using data from both axes) to support trend ;
between 20 °C and 60 °C percentage transmission decreases, from 95% to 70% ;
between 60 °C and 70 °C, decrease is, significant / steep / from 70% to 19% ;
between 70 °C and 80 °C, decrease is, less steep / more steeply than initial temperature range / from 19% to 6% ; [3 max]
- (ii) at (temperatures above) 60 °C, cell / vacuolar, membranes damaged / AW;
A tonoplast
(membrane) proteins, denatured / altered tertiary structure ;
increased fluidity (of membrane) / phospholipid bilayer more fluid ;
(so) diffusion / AW, of, betalain / pigment (out) ;
as temperature increases, rate of diffusion increases / diffusion occurs more quickly ; [3 max]

Q5.

- 3 (a) thin / flat ;
large / high, surface area to volume ratio / small / low, volume to surface area ratio ; **R** large surface area (on its own)
(SA:V ratio) 5.95:1 ; **A** anything between 5:1 and 7:1 or suitable calculation e.g. $2 \times (12.5 \times 3.0) / 12.6$

body surface is gas exchange surface ;
no cell is far from surface / short (diffusion) distance ;
ref. diffusion of, oxygen / carbon dioxide / gases ; **A** gas exchange by diffusion
A description of diffusion as movement from high to low concentration
low, activity / metabolic rate / metabolism ; [4 max]

- (b) (i) cell membranes impermeable to sodium ions ;
(as) sodium ion channels are not present (in cell membranes) ;
active transport / active uptake ; **A** sodium pumps to take up sodium ions
move sodium ions against their concentration gradient ;
uses, energy / ATP ;
R refs to cell walls / impermeable skin [2 max]

- (ii) ref. to, (nerve) impulses / action potentials / depolarisation / resting potential ; *treat ref. to electric as neutral*
helps to maintain, water / solute / osmotic, potential of, body fluids / named body fluid ;
helps to maintain, osmotic / electrolyte, balance ;
ref. to, urine formation / osmoregulation ;
absorption of glucose / co-transport ; [1 max]

[Total: 7]

Q6.

- (b) (i) 2, fatty acid / hydrocarbon, chain / tails ;
(third fatty acid replaced by a) phosphate group ;
AVP ; (most) contain, nitrogen / choline (attached to phosphate in, head / polar portion) ; [max 2]

- (ii) can form a bilayer ;
link between, hydrophobic core / AW, and barrier to water-soluble substances ; **A** polar / ionic
idea of, hydrophilic / phosphate, head, forming H bonds with water ;
A facing, water / watery environment / aqueous environment / cytoplasm / cytosol

ref. contribution to fluid nature of membrane ;
further detail ; e.g. mainly saturated fatty acids, less fluid e.g. mainly unsaturated fatty acids, more fluid
ref. to control over membrane protein orientation ; e.g. hydrophobic – hydrophobic interaction for 'floating' proteins [max 3]

Q7.

1 (a) one mark each column

transport mechanism
(passive / simple) diffusion **R** facilitated diffusion } ;
endocytosis / phagocytosis **R** bulk transport

example
glucose / amino acids / ions / named ion **A** polar / hydrophilic, molecules } ;
accept any relevant
water

[2]

(b) ignore correct examples of materials if given in addition to transport mechanism
R if incorrect examples given

facilitated diffusion ;
active, transport / uptake ; **A** sodium-potassium pump (mechanism)
(passive / simple) diffusion or osmosis ;
endocytosis or exocytosis ;
A (for endocytosis) pinocytosis / micropinocytosis / phagocytosis

[4]

[Total: 6]

Q8.

5 (a) **P** – moves, polar substances / hydrophilic molecules / ions, through membrane / in or out (of cells) ;
 A facilitated diffusion / active transport / described
Q – receptor / recognition site / cell recognition / binding site ;
 A cell adhesion / 'receives' named signal
 A stabilises membrane (as forms hydrogen bonds with water)
R – regulates / AW, fluidity of, membrane / (phospholipid) bilayer ;
 A contributes to hydrophobic layer / impermeability to ions

[3]

(b) 7.0 nm ;

[1]

(c) *fluid*
idea of phospholipid (and protein) molecules, move about / diffuse (within their monolayer) ;

mosaic to max 1
protein (molecules), interspersed / scattered / not a complete layer / AW ;
different / AW, proteins (molecules) ;

[max 2]

- (d)
- 1 water molecules are polar ;
R hydrophilic/ charged
 - 2 *idea that few polar molecules pass through the phospholipid (bilayer) ;*
ora for non-polar molecules
A none pass/ repelled
 - 3 core of membrane/phospholipid tails, are hydrophobic ;
A hydrophobic core
 - 4 channels (through aquaporins), are hydrophilic ;
A core of channel proteins /described as R-groups of amino acids
 - 5 (aquaporins) increase permeability of membrane to water ;
 - 6 example ;
e.g. root hairs/small intestine epithelium/nephron
 - 7 role of water in a cell ;
e.g. solvent/ reactant/ reaction medium/turgidity or support in plant cell
ignore references to osmosis/ bursting /crenation/ regulation

[max 3]

[Total: 9]

Q9.

- (c)
- 1 *idea of separation / barrier / AW, from surroundings / external environment ;*
 - 2 regulates / controls / AW, entry / exit, substances / named substances ;
 - 3 enables recognition of self (antigens) / cell recognition / avoids cell destruction / act as antigens / AW ;
 - 4 allows binding of / receptors for, hormones / signal molecules / neurotransmitters / antigens ;
 - 5 cell to cell adhesion ;
 - 6 location for enzymes / multi-enzyme systems / enzyme pathways ;
 - 7 AVP ; e.g. idea of flexibility (for some cells,
ref. glycoproteins / glycolipids, form H bonds with water for stability

[max 3]

Q10.

- (c) 1 phospholipid bilayer ;
A lipid bilayer
2 phospholipids have, phosphate / hydrophilic, heads, and, hydrophobic tails / fatty acid chains ;
3 ref. to, labile nature of bilayer structure / phospholipid (molecules) moving (within their monolayer) ;
4 protein molecules, interspersed / scattered / not a complete layer / AW ;
5 many / AW, different / AW (protein molecules) ;
6 example of type of protein ;
7 *idea of* (most) proteins, moving / not in fixed position ;
8 reference to cholesterol ; [max 4]
- (d) 1 ref. to movement, down water potential gradient / from high(er) to low(er) ;
2 apoplastic / cell wall, pathway from xylem to cell walls of (palisade mesophyll) cells ;
3 ref. to osmosis ; *in context of* movement, into cell / through cell surface membrane / through tonoplast,
R osmosis from xylem to vacuole
4 symplastic / cytoplasmic, pathway (within cell) ;
5 via plasmodesmata ; *in context of water arriving from adjacent cell*
6 ref. to channel proteins / aquaporins ;
7 solutes / named, in vacuole ; [max 3]

Q11.

- (b) movement of air / oxygen into alveoli;
concentration gradient (between alveolar air and blood) / AW
(for either oxygen or carbon dioxide);
oxygen dissolves in film of liquid / surfactant fluid;
diffusion;
oxygen and carbon dioxide exchanged (idea of);
squamous / alveolar / pavement epithelium; } A. alveolar/capillary
endothelium (of capillary); } wall once
red blood cell;
ref to short diffusion distance into capillary / one cell thick /
2-3 μm ; R. thin wall 4 max

Q12.

5 (a) *max 3 for glycoproteins and carrier proteins combined*

glycoproteins

receptors / receptor molecules;
for hormones / neurotransmitters / named hormone /
neurotransmitter (e.g. insulin, acetyl choline, noradrenaline);
idea of (cell surface) antigens / (cell surface) markers / cell
recognition / cell adhesion;
help to stabilise membrane structure / forms H bonds with water
molecules;

carrier proteins

allow named substance (e.g. glucose / amino acids) / polar substance
/ ion(s) / hydrophilic / water soluble substance (to pass through
membrane);
(ref) against concentration gradient / active transport;
energy / ATP (req for transport);
(and) facilitated diffusion / faster than simple diffusion (for ions
/ polar molecules);

cholesterol

maintains / regulates fluidity of membrane / prevents membrane
being too rigid or fluid / mechanical stability (qualified) /
prevent ions / polar / water soluble / named molecule, passing /
leaking through membrane;

max 4

(b) *max 3 for each of the following*

A

active transport;
carrier / transport protein;
(pumped) against concentration gradient / low to high conc;
using energy / ATP;
detail (eg binding to specific receptor sites / idea of conformational
change);

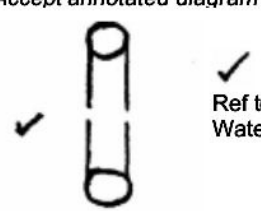
B

diffusion; R. facilitated diffusion
ATP not used; R. energy not needed
through lipid bilayer / phospholipids / hydrophobic region;

max 4

Question	Expected Answers	Marks
5 (c)	(bacteria) adhere / stick / bind / attach , to surface (of phagocyte); ref to receptors / receptor proteins (on phagocytes) / (detect) bacteria 'marked' by antibodies / opsonins; ref to pseudopodia / extensions of cytoplasm; R. invagination unqualified engulfed / enveloped / endocytosis / phagocytosis, to form <u>vacuole</u> / <u>vesicle</u> / <u>phagosome</u> ; A. marking points from <u>annotated</u> diagram(s)	max 2
(d)	contain (hydro)lytic / digestive / named enzymes / digestion of <u>bacteria</u> / <u>pathogens</u> ;	1
		[Total 11]

Q13.

Question	Expected Answers	Marks
2 (a)	Bilayer/two layers; Hydrophilic part/polar head/phosphate/choline, faces, water/outside cell/tissue fluid/cytoplasm; Hydrophobic part/fatty acid chains, face each other/AW. Accept annotated diagram  Ref to outside/cytoplasm/ Water/tissue fluid etc.	[2]
(b)	Phospholipid has	

Q14.

Question	Expected Answers	Marks
5	<p>(a) Total, mass/volume, is, constant/same/same as the larger cube; R control/fair test.</p>	[1]
	<p>(b) <i>One or both lines on the graph</i> Rapid increase in mass, for first three hours; Slower increase, between 3-25 hours/levels out after 25 hours over rest of time;</p> <p><i>Comparison</i> Larger percentage increase in 8 cubes; Ref to data to show how much greater.</p>	max [3]
	<p>(c) Cell volume increases/ref to mass of water; Lower, water/solute, potential of yam cells; A more negative Water entered yam by osmosis; Down water potential gradient/described (from high to low water potential); Through partially permeable membranes (around cells); Potato (yam) (cells) contain, solutes/salts/ions/ sugars/osmotically active substances.</p>	max [3]
	<p>(d) Greater surface area: volume ratio; 6:1 not 3:1; A 2:1; Greater surface, exposed to water/for water to diffuse through/move through by osmosis (for every 1 cm³ of volume); Therefore more water per unit time (at least initially); Outer cells of large cube may have become fully turgid so restricting inner cells from, enlarging/absorbing water/becoming fully turgid; A tissue tensions restrict uptake.</p>	max [2]
		[Total: 9]

Q15.

(b) *oxygen to max 3*

from, air/atmosphere, into pneumatophores/breathing roots;
A roots suitably qualified.
diffusion, down concentration gradient/from high concentration to low concentration;
through/between, cells;
air spaces between cells;

water to max 3

osmosis;
from soil/mud into, root hair/epidermal cell/epidermis;
down water potential gradient/from high water potential to low water potential;
A into lower water potential/more negative water potential
root cell (vacuoles) have, salts/solutes/ions/minerals, to lower water potential/lower
solute potential;

[5]

Q16.

- (c) 1 (carrier / channel protein for) facilitated diffusion / described ;
A action of (co-) transport protein described
 2 (carrier protein for) active transport / described ;
 3 cell recognition / distinguishing self from non-self / act as antigens / AW ;
 4 receptor ; **A** binding site qualified in terms of, hormones / neurotransmitters / cytokines / cell signalling molecules ;
 5 T-cell receptor / described ;
 6 cell (to cell) adhesion / described ;
 7 enzyme ;
 8 form (hydrogen) bonds with, water / fluid surroundings, to stabilise membrane ; **[3]**

Q17.

- 3 (a) *accept ora*
penalise once if refs. in context of rates e.g. faster
 no cells remaining, correct concentration value given (accept up to 0.26%) ;
 100% / AW, cells remaining, ref. from 0.86%–0.9% / AW ;
 steep increase in percentage cells remaining between 0.5–0.8% ; **A** to 0.7% if next marking point included
 steepest increase between 0.7–0.8% ;
 comparative data quote to support ref. to increase ; **[max 3]**
- (b) *max 5 if no mention of water potential anywhere in the answer*
 correct use of term osmosis linked to water potential (in context of high to low) ;
- 0% and 0.7%
 (net) water in (to red cells) ;
 0%, all cells burst / (haemo)lysis of all cells ;
 0.7%, some cells burst ; ora } general ref. to bursting at
 cell membrane cannot withstand pressure ; } either concentration ;
 (0.7%) (remaining) cells swollen / cell volume increases ;
 0.7% water potential gradient not as steep as in, water / 0% ;
- 1.5%
 (net) loss of water from cells ;
 cells, shrink / AW or cell volume decreases ; **A** descriptions relative to biconcave disc shape
[max 6]

Q18.

- (b) 1 vesicle / vacuole, moves towards, cell, surface / membrane ;
A plasma membrane **R** if lysosome
 2 fusion / described, of vesicle with membrane ; **R** attach / bind / combine
 3 ref. to (fluid nature of) phospholipids ;
 4 contents / AW, secreted / released / exported / removed / emptied / excreted ;
A waste material / digested material
 5 active process / energy-requiring / ATP used / AW ;
R 'active transport' **R** endocytosis **[max 3]**

Q19.

- (c) osmosis, defined in terms of water potential / used in correct context ;
0% and / or 0.4%
higher / less negative, water potential outside so water enters ;

0%, higher / less negative, water potential than 0.4%, so cells burst ; ora

0.9%
equal / same, water potential inside and outside cells, water in = water out ;
A no net movement of water / ref. to isotonic / no water potential gradient
R 'no osmosis' / no movement of water

1.5% and / or 3.0%
lower / more negative, water potential outside so water moves out ;

3.0%, lower / more negative, water potential than 1.5% so cells, smaller / AW ; [max 4]
- (d) cells, increase in size / burst ; A vacuole increases in size R becomes turgid
no cell wall to, prevent cell bursting / withstand (turgor) pressure ;
A idea that cell membrane alone cannot withstand increase in size / bursting [2]

Q20.

- 1 (a) (i) A phospholipid ; (1)
B protein ; ignore protein descriptions R glycoprotein R lipoprotein (1) [2]
- (ii) polar / hydrophilic, head / group ;
attracted to / AW, water / aqueous environment ; A water-loving
ref. hydrogen bonding (polar head to water) ;

non-polar / hydrophobic / hydrocarbon / fatty acid, tails / chains / groups ;
repelled by / away from, water / aqueous environment ; AW R water-hating [max 3]
- (b) C any one of
(channel) allows, ions / water / polar molecules / water-soluble molecules /
hydrophilic molecules, to, pass through membrane / enter cell / leave cell ;
R transport, without qualification e.g. across, through
facilitated diffusion ;
active transport ; (max 1)
- D any one relevant e.g.
cellular recognition
cell identification
antigen
cell signalling
receptor
binding site
ref to hydrogen bonding with water / forms bond with water to stabilise membrane
cell adhesion (max 1) [2]

(c) 1764 ;;

if correct working (588 × 3) is shown, but no answer or incorrect answer, award one mark

[2]

[Total: 9]

Q21.

- 1 (a) **P** to protein on right hand side (closed carrier protein) ;
Q to channel protein on left (open carrier protein) ;
allow 1 mark if P and Q wrong way round

R to, central / left, sugar chain on glycoprotein ;
S to circles of phospholipids on the lower surface ;
T to cholesterol ;

accept names instead of labels

accept if letters put on the appropriate structures without using label lines, letter must be within each structure

[5]

- (b) attachment (of bacteria) to receptor(s) ; AW
ref. ability to attach to antibody (bound to antigen on bacterium)

infolding / invagination / AW, of membrane ; **A** membrane engulfs **A** pseudopodia form (round bacterium)

fusion / AW, of membrane ;

formation of, vacuole / vesicle ;

[max 3]

[Total: 8]

Q22.

- 3 (a) (i) active, transport / uptake ;

max 2

movement, against the concentration gradient / from low to high concentration ;

A diffusion gradient

requires energy (from ATP) ;

specificity / specific binding site ; **A** complementary shape

conformational change / change in 3-D shape ; **A** ref. to, 'flip-flop' / 'kissing gate' mechanism

[max 3]

Q23.

- 2 (a) (i) 1 diffusion through (freely permeable) cell wall;
2 membrane is partially permeable ; **A** selectively
3 osmosis across membrane (into cell)
4 (only) some water may pass between phospholipids (across membrane);
5 movement across membrane facilitated by aquaporins ;
- 6 ref. down water potential gradient / from high water potential to low water potential;
A from a higher / to a lower, water potential *if in context*
7 AVP ; e.g. further detail about aquaporin (hydrophilic channel) [max 3]
- (ii) 1 increases permeability of membrane to water ;
2 *idea that* osmosis across bilayer does not supply cell rapidly enough with water (that needs to pass on to surrounding cells) ;
3 *idea that* phospholipids are relatively impermeable to water ;
4 *idea that* water cannot pass / only some water passes, through hydrophobic region of membrane / AW ; [max 1]

(b) pathway via, cells of cortex / cortical cells, and endodermis / endodermal cells ;

symplast pathway, described as
cytoplasm and, plasmodesmata / vacuole(s) ;

(out of cell to) apoplast pathway, described as
cell wall pathway ;

Casparian strip / suberised cell wall, of endodermis, impermeable to water ;
(so) pathway only via, symplast / cytoplasm ;

AVP ; e.g. reference to pericycle
reference to passage cells of endodermis
vacuolar pathway (*unless given in mp 2*) [max 3]

Q24.

- 2 (a) (i) 1 obvious bilayer (of phospholipids) shown, phospholipid with single head and two tails; *must have inner / outer membrane label(s) to gain mp 2 and 3*
allow 1 mark if both glycoprotein and glycolipid on one side and no inner / outer label
- 2 glycoprotein labelled; } **A** glycocalyx for one mark, must have inner / outer label
 3 glycolipid labelled; }
- 4 one type of protein drawn and labelled as protein;
treat description as neutral
- 5 protein type qualified; e.g. if protein is labelled as
 integral / intrinsic *must extend into hydrophobic core and be in phosphate head portion*
 transmembrane /
 transport / carrier / *must extend across / through bilayer if channel protein must*
 channel / pore *show channel*
 peripheral / extrinsic *must be on surface / on one side*
 aquaporin
 gated protein
- 6 cholesterol, labelled; *must extend into hydrophobic core*
if, circular / globular, must be smaller diameter than phospholipid head or have a single tail
R if indistinguishable from a protein drawn on diagram
- 7 detail of phospholipid, labelled; e.g. phosphate / hydrophilic head
 fatty acid / hydrocarbon / hydrophobic tail
 saturated / unsaturated fatty acid tails
- 8 hydrophobic core, labelled;
look for label to include both layers
- 9 **AVP**; e.g. cytoskeletal filaments [max 5]

(ii) *fluid*

- 1 molecules (of membrane) move about / AW; **A** idea of membrane flowing
 2 further detail; ref. to phospholipid and protein molecules moving or ref. to (lateral) diffusion
phospholipid and protein molecules move about = 2 marks

mosaic

- 3 protein molecules, interspersed / scattered / not a complete layer / AW;
 4 many / AW, different / AW (protein molecules); [max 3]

[Total: 8]

Q25.

- (c) 1 concentration of all the ions is greater in the root tissue than in the solution ; ora
 A roots
2 comparative data quote ;
- according to these data*
- 3 (so) ions will not diffuse into the root tissue ;
 A if (facilitated) diffusion only, initially/till equilibrium reached
4 (so) active transport ; **A** active, uptake/pumping I facilitated diffusion
5 use ATP ; **A** energy
 R ATP energy
6 move ions, against concentration gradient/from low to high concentration;
 A diffusion gradient
- 7 use, membrane/integral/intrinsic/transmembrane/transport/carrier, proteins ;
 R channel proteins
8 are specific/have specific binding sites ;
9 involve, conformational/shape, change ;
- 10 comparative data quote to suggest that some ions are pumped more than others ;
 e.g. steepest gradients for K^+ and SO_4^-
- 11 phospholipid bilayer/hydrophobic core (of cell surface membrane) is impermeable to ions ;
12 so ions cannot diffuse out/(membrane) proteins only allow inward flow of ions ;
- 13 AVP ; e.g. suggestion of differing numbers of specific membrane proteins to explain observation of mp 10 [max 5]

Q26.

- (b) 1 cell contents shrink / cytoplasm shrinks ; AW
 R cell shrinks *unless clear that the cell wall remains, intact / same size*
- 2 cell (surface) membrane / plasma membrane, peels away / AW, from cell wall ;
 A plasmolysis occurs / cell becomes flaccid
- 3 (movement of) water out by osmosis ;
4 down water potential gradient / from high to low water potential / to lower water potential /from less negative to more negative water potential ;
 A ψ for water potential [max 3]

Q27.

- 1 (a) (i) calcium ions are, water soluble / charged / not, fat / lipid, soluble / hydrophilic / ionic ; **A** not oil soluble
phospholipid bilayer / AW, is hydrophobic / AW ; [2]
- (ii) active transport / active uptake ; [1]
- (calcium ions) moved against their concentration gradient ;
ref. to, carrier protein / transport protein / pump protein ; **ignore** ion pump
R channel protein
ref. to calcium ions combine with binding site ;
carrier protein, changes shape / conformational change ;
ref. to ATP ; [2 max]
- (b) bacteria / antigen / epitope, combine(s) with / attach to/ recognition by, receptor ;
antibody on bacteria combines with receptor ;
opsonisation / opsonisation described ; e.g. facilitates phagocytosis
ref. to constant region ;
- membrane infolds / invaginates / envelops / engulfs / enclose / AW ;
accept answers without 'membrane' where implied previously / later
membrane fuses ;
to form, vacuole / vesicle / phagosome (enclosing bacteria) ; [3 max]
- (c) lysosomes fuse with, vacuole / vesicle / phagosome ;
A form secondary lysosomes
lysosomes contain, enzymes / named digestive enzyme ;
(catalyse) hydrolysis / digestion ; **A** breakdown
(digests / breaks down) protein / murein (or peptidoglycan) / carbohydrate / lipid /
phospholipid / nucleic acid / DNA / RNA ;
named bond ; e.g. peptide, glycosidic, ester, phosphodiester [4 max]

[Total: 12]

Q28.

- 1 (a) (i) bracket extends across whole bilayer : [1]
- (ii) *fluid*
phospholipids move (within their monolayer) / proteins, move / float ;
A phospholipids are liquid
- mosaic*
proteins, scattered / dispersed, within, phospholipids / bilayer ;
R membrane unqualified [2]

- (c) control of entry and exit of substances ;
barrier to, polar molecules / water soluble molecules ;
adhesion ;
idea of retaining, large molecules / cell contents ;
allow substances across, passively / by diffusion ;
ref to channel proteins ; **A** pore *allow transport protein once*
move substances through carrier proteins ;
active transport ;
ref to facilitated diffusion ;
endocytosis / exocytosis / phagocytosis / pinocytosis ;
recognise, hormones / neurotransmitters / chemical signals ;
sites of chemical reactions / sites for enzymes ;

[3 max]

Q29.

- (c) *one mark per line*

similarities

use, membrane / integral / intrinsic / transmembrane / transport / carrier, proteins ;
R channel proteins
are specific / have specific binding site ;
involve conformational / shape, change of protein ;
(movement of (named)), ions / polar molecules / water soluble molecules / hydrophilic
molecules / lipid insoluble molecules ;
I large molecules **A** charged
(movement) across membranes / into or out of the cell ;

[max 2]

*differences **A** ora*

facilitated diffusion is (movement from), high(er) to low(er) concentration /
down concentration gradient ; ora **A** diffusion gradient
I 'along a concentration gradient'
facilitated diffusion, is passive process / does not require energy *and* / or ATP (from the cell) ;
R ATP energy
R the cell makes energy for active transport

[max 2]

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