

BY4

Question	Answer	Mark
1. (a) (i)	<p>A = Dendrite(s), accept dendron;</p> <p>B = Axon/ axoplasm;</p> <p>C = Node(s) of Ranvier;</p> <p>D = Synaptic knob/motor end plate/ axon ending/ axon terminal/ synaptic bulb;</p> <p>NOT synapse/ dendrite/ nerve ending/ neuromuscular junction</p>	4
(ii)	Muscle;	1
	Gland; (name = neutral)	1
(iii)	Grey matter	1
(iv)	Ventral (root) (ref to ganglion = neutral).	1
(b) (i)	<p>Schwann cell;</p> <p>coils/ wraps/ folds/ spreads/ grows/ surrounds;</p> <p>NOT fuses/ binds/ accumulates</p> <p>(cell) membrane / (phospho)lipids</p>	3
(ii)	<p><u>Electrical</u> insulation;</p> <p>Increase distance of local circuits or currents/ saltatory conduction (or description of);</p> <p>Speed up transmission/ impulses travel faster;</p> <p>Protection of axon / Dendron; NOT protection alone/ protection of nerve</p> <p>Reference to preventing ion exchange/ depolarisation/ action potential</p>	<p style="text-align: right;"><i>Max 3</i></p>

Question	Answer	Mark
2. (a) (i)	Condensation / phosphorylation;	1
(ii)	Ribose;	1
(iii)	Adenine;	1
(b)	Hydrolysis/hydrolyse; Enzyme / ATPase; NOT Synthetase (ATP)to ADP and iP/ Pi/ phosphate; Ref. 30.6 KJ; Accept answer in range 30 – 30.9	Max 3
(c) (i)	S; R; S;	3
(ii)	Codes (of primary structure) of protein or enzyme or polypeptide/ allows mitochondria to replicate/ self replication	1
(iii)	Chemiosmosis; Protons/ H ⁺ / hydrogen ions; Not hydrogen or atoms or molecules Pumped (from matrix) into inter membrane space; Using energy from passage of electrons along the ETC; Accumulation of hydrogen ions;	Max 3

Question	Answer	Mark
3. (a) (i)	<p>Photosynthesis produces oxygen/ photolysis produces oxygen/ light dependent stage produces oxygen;</p> <p>Aerobic bacteria/ bacteria need oxygen for respiration;</p> <p>Most bacteria {move/ attracted} to (blue and) red regions;</p> <p>Most {photosynthesis/ photolysis occurs/ more oxygen is released} in the (blue and) red regions / at these wavelengths/ frequencies (650-700nm);</p>	Max 3
(ii)	<p>A Light Dependent stage;</p> <p>B (Absorbed) energy passed to reaction centre or primary pigment or chlorophyll a;</p> <p>C Excites electron or electron lost/ emitted;</p> <p>D Reference to PS II;</p> <p>E Photolysis;</p> <p>F Use of photolysis equation/ or description of;</p> <p>G Replace electrons lost (from PS II) ;</p> <p>H Oxygen released</p>	
(b)	Evenly/ equally (along strand)	Max 5
(c) (i)	Chlorophyll a; NOT A	1
(ii)	<p>Carotenoids; xanthophylls; chlorophyll b; chlorophyll c; carotene</p> <p>Accept phytochromes</p>	Max 2
(iii)	<p>Increases range of wavelengths/ frequencies (of light) used/ Absorb different wavelengths (of light);</p> <p>More photosynthesis/ increased rate of photosynthesis;</p> <p>More sugar/ carbohydrates/ glucose made;</p>	Max 2

Question	Answer	Mark
4. (a) (i)	A = Cortex; (nephron = neutral)	1
(ii)	X = (proximal) convoluted tubule / (distal) convoluted tubule; Y = Glomerulus / Malpighian body/ glomerular capillaries Z = Bowmans capsule;	3
(iii)	X transverse section, W = LS./ cut at different angles/ planes/ axes/ OWTTE	1
(iv)	loop of Henle; ascending or descending; collecting duct;	3
(b)	Increased/ high, blood/ hydrostatic <u>pressure</u> in <u>glomerulus</u> ;	1
(c)	Afferent arteriole/ Blood vessel wider than efferent/ (or description of process)/ ORA; Pores/ gaps/ fenestrations in endothelium / capillary wall; Pass through pores, in <u>basement membrane</u> ; Ref size/ charge allowing only certain substances through/ molecular sieve; 2 examples of substances which pass through; 2 examples of substances which do not; Filtration between (feet) of podocytes; Ref. Hydrostatic pressure having to overcome the water potential of blood;	Max 6

Question	Answer	Mark
5.	Bacteria / fungi / decomposers; Accept putrefication/ decomposition Ammonium ions; Nitrosomonas; Nitrites/ NO_2^- , Nitrobacter; Rhizobium; Azotobacter;	7

Question	Answer	Mark
6. (a)	<p>Glucose is a monosaccharide;</p> <p>(and so) can be used instantly/ OWTTE for <u>respiration</u> / directly into <u>glycolysis</u>/ primary metabolite;</p> <p>Glucose more easily absorbed/ ORA;</p> <p>Lactose is a disaccharide/ made of glucose and galactose;</p> <p>And so needs hydrolysis/ broken down/ digested (into monosaccharides) ; REJECT converted unqualified</p> <p>Enzyme/ Lactase needs to be synthesised or made/ ORA</p>	Max 3
(b)	<p>A Slow start/ lag phase;</p> <p>B Adjusting to surroundings/ synthesis of enzymes/ DNA replication/ small population size;</p> <p>C rapid increase in population/ log/ exponential phase;</p> <p>D No limiting factors/ excess glucose; NOT plenty of food</p> <p>E Levels off / second lag phase;</p> <p>F when glucose runs out</p> <p>G Synthesis of enzymes / lactase (to hydrolyse lactose);</p> <p>H To glucose and galactose;</p> <p>I Rapid rise (when lactose is hydrolysed);</p> <p>J Then levels off / stationary phase/ carrying capacity reached;</p> <p>K Reason for stationary phase/ lactose used up/ toxic waste produced/ oxygen running short;</p>	Max 5
L Use of correct figures;		

Question	Answer	Mark
7. (a)	<p>A <u>Decarboxylase</u>;</p> <p>B which removes CO₂;</p> <p>C in Link reaction / Krebs;</p> <p>D Dehydrogenase;</p> <p>E which removes hydrogen;</p> <p>F in Glycolysis / link / Krebs;</p> <p>G ATP synth(et)ase; reject ATPase</p> <p>H which produces ATP from ADP and iP;</p> <p>I NAD acts as hydrogen carrier/ is reduced</p> <p>J in Glycolysis / link / Krebs</p> <p>K FAD acts as hydrogen carrier/ is reduced</p> <p>L in Krebs;</p> <p>M Reduced NAD/ FAD carry protons/ electrons to ETC;</p> <p>N Coenzyme A;</p> <p>O Joins with/ carries an acetyl/ acetate group;</p> <p>P electron carriers in ETC.;</p>	<p>Only award B and/ or C if an enzyme is mentioned</p> <p>Only award E and/ or F if an enzyme is mentioned</p>

ACCEPT mark points on a clearly annotated diagram

Max 10

Question	Answer	Mark
7. (b)	<p>A Sodium potassium pump;</p> <p>B 3 Na⁺ out, 2K⁺ in (must refer to ions)/ Membrane more permeable to potassium ;</p> <p>C creates a potential difference across membrane/ membrane polarised/ inside negative compared to outside/ inside -60 / -70 mV; ;</p> <p>D resting potential;</p> <p>E threshold reached ;</p> <p>F sodium (voltage gated) channels/ gates open/ more permeable to sodium;</p> <p>G sodium diffuses/ (accept floods) in;</p> <p>H Ref to depolarisation/ +40mV;</p> <p>I Potassium (voltage gated) channels/ gates open;</p> <p>J sodium channels close;</p> <p>K Ref to repolarisation;</p> <p>L Synaptic knob/ presynaptic membrane + Ca²⁺ channels open/ membrane becomes more permeable;</p> <p>M Synaptic vesicles fuse with <u>presynaptic membrane</u>; NOT bind</p> <p>N Exocytosis/ Description of neurotransmitter secretion; NOT synaptic vesicles</p> <p>O Receptors on <u>post synaptic membrane</u>;</p> <p>P Sodium channels open on <u>post synaptic membrane</u></p>	<p>Max 7 A - K</p> <p>Max 3 L - P</p>