

LEAVING CERTIFICATE BIOLOGY HIGHER LEVEL EXAM PAPER SOLUTIONS

Sample Paper 1

Section A

- Q1** (a) Nitrogen
 (b) Phosphate
 (c) Structural functions = hair, nails, membranes etc.
 Metabolic functions = enzymes, hormones, antibodies etc.

(d)

Vitamin	Solubility	Metabolic role	Deficiency disorder
C Also accept Vitamin B or named vit. B with other answers as appropriate	Water soluble	Forms connective tissue (or healthy skin or bone growth)	Scurvy
D Also accept vitamins A, E or K with other answers as appropriate	Fat Soluble	Calcium absorption or bone formation	Rickets

10 (2 marks)

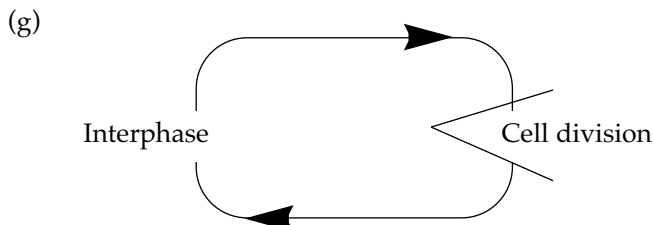
- Q2** (a) A = Photosynthesis
 B = Burning or combustion
 C = Respiration
 D = Assimilation
 (b) Reduce burning of fossil fuels
 Reforestation (or plant more trees)
 (c) Pollution = any undesirable change in the environment
 Pollutant = the agent responsible for pollution
 (d) Name any pollutant
 State one effect of the pollutant

10 (2 marks)

- Q3** (a) Absence of nuclear membrane or nucleus (allow absence of cell organelles)
 (b) Ribosomes
 (c) Mitochondria and Chloroplasts
 (d) (i) Proteins that speed up reactions but are not used up (or organic catalysts or biological catalysts)
 (ii) The part of the enzyme that joins with the substrate
 (iii) Temperature and pH
 (e) Catabolic enzyme, e.g. any digestive enzyme
 Anabolic enzyme, e.g. DNA ligase

10 (2 marks)

- Q4** (a) Metaphase
 (b) Equatorial plate or equator
 (c) B = Centromere
 C = Spindle or spindle fibres
 (d) 4
 (e) 2
 (f) Cleavage furrow is found in animal cells
 Cell plate is found in plant cells
 Both at cell division

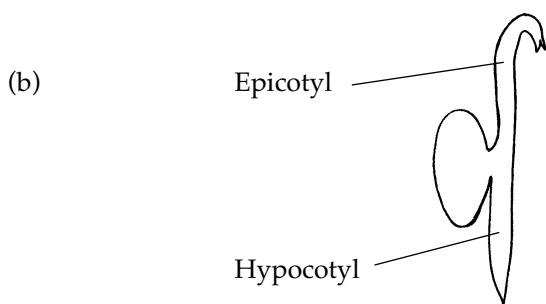


(20 marks)

- Q5** (a) 8 labels correctly shown 8(1 mark)
 (b) Coming from an artery (or the afferent arteriole is wide and the efferent arteriole is narrow) (3 marks)
 (c) Glucose is small enough to pass through but protein is too large. (3 marks)
 (d) Any one of potassium (K^+), Hydrogen (H^+) or ammonium (NH_4^+) ions (3 marks)
 (e) Osmoregulation (3 marks)

- Q6** (a) Petal and sepal = Protects mature reproductive parts vs Protects bud (or brightly coloured vs not)
 Filament and style = part of stamen vs carpel (or male vs female or supports anther vs supports stigma).
 Generative nucleus and polar nucleus = in pollen vs in embryo sac (or male vs female or does not fertilise vs does)
 Fruit and seed = fruit on outside vs seed on inside (or formed from ovary vs ovule)

4 (2 marks)



2 (2 marks)

- (c) Dormancy = allows time for dispersal or
 Allows time for embryo to develop or
 Avoid seed germinating late in year or
 Allows a long growing season
 Dispersal = Prevents overcrowding
 Allows plants find new growing areas
- (any two)

4 (2 marks)

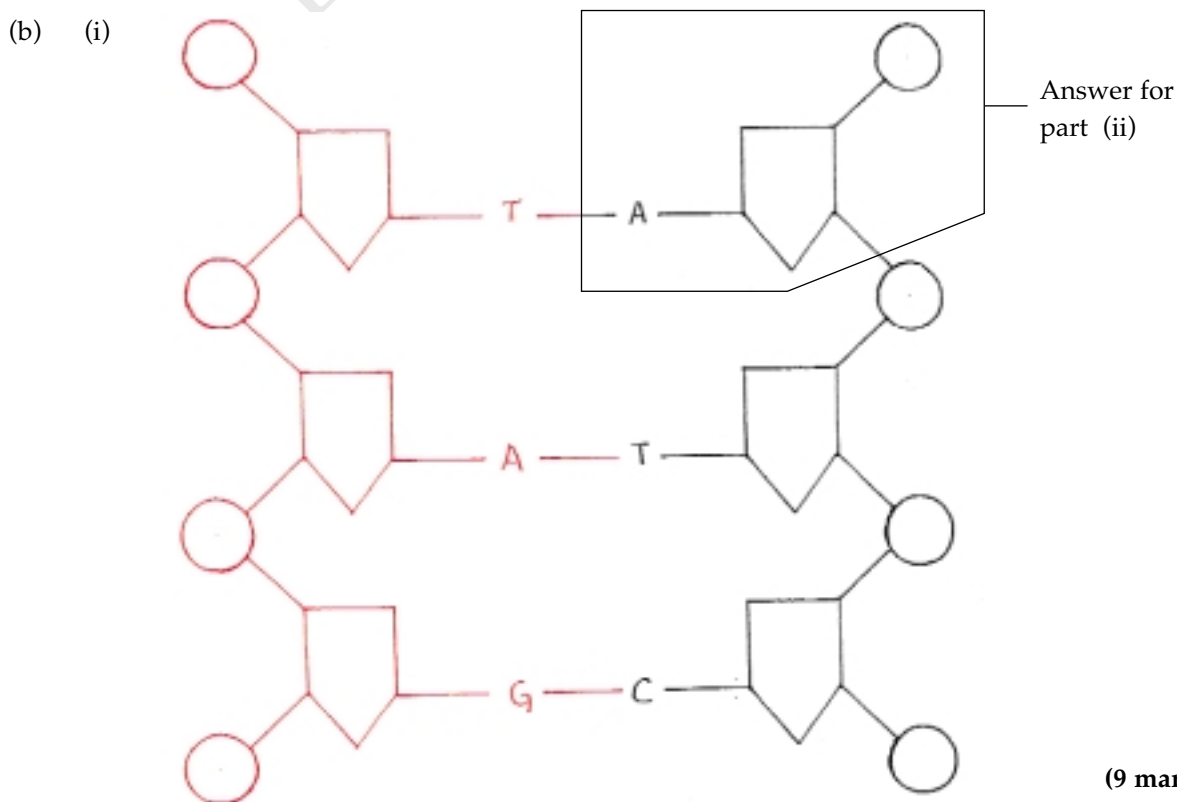
Section B

- Q7** (a) Control = leaf washed with alcohol (or agar dish with no leaf).
Results in control = no yeast grows
Results in investigation = yeast
- (b) Washing = remove micro-organisms.
Nutrient agar = food for yeast and provides support medium for growth of yeast
Vaseline = to attach leaf to lid
Lower surface = more yeast on lower surface
Sealing = prevent dishes from opening accidentally
Warm place = stimulate growth of yeast **10 (3 marks)**
- Q8** (a) Process = osmosis
Visking tubing = semi (selectively) permeable
Structure = cell (or any) membrane **3 (4 marks)**
- (b) Contents = increased volume (or less concentrated)
Start = Red/yellow
End = Red/yellow **3 (4 marks)**
Absorption by plants = roots absorb water in this way
Food preservation = removes water from fungi/bacteria so can't grow **2 (3 marks)**
- Q9** (a) Germination
Control = A
Ten seeds = as some seeds may not germinate **3 (3 marks)**
- (b) B = No growth
No water
C = No growth
Temperature too low
D = No growth
No oxygen **6 (2 marks)**
Stopper = D
Other 3 stoppered = fair tests (or so that all tubes are the same)
Other factor = dark **3 (3 marks)**

Section C

- Q10** (a) State ecosystem (no marks)
- (i) Names 3 (1 mark)
 - Diagrams 3 (1 mark)
 - (ii) Description (3 marks)
- (b) (i) Name two factors 2 (3 marks)
- How measured 2 (3 marks)
 - (ii) Named organism (2 marks)
 - How factor effects organism (3 marks)
 - (iii) Food chain definition (3 marks)
 - Example of food chain (2 marks)
- Pyramid of numbers definition (3 marks)
- Example of pyramid of numbers (2 marks)
- (c) (i) To carry out an objective survey (or so as not to select special parts of the field) (9 marks)
- (ii) 6 (6 marks)
 - (ii) 3,600 (9 marks)

- Q11** (a) (i) X = Phosphate
Y = Deoxyribose 2 (2 marks)
- (ii) A = Adenine
 - T = Thymine
 - C = Cytosine 3(1 mark)
 - (iii) Double Helix (2 marks)



- (ii) As shown in Part (i) (6 marks)
 (iii) Hydrogen bonds (3 marks)

(iv)

DNA	RNA
Deoxyribose	Ribose
Thymine	Uracil
Double strands	Single strand

Any two (5 + 4 marks)

- (c) (i) m = Messenger
 t = transfer
 Ribosomal RNA (3 (2 marks))
 (ii) Codon = 3 Bases in a row (3 marks)
 Example = CTT (or any 3 bases) (1 mark)
 (iii) DNA → mRNA = Transcription (3 marks)
 Location = Nucleus (1 mark)
 (iv) RNA → Protein = Translation (3 marks)
 Location = Cytoplasm (or cytosol and ribosome) (1 mark)
 (v) Ribosome (3 marks)
 (vi) Amino acid (3 marks)

- Q12 (a) (i) Respiration = release of energy (or ATP) from food (or glucose) (2 (3 marks))
 (ii) Releases energy (3 marks)

(b)

	Aerobic	Anaerobic
Require	Food + O ₂	Food
End products	CO ₂ + H ₂ O	Lactic acid or Ethanol + CO ₂
Energy yield	High	Low
Locations	Cytoplasm (or cytosol) + mitochondrion	Cytoplasm (or cytosol)

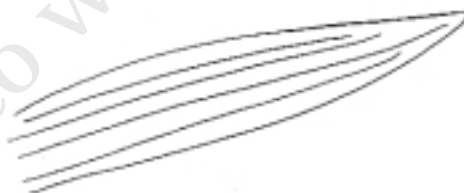
8 (3 marks)
 (mitochondrion gets 3 marks extra)

- (c) (i) X = Pyruvic acid
 Y = Acetyl co-enzyme A
 Z = Krebs cycle (3 (3 marks))
 (ii) Carbon dioxide (3 marks)
 (iii) Organelle = Mitochondrion (3 marks)
 Account = Electrons / from NADH / Lose energy /
 O₂ needed / water formed (Any 3 (2 marks))
 Compound = ATP (3 marks)

- Q13** (a) (i) A = Dermal
B = Vascular
C = Ground 3 (2 marks)
- (ii) Stoma (1 mark)
Enters = CO₂
Leaves = O₂ (or H₂O) 2 (1 mark)
- (b) (i) Dicots = 2 cotyledons/Network of veins in leaf etc. 2 (3 marks)
Monocots = 1 cotyledon/Parallel veins, etc
- (ii) Xylem + phloem 2 (1 mark)
Xylem = Transports water
Phloem = Transports food 2 (3 marks)
- (iii) Xylem – Diagram (3 marks)
Labels 3(1 mark)
Phloem – Diagram (3 marks)
Labels 4(1 mark)
- (c) (i) Herbaceous = Plants that do not contain wood
Venation = pattern of veins in the leaf
Cotyledons = seed leaves 3(3 marks)
- (ii) Dicot (3 marks)
- (iii) Parallel venation (3 marks)

leaf vein Diagram
Labels

(3 marks)
2 (3 marks)



- Q14** (a) (i) Diagram (6 marks)
 Labels 6(1 mark)
 Locations shown
 A = Testes
 B = Any 2 of Seminal vesicles, Prostate, Cowpers gland
 C = Epididymis
 D = Testes 4(1 mark)
- (ii) Secondary characteristics = features that distinguish males from females, apart from the sex organs. (4 marks)
 4 male characteristics = secondary hair, large larynx, large muscles, wider shoulders, more sebum (or oily skin), stronger bones 4(1 mark)
- (ii) Cause = smoking, alcohol, steroids, low hormone levels, mumps (3 marks)
 Corrective measure = as appropriate (3 marks)
- (b) (i) Progesterone (3 marks)
 (ii) Corpus luteum or yellow body (3 marks)
 (Give 1 mark for ovary)
 (iii) Prevents the formation of an egg (3 marks)
 Gets to ovary = in the blood (3 marks)
 (iv) No (3 marks)
 Reason = Progesterone level stays high if present / Level fell in this case 2 (3 marks)
 (v) Allows FSH to be made / allows new egg to form / allows uterus to contract / menstruation occurs any 3 (3 marks)
- (c) (i) Pollination = transfer of pollen / from anther (or stamen) / to stigma (or carpel) 3(2 marks)
 Self v Cross = Anther and stigma on same plant vs Anther and stigma on different plants (3 marks)
 (ii) Pollen tube grows / down style / to ovule / guided by tube nucleus / at micropyle / tube nucleus dies / mention of 2 male (or sperm) gametes any 4 (3 marks)
 Diagram (3 marks)
 Labels 4(1 mark)
 (iii) Seedless fruit = special breeding programmes or spray with growth regulator (or auxin) (2 marks)

- Q15** (a) (i) Diagram = (2 marks)
 Labels = 5 (2 marks)
 Functions = 3 (3 marks)

Motor	Sensory
● Impulse away from cell body	Impulse to cell body
● Cell body at end of axon	Cell body to side or axon
● Cell body in CNS	Outside CNS

any 2 (3 marks)
 (3 marks)

- (b) (i) (a) Synapse = where neurons meet (3 marks)
 (b) Synaptic cleft = tiny gap or space between neurones (3 marks)
 (ii) Diagram = (2 marks)
 Labels = 3 (2 marks)
 Electrical impulse/Neurotransmitter swellings/Chemical made/
 Name neurotransmitter/Diffuses across synapse/Neurotransmitter
 breaks down/Forming electrical impulse any 5 (2 marks)
 (iii) Disorder = Paralysis or Parkinsons (3 marks)
 Cause/Prevention/Treatment = as appropriate 3(1 mark)

Nervous	Hormonal
Electrical	Chemical
Fast acting	Slow acting
Short lived	Long lived

Any 2 (3 marks)

- (ii) Exocrine = Have ducts (2 marks)
 Example (1 mark)
 Endocrine = Ductless (2 marks)
 Example (1 mark)
 (iii) Named gland (3 marks)
 Named hormone (3 marks)
 Deficiency symptoms – 1st symptom (2 marks)
 – 2nd symptom (1 mark)
 Correction (3 marks)
 (iv) Named hormone supplement e.g. insulin (3 marks)
 Necessary = simple statement (3 marks)