

Leaving Certificate 2006
Biology - Ordinary level
Marking Scheme

Section A

Answer any **five** questions 5(20)

1. **2(7) + 2(3)**
(a) Autotroph or producer [allow (named) plant]
(b) Consumer or heterotroph [allow predator or carnivore or named animal]
(c) Habitat or ecosystem
(d) Sun or light
(e) Biosphere
2. **6(3) + 2(1)**
(a) A = cell wall [allow membrane] B = nucleus C = cytoplasm D = vacuole
(b) (cell) wall/vacuole/chloroplast/definite shape
(c) Sap or component e.g. water, glucose
(d) Cellulose or no carbohydrate if 'membrane' given above
3. **5(3) + 5(1)**
(a) Carbon/ hydrogen/ oxygen/ nitrogen [allow nitrate]
(b) Sulphur/ phosphorus [allow phosphate]/ iron
or an element from (a) not listed in answer to (a)
(c) Meat/fish/pulses/milk/egg (white) / vegetables *or examples of meat & fish* any two
(d) Biuret or NaOH and copper sulphate or KOH & copper sulphate
(e) 1. blue
2. purple/violet
4. **2(6) + 4(2)**
(a) A on stoma and Stoma
(b) Oxygen/ water (vapour) / carbon dioxide / nitrogen
(c) B on palisade layer
(d) Chloroplasts
(e) Water [allow chlorophyll]
5. **6(3) + 2**
(a) A = ovary B = Fallopian tube (oviduct) C = uterus / womb [allow muscle or endometrium]
(b) A (ovary) – *note follow on*
(c) Fusion (union) of gametes (gamete nuclei) or formation of zygote
(d) B (Fallopian tube/oviduct) [allow C i.e. uterus/womb]
(e) Genetic/ hormonal/ lack of ovulation / disease of endometrium/ collapsed Fallopian tubes or abuse of alcohol or abuse of drugs / anorexia / menopause / contraception / hysterectomy / fibroids /obesity / STD / smoking /stress
6. **2(6) + 4(2)**
(a) A = vacuole (or lipid body or food reservoir)
B = cytoplasm
(b) Budding / cloning [allow mitosis]
(c) Mitosis
(d) (i) Lack of oxygen or air
(ii) Carbon dioxide [allow ATP]

Section B
Answer any two questions 2(30)

7. (a) **5 + 1** (i) Left atrium (auricle)
(ii) Pulmonary vein
- (b) **4(5) + 4(1)**
(i) Scalpel / blade / scissors / knife
(ii) Ventral side up (identify left and right)/
section or words to that effect
expose left ventricle / expose right ventricle /section to show aorta) /
pinning back/ [allow one]safety precaution any three
(iii) Diagram
Labels any three
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8. (a) **5 + 1** (i) Numbers or amount or how many organisms/species/communities
(ii) square frame or diagram
- (b) **4(5) + 2(2)**
Name
(i) Position quadrat / random / number of times / count plants / estimate
cover/ average/ result/ (number) per area or percentage cover
any three
(ii) Description by word or diagram
(iii) Lack of randomness/ insufficient quadrats/ species identification /
carelessness / human error / unsuitable equipment
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9. (a) **5 + 1** (i) Endosperm or cotyledon or (seed) leaf or nucellus or around the
embryo
(ii) Starch (allow sugar or named sugar)
- (b) **4(5) + 4(1)**
(i) Starch or skimmed milk / malt / nutrient
(ii) (Named) seeds / soak seeds / some seeds killed / split seeds / live seeds in
one plate/ dead seeds in other plate/ identical conditions/ number of
days/remove seeds/ add iodine solution / observe /disinfect seeds.
any five
(iii) Agar stays red-brown where live seeds were placed/ agar turns blue-black
in other plate
*N.B. If skimmed milk agar is used then protein digestion is being tested so
the Biuret test will be used and the result will be blue for live seeds and
purple for dead seeds*

Section C
Answer any four questions 4(60)

10. (a) (i) Diagram showing (numbers at each) trophic or feeding level **3**
(This can be answered by diagram)
- (ii) Pyramid with named organisms at three levels **3(2)**
- (b) (i) Declines in winter or early spring/ increases in summer/peaks in autumn/declines in autumn any two **6+3**
- (ii) Migration (immigration) or breeding (birth) or increased food **3**
- (iii) Starvation/predation/disease/migration (emigration) / death / cold weather / lack of shelter / competition any two **2(3)**
- (iv) Yes *(or implied)* **6**
Same breeding pattern or same causes of mortality **3**
(Allow 'no' followed by 'valid reason' but 'no' on its own = 0)
(e.g. do not migrate/ do not breed in area)
- (c) (i) Increasing population/ increasing consumption (prosperity)/ too little recycling /opposition to incinerators/shortage of landfill sites/ illegal dumping/ NIMBY / cost any two **6 + 3**
- (ii) Description of method (any one valid point) **3**
- **Agriculture**
e.g. Slurry / dilute / on dry land / a fertilizer.
 - **Fisheries**
e.g. Heads, neutralise waste / pulped and dried / fertiliser or pig feed.
 - **Forestry**
e.g. Small branches / humus / Large branches / wood products.
- (iii) Reduce / Reuse / Recycle / bulk packaging/ biodegradable packaging/ incineration any two **2(6)**

11. (a) Allele – alternative form of gene
Homozygous – identical pair of alleles
Genotype – total of individual’s genes or blueprint for phenotype or genes controlling a trait **3(3)**
- (b) (i) 1. male XY 2. female XX **2(3)**
- (ii)
- | | | |
|---|----|----|
| | X | Y |
| X | XX | XY |
- gametes **3(3)**
offspring **2(3)**
equal number of XX and XY correctly shown **6**
- (c) (i) **Artificial** (manipulation) / alteration or change of a gene (or genotype / to produce a valuable substance or to confer a valuable trait any two **2(6)**
- (ii) example of animal – e.g. “antifreeze” in farmed fish /pharmaceuticals from transgenic animals **6**
example of plant – e.g. long life tomatoes/weed resistance in crops/ Vitamin A in rice **6**

12. (a) (i) i 2/2 c 1/1 pm 2/2 m 3/3
2 1 2 3 **2**
(ii) Tooth type & function **6+1**
- (b) **8(3) + 3(1)**
(i) A = duodenum (small intestine) B = liver C = stomach
D = pancreas E = colon (large intestine)
(ii) Enzyme or breaks down / starch
mouth or duodenum or ileum or small intestine
Anything between pH 7 and pH 9
(iii) Digestion or produce vitamins or kills harmful bacteria
(iv) Peristalsis or prevents constipation or prevents (colon) cancer or
forms faeces
- (c) (i) Movement (passage) / across membrane / into blood or lymph **3 + 1**
(ii) (Small) intestine or ileum or villus **6**
long/villi/ microvillus/ capillary network/lacteals or lymph vessels
any one **1**
(iii) (hepatic) portal vein **1**
(iv) Colon or rectum or stomach or duodenum or ileum **6**
stores faeces or expels faeces or digestion or digestion or digestion **6**
(Allow Intestine)

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13. (a) (i) X = oxygen Y = carbon dioxide **5 + 1**
(ii) (energy release) not requiring oxygen or air or correct equation **3**

- (b) **4(5) + 4(1)**
(i) Cytoplasm
(ii) No
(iii) Small amount
(iv) Mitochondrion
(v) Yes
(vi) Large amount or much greater than first
(vii) Muscular activity/ nerve impulse/ maintenance of body temperature/
reabsorption in kidney/respiration any two

- (c) (i) diagram of apparatus **0, 3, 6**
(Diagram with solution = 3 and correct label = 3)
(Description: Labels or points)
Container/yeast/ water/ sugar/ fermentation lock or Bunsen valve/ control/
incubate / boiling / cooling / oil / time / ethanol (alcohol) / CO₂ produced
any four **4(5)**
(ii) Name of test or reagent / initial colour/final colour **1**
(H₂SO₄ (acidified) + Potassium (sodium) dichromate – orange to green
Iodoform test - brown to yellow)

14. (a) **5(5) + 3 + 2**
 (i) A = terminal or apical bud B = leaf scar C = scale, girdle or growth scar D = lateral or axillary bud
 [Allow "bud" once only] **any two correct answers**
 (ii) Growth region or region of mitosis
 (iii) Bud or cambium or under bark or stem tip
 (iv) Award marks for candidates who attempt this question
 (v) Transport/ support/ displays flower or leaf or fruit / photosynthesis / reproduction / gaseous exchange / storage / perennation **any two**
- (b) **5(5) + 5(1)**
 (i) A = xylem B = phloem
 (ii) Vascular or complex
 (iii) L = companion cell M = sieve tube N = sieve plate
 (iv) Water/ named mineral or minerals
 (v) Glucose or amino acid or water or sap or food
 (vi) Support
 (vii) Centre or zone of differentiation or vascular bundle
- (c) **4(5) + 8(1) + 2** [*this last mark of 2 is tied to part (v) below*]
 (i) A = petal B = anther C = filament D = receptacle
 E = sepal F = carpel or ovary or pistil
 (ii) To attract insects or pollination
 Colour/ scent/ size/ shape **any two**
 (iii) Anther or stamen
 (iv) Wind /insect or animal / artificial **any two**
 (v) Seed or zygote or embryo or food reserve

15. (a) 7(4) + 2(1)

- (i) A = (erector) muscle B = hair C = capillaries [allow blood vessels or arterioles or arteries or venules or veins] D = sweat gland
- (ii) Has constant body temp. or warm blooded or can regulate temp.
- (iii) Carbohydrate (or named) or lipid or respiration or liver or muscle or food or metabolism
- (iv) Sweat / evaporates/ heat lost
- (v) Contract

(b) 4(6) + 6(1)

- (i) A = (optic) nerve B = retina C = (suspensory) ligament
D = lens E = cornea
- (ii) Retina
- (iii) Rods: black and white or vision in poor light
Cones: colour or vision in good light
- (iv) Carries impulse to brain
- (v) Award marks to candidates who attempt this question i.e. 15(b)

(c) 4(6) + 6(1)

- (i) movement / support / shape/ muscle attachment / protection / makes blood cells any two
- (ii) 1. Cervical [allow “atlas and axis”]
2. Lumbar
- (iii) Spinal cord
- (iv) Humerus / radius / ulna
- (v) cause/symptom/ treatment/prevention any two
Arthritis: e.g. injury/disease/ inflammation/ affects joints/ impairs movement/ joint replacement/ dietary supplement/etc.
OR Osteoporosis: e.g. loss of bone tissue/ bones brittle/ common in older women/ HRT/ calcium deficiency / pain / exercise / lack of exercise

N.B. APPLYING ‘SLIDING’ MARKING.

- **SECTION A**
 - 1. The first correct point gets first mark etc
- **SECTION B**
 - 1. The first correct point in each ‘subsection’ gets first mark etc.
- **SECTION C**
 - 1. The first correct point in each ‘subsection’ gets first mark etc.