



Rewarding Learning

**General Certificate of Secondary Education
2012**

Science: Biology

Paper 2
Foundation Tier

[G0902]

WEDNESDAY 20 JUNE, MORNING

**MARK
SCHEME**

- 1 (a) (i) Labelled line F to filament; [1]
- (ii) A – Petal;
B – Stigma;
C – Sepal; [3]
- (iii) Anther – produce pollen;
Nectar – to attract insects/bees; [2]
- (iv) Pollen **from** the **anther**;
To the **stigma**; [2]
- (v) Wind/bees; [1]
- (b) (i) Red and fleshy to attract birds/animals to eat;
Hard coat not digested/passes through gut; [2]
- (ii) Any **two** from:
Self/explosive;
Water;
Wind; [2]
- (iii) Any **one** from:
Prevent overcrowding;
Reduce competition for light/nutrients/water;
Colonise new areas/habitats; [1]
- (iv) Two bars drawn accurately; [2]
- (v) Larger fruits;
Better price/more profit; [2]
- (c) (i) From buds on the runner; [1]
- (ii) Provides it with food (from the parent plant); [1]
- (iii) New plant can photosynthesise/make own food/glucose/starch; [1]
- (iv) Only one parent plant has produced the offspring/no mixing
of genes; [1]

AVAILABLE
MARKS

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- 2 (a) (i) A – White blood cell/cell membrane;
B – Platelets; [2]
- (ii) Plasma; [1]
- (iii) Transport oxygen; [1]
- (iv) **Large surface area** – faster diffusion/more gas exchange;
No nucleus – **More** room for haemoglobin/able to carry **more** oxygen; [2]
- (b) (i) A – Aorta;
B – Vena cava; [2]
- (ii) Hepatic portal vein correctly drawn;
Label; [2]
- (iii) Lungs; [1]
- (iv) Arrow drawn from heart to lungs; [1]
- (v) Pulmonary vein – oxygenated/less CO₂; [1]
- (vi) Chamber Y – Left ventricle;
Produce high pressure;
Pump blood all around the body/further; [3]
- (c) (i) Valves;
Thinner muscle;
Bigger lumen; [3]
- (ii) Away from heart;
Vein;
Capillary; [3]

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- 3 (a) A: Oesophagus;
B: Liver;
C: Colon; [3]
- (b) Long/folds; [1]
Good blood supply; [1]
- (c) Any **one not given in (b)** from:
Large surface area/villi;
Moist;
Permeable;
Thin walls; [1]
- (d) Mouth (Ingestion);
Mouth/stomach/small intestine (Digestion);
(Colon) Absorption;
(Anus) Egestion; [4]
- (e) (i) Liver; [1]
- (ii) Emulsifies fats/breaks them down (into smaller pieces/droplets/
particles); [1]
- (iii) Neutralises; [1]
- (f) Enzyme; [1]
- (g) A – Glycerol/Fatty acid; } Allow Glycerol and Fatty acid only **once** each [2]
B – Fatty acid/Glycerol; }
- (h) Any **two** from:
Small;
Simple;
Soluble; [2]

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- 4 (a) (i) Coal/oil; [1]
- (ii) Any **two** from:
CO/CO₂;
SO₂/SO_x;
NO₂/NO_x; [2]
- (iii) Soot covers leaves/blocks stomata;
(Must affect outside of leaf) [1]
- (iv) Less light enters leaf/less gas exchange; [1]
Less **photosynthesis**; [1]
- (v) Any **two** from:
Renewable sources of energy;
Scrubbers in factory chimneys;
Catalytic converters;
Increased use of public transport/example described;
Increased insulation;
Burn less fossil fuels;
Use unleaded petrol; [2]
- (b) (i) Landfill; [1]
- (ii) Any **two** from:
Smell;
Unsightly;
Disease;
Attracts unwanted birds/gulls/animals/rodents/foxes;
Leaching of toxins to groundwater;
Needs **large area** of land/damages habitats/needs long time; [2]
- (iii) Incineration/burning/composting/recycling; [1]
- (c) (i) Knock; [1]
- (ii) (Red squirrels) decreasing;
(Grey squirrels) increasing; [2]
(**Reject** a description of numerical values)
- (iii) Any **three** from: Grey squirrels –
Eat wider range of food;
Outcompete reds for habitats;
Higher reproduction rate;
Resistant to/carrier of virus (parapox); [3]

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- 5 (a) (i) A – **Spongy mesophyll**;
 B – **Lower** epidermis;
 C – Stoma(ta); [3]
- (ii) Allows (maximum amount of) light into leaf/cells/mesophyll/
 chloroplasts;
 Thin (leaf);
 Large **surface area** (for light absorption); [3]
- (iii) 8 (arbitrary units); [1]
- (iv) Any **two** from:
 Thickened **inner** walls;
 Chloroplasts present;
 Smaller vacuole;
 No cuticle; [2]
- (v) Any **three** from:
 Carbon dioxide; }
 Through stomata; } **or** { Water;
 By diffusion; } { From xylem;
 Into mesophyll cell/chloroplast/air space/vacuole/any appropriate }
 named structure; } { By osmosis; [3]
- Quality of written communication [2]
- (b) (i) Kill the leaf/break down cuticle/cells (to allow chemicals to enter);
 Remove chlorophyll/green colour/decolorise leaf; [2]
- (ii) Any **one** from:
 Turn off Bunsen/no naked flames;
 Wear goggles; [1]
- (iii) Dip(ped) in water; [1]
- (iv) Starch;
 Yellow-brown to blue-black; [2]
- (v) Starch all used (up)/not present;
 By respiration; [2]

- 6 (a) (i) nn;
Normal wing; [2]
- (ii) Wings can't be used/can't fly;
to get food/find mate/escape predators; [2]
- (iii) Length of DNA/chromosome;
In nucleus; [2]
- (b) (i) NN, Nn;
Nn, nn; [2]
- (ii) 3:1; [1]
- (iii) 16, 4; [1]
- (iv) 4:1; [1]
- (v) Any **one** from:
Random process;
Large numbers required/small numbers produced in this case; [1]
- (c) (i) Man: Testosterone;
Woman: Oestrogen; [2]

(ii)

Secondary sexual characteristic	Males	Females
Voice deepens	✓	✗
Growth of body and pubic hair	✓	✓
Menstruation begins	✗	✓
Sexual awareness	✓	✓

[1]

[1]

[1]

[1]

[4]

Total

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120