BIOLOGY - BY5

No.		Answer	Mark
1.		Secondary succession; Pioneer; Climax community; Seres; Gross primary productivity/GPP; Pyramid of energy/energy flow diagram;	**6**
2.	**(a)**	Large petals, small insignificant petals/no petals; Brightly coloured, dull/brown/green; (not: not coloured) Scented, not scented; Nectar, no nectar; Small amount of pollen, large amount of pollen; Pollen sticky/sculpted, pollen smooth/not sticky/air sacs; Pollen large/heavy, pollen small/light; Anthers/stigma outside flower, enclosed within petals; (Large) feathery stigmas, small/round stigmas; Any 4. One comparison from each pair matched boxes.	**4**
	(b)	lack of/less genetic variation/inbreeding/increased risk of genetic faults/ ref. homozygous recessive. (not: no variation)	**1**
	(c)	pollen tube delivers male gametes to egg/ovule/do not need motile (gametes)/ no water needed/pollen grains transferred by wind or insects;	**1**
		stops risk of dehydration of gametes;	**1**
		Tough exine/outer wall;	**1**
	(d)	*Fruit from fertilised* ovary; (not: ref. ovary wall/pericarp)	**1**
		Embryo plant from zygote; (not: fertilized egg cell)	**1**
		Testa from integuments;	**1**
		Seed from ovule; (not: ovum)	**1**

3. (a) (i)

Gametes	HW	HR	hW	hR
HW	HW HW	HR HW	hW HW	hR HW
HR	HW HR	HR HR	hW HR	hR HR
hW	HW hW	HR hW	hW hW	hR hW
hR	HW hR	HR hR	hW hR	hR hR

1 mark per column; if wrong- gametes-1, letters -1; **4**

(ii) Phenotypes

Horn less roan 6

Horn less red 3

Horn less white 3

Horned roan 2

Horned red 1

Horned white 1

3 marks all phenotypes + 3 for all correct matching ratio **6**
-1 per error, no ecf from (i)

(b) mutation;

<u>Variation</u> in population;

(Light coats and dark skins) advantage/better adapted;

Greater chance of survival/selective advantage(in context);

Passed on alleles to offspring; (not: genes)

Repeated over many generations/frequency of alleles increased. **Max 4**

4. (a) Wolf, dingo, coyote, golden jackal;
Interbreed producing fertile offspring; **2**

(b) share same gene pool;
Similar physiology;
Similar behaviour;
Similar genetic makeup/ref DNA;
Similar proteins;
Similar morphology
Similar genetic profile (not: same/same number of chromosomes) **Max 2**

(c) (i) Black backed and side striped jackal **1**
(not: jackals/golden jackal)

(ii) reproductive cycles different;
Difference in reproductive/courtship behaviour /pheromones;
Changes in chromosome numbers/ploidy;
Different activity times;
Mechanical isolation;
Any sensible suggestion e.g. gamete attack by immune system. **Max 1**

(d) Chromosomes not homologous; (not: ref. number)
Cannot pair/form bivalents;
During prophase 1 (of meiosis);
Meiosis does not take place;
no gametes produced; **Max 4**

5. (a) Each strand of DNA used as a template to make a new DNA strand;

New DNA (mols) made of an old/original strand linked to a new strand; (not: if ref. to new DNA strand) **2**

(b) (i) nitrogenous bases/organic bases/purines and pyrimidine bases/ all four named **1**
(not: bases/letters only/nucleotide)

(ii) spin (at same) speed;

(Same) time;

(Same) density/concentration of gel;
(Same) temperature
(not: pH/ref. volume or mass)

Max 2

(c) (i) Tube A all heavy/N^{15};

Tube B DNA mixture of heavy and light (so intermediate position)/ N^{15} + N^{14};

DNA in B must be made from one strand of heavy and one light;

If conservative would get two bands in light and heavy position.

Max 3

(ii) C intermediate and light equal amounts;
(touching dotted lines)

D intermediate and light more light than intermediate e.g. shown as thicker or wider line;

6. (a) (i) X transcription;
Y translation; **2**

(ii) 8 marks on diagram **8**
S- to line between anticodon/codon; T – to solid line not dotted line; R not if just labelled to black circle

(b) CCT ACA GCA CGT
All correct 2 marks
2/3 correct 1 mark

7. (a) (i) A Spermatogonia
B Primary spermatocytes
C Secondary spermatocytes
D Spermatids
2 correct for 1 mark

(ii) Sertoli cell. (not: nurse cell) **1**

(iii) nutrition of sperm cells/supplies oxygen/removes waste products; not protection unqualified. **1**

(b) (i) Mitosis (correct spelling only) **1**

(ii) 4 cells produced (from each/B) during meiosis

8. (a)

A. Less carbon dioxide removed from air;
B. Ref global warming; (not: greenhouse effect)
C. ref one consequence of global warming e.g. melting ice caps/flooding/climate change/greenhouse effect qual.;
D. destruction/loss of (natural) habitats;
E. leads to reduction in biodiversity;
F. Extinction of some species (not: ref. destroys).
G. Some plants may have clinical/medicinal properties, lost before investigated;
H. some species may have alleles which could be introduced into gene pool of related species;
I. Soil erosion or description/localised flooding;
J. ref less protection of soil from drying/wind helps to increase desertification;
(I+J in context of removal of roots)
K. effect climate, ref transpiration/water cycle/rainfall patterns;
L. replanting;
M. allow (natural) regeneration;
N. coppicing/selective cutting;
O. ref to efficient forestry, planting trees of correct/endemic/local species/correct distance apart;
P. control pests and diseases;

Max 7 for A-K

(b)

A. Cells from Islets of Langerhans;
B. gene for insulin located;
C. gene/DNA probe;
D. (cut gene) restriction endonuclease /enzyme;
E. mRNA for insulin;
F. reverse transcriptase qual.; (e.g. make DNA from RNA)
G. DNA polymerase qual.;(e.g. make DNA double stranded)
H. sticky ends on gene;
I. bacterium/*E.coli* (is source of);
J. plasmids;
K. same restriction endonuclease;
L. sticky ends with complementary bases;
M. DNA ligase;
N. ref marker/tracer genes/antibiotic resistance;
O. recombinant DNA.
P. introduced back into bacterium/ *E. coli*;