

Biology BY5

Question	Mark Scheme
1 (a) A = Seminal vesicle	1
B = Vas deferens (not: sperm duct)	1
C = Prostate (gland) (not: Prostrate)	1
D = Urethra (correct spelling required)	1
E = Epididymis	1
F = Seminiferous tubule	1
(b) Seminiferous tubules (A. Germinal epithelium)	1
Spermatogenesis; (not: spermiogenesis)	1
<u>Primary</u> spermatocytes;	1
<u>Secondary</u> Spermatocytes;	1
Spermatids;	1
Sertoli. (not: nurse)	1

12 MARKS

Question		Mark Scheme
2	(a) Shaded on diagram	1
	(b) B + D (both needed)	1
	(c) Haploid kangaroo C (not: if more than 1 letter)	1
	Diploid mosquito A	1
	(d) (i) Diploid means <u>a pair</u> (of each) chromosome (not: 2 chromosomes present) because meiosis could not take place/ because haploid can't be less than 1 or equiv.	1
	(ii) Mitosis. (correct spelling required)	1
	(e) (i) Q S M N P R	1
	(ii) Q	1
	P	1
	Q	1
	S	1
	R	1
	(If words used minus 1 mark)	

12 MARKS

Question		Mark Scheme
3	(a)	RR WW (allow: C ^r C ^w /key) 1
		R W 1
		RW 1
		Pink 1
		R W 1
		RR RW RW WW (allow genotype in Punnett square) 1
		lines to correspond
		Red Pink White 1
		1 2 1 1
	(b)	(i) E Column: 1
		(1 mark) $\left\{ \begin{array}{l} 65 \\ 130 \\ 65 \end{array} \right.$
		O-E ² column 9 1 4 (1 mark) 1
		O.21 (A. O.207 O.208.) (not: 0.05) 1
	(c)	(i) Accept null hypothesis 1
		Less than critical value / 0.90 probability / 90% probability/ deviation from expected due to chance / < 95% / > 5% ref. chance or significance needed If calc ⁿ wrong e.g. 5.99 or above then reverse above i.e. ecf ∴ reject null hypothesis etc
		(ii) Snapdragon flower colour is controlled by a single gene with <u>two</u> <u>codominant</u> alleles (not: genes) 1

14 MARKS

Question			Mark Scheme
4	(a)	(i) A A U A G A A A G C C C U A C	1
		(ii) tyr, arg, ala, ser, leu. (abbreviation or full name)	1
		(iii) Start codon / AUG (allow: ref. 5-3 direction) (not: punctuated/stop codon)	1
		(iv) Mutation (not: chromosome mutation).	1
		(v) Amino acid sequence different/one less/ thr, glu, his, arg/alters primary structure/different polypeptide chain. (not: sequence is wrong/different protein/ref. reading frame)	1
	(b)	(i) 4	1
		(ii) Switches on gene which codes for gamma chain; (not: fetal haemoglobin/HbF) mRNA made; Transcription or description; mRNA translated or description; Ribosomes; Ref <u>role</u> tRNA; Ref formation of <u>peptide</u> bonds. Max 4	4
		(iii) Reduced oxygen supplied to tissues/haemoglobin doesn't carry as much oxygen (not: no oxygen/ref. affinity)	1
		(iv) Foetus would not be provided with sufficient oxygen/ Oxygen would not be supplied to tissues until pp of oxygen low/affinity for oxygen too high. (not: higher)	1

12 MARKS

Question	Mark Scheme
<p>5 (a) Egg taken;</p> <p>Nucleus/DNA removed;</p> <p>Nucleus/DNA (from adult dog Trakr) taken from a body cell (skin)</p> <p>placed into enucleate egg/2 cells fused.</p> <p><u>Stimulated</u> to divide;</p> <p>Placed/implanted into uterus of surrogate/bitch (allow:dog);</p> <p>(Who is at) correct stage of reproductive cycle.</p> <p>Somatic cell nuclear transplant/transfer (not: embryo cloning)</p>	<p>Max 4</p>
<p>(b) (Somatic) mutation;</p> <p>Environmental influence or description;</p> <p>Different ages. (not: cloned at different times)</p>	<p>Max 2</p>
<p>(c) a. More offspring produced than can survive, overproduction;</p> <p>b. Numbers in a species remain constant;</p> <p>c. Large number die;</p> <p>d. Struggle for survival/competition;</p> <p>e. Variation or description of coat colour;</p> <p>f. Selection pressures favour one phenotype</p> <p>g. Those with beneficial <u>alleles</u> better chance of survival/selective advantage;</p> <p>h. Reproduce/breed;</p> <p>i. Pass on beneficial alleles to offspring.</p>	<p>Max 4</p>

10 MARKS

Question	Mark Scheme
6 (a) <i>Restriction endonuclease</i> , cuts DNA into smaller segments/at specific base sequences. (not: cuts genes/removes gene from DNA)	1
<i>DNA ligase</i> , joins sections of DNA together/splices genes. (not: joins sticky ends)	1
<i>Reverse transcriptase</i> , enzyme which uses RNA as a template for making a DNA mol. (not: converts RNA into DNA).	1
<i>Marker gene</i> , a gene which enables the detection of a bacterium which has taken up a genetically modified plasmid/with the gene.	1
<i>PCR</i> , (in vitro) replication of <u>DNA</u> molecule, to give multiple <u>copies</u> (amplify DNA)	1
(b) (i) Determine sequence of bases throughout all human DNA; Identify genes formed by bases; Find location of genes; Produce database of genes. Max 2	2
(ii) Identification of carriers/allow genetic counselling; Checking embryo before implantation; Pre/post natal testing; Checking to see if there is a risk of a condition developing; Extra screening/regular health checks/life style advice; Drug targeting; Possibly gene therapy/forensic/identity. Max 2	2
(iii) Cause anxiety; Should a line be drawn between medical treatment and enhancement; Ref problems if information gets into wrong hands, insurance, employment/discrimination, etc. (not: designer babies) Max 1	1

10 MARKS

Question	Mark Scheme
7 (a)	<p>A = Energy (in form of organic mols) passing from one trophic level to another. (not: through food chain/between consumers)</p> <p>B = Photosynthesis/light energy to chemical energy.</p> <p>C + D = Energy loss, not all wavelengths of light absorbed/some reflected/transmitted; Latent heat of evaporation; Loss as heat/ by radiation/convection.</p> <p>(Any 2 marks from 3 for C + D energy loss from plant)</p> <p>E = Loss of energy from plant by respiration.</p> <p>F = Ref NPP <u>and</u> GPP.</p> <p>G = Calc of efficiency = 1% or 0.8%</p> <p>H = some parts of plant not eaten / enter decomposition pathway.</p> <p>I = Respiratory loss by consumers/heterotrophs.</p> <p>J + K = Examples of what energy produced by respiration used for.</p> <p>2 Examples from movement/anabolic / catabolic reactions/ maintaining temp/active transport.</p> <p>L = Consumers lose energy by egestion/ref. cellulose not digested.</p> <p>M = Consumers lose energy by excretion.</p> <p>O = Secondary and tertiary consumers more efficient than primary consumer/ Calc primary to secondary or secondary to tertiary (comparison 10% to 20%).</p> <p>P = reason for difference in efficiency – more egested waste in primary consumers</p>

10 MARKS

Question	Mark Scheme
(b)	A = Pollination transfer of pollen from anther to stigma.
	B = 2 examples of pollinating mechanisms from wind, insect, self, bird, water, bat, mammal. (not: specific example e.g. bee/ cross pollination unless qualified)
	C – (<i>After landing on stigma</i>) pollen grain absorbs water/ref. sucrose.
	D = Pollen tube.
	E = Tube nucleus controls growth.
	F = Enzymes/pectinase released/secreted.
	G = <u>Digest</u> route along ovary wall/through style/carpel.
	H = Passes through micropyle.
	I = Male gamete fuses with egg cell.
	J = Forms zygote which develops into embryo plant.
	K = Embryo plant consists of plumule and radicle,
	L = Radicle is embryo root/plumule is embryo shoot .
	M = Cotyledon, embryo/seed leaf, food store.
	O - Product of (fertilised) ovule is seed.
	P = Product of (fertilised) ovary is fruit.

10 MARKS