GENETICS AND EVOLUTION REVISION

(1) a) to provide a "code" for the synthesis of proteins.
A more general, but equally correct answer could be
- a blueprint for living things

(b) Double Helix

(c) In the nucleus of all cells (except red blood cells)

(d) Two strands of phosphate and sugar molecules joined together to form two long parallel strands. The strands are linked by bases - one base attached to each strand bonds together, joining the two strands in the centre. The base units may be adenosine, thymine, Cytosine, Guanine.

(2) GATTCGTGGCAGCTGAATGCAT

(3) A chromosome is a long sequence of DNA (bases) containing a series of genes. 46.

(4) a) gametes
b) sperm (males), ovum/egg (females)
c) 23. Sex cells join (sperm + egg) to produce a zygote, which grows into a new individual with the correct number of 46 chromosomes - 23 from each parent sex cell.

(5) Males are XY, Females are XX. Thus the mother always passes an X chromosome onto each child. Male offspring receive a Y chromosome from their father, female offspring receive an X chromosome from their father.

(6)

	R	r
r	Rr	rr
r	Rr	rr

(7) homozygous (recessive) non-stinging = two recessive alleles (ΔΔ)
heterozygous stinging (two diff.) = one dominant, one recessive allele (SΔ)

	Δ	Δ
S	SΔ	SΔ
Δ	ΔΔ	ΔΔ

50% hetro stinging (SΔ)
50% homo non-stinging (ΔΔ)

(8) homo long haired (dominant) = LL
short haired (recessive) = ll

	L	L
l	Ll	Ll
l	Ll	Ll

100% Ll, 100% hetro long haired

(9) W vs w

	W	w
W	WW	Ww
w	Ww	ww

25% WW - homo dominant
50% Ww - heterozygous
25% ww - homo recessive

75% (25% + 50%) - large wing span
25% - short wing span

(10) Brown allele is dominant

(11) Colour blind male = X_bY
carrier female = X_BX_b

	X_b	Y
X_B	X_BX_b	X_BY
X_b	X_bX_b	X_bY

PTO.

Girls – $X_B X_b$ and $X_b X_b$

25% heterozygous not colour blind — 25% homozygous recessive is colour blind

Boys – $X_B Y$ and $X_b Y$

25% not colour blind — 25% is colour blind

(12) mother has the disease so must be homo recessive $X_s X_s$
Father does not have disease, so dominant $X_S Y$

	X_S	Y
X_s	$X_S X_s$	$X_s Y$
X_s	$X_S X_s$	$X_s Y$

all boys (100%) have recessive allele, will have disease

all girls (100%) are heterozygous, NOT have disease

(13) A mutation is a spontaneous or induced change in the "normal" base sequence of DNA (or chromosome or gene)

Two main types are • POINT mutations which involve one base unit changing (substitution, deletion, insertion), and • chromosomal mutations where sections of chromosomes are exchanged or deleted during copying.

(14) a) This is autosomal – so two alleles for everybody

1. aa	5. Aa	9. aa
3. Aa	6. Aa	11. aa
4. Aa	7. Aa	12. aa.

b) 3 – NOT diseased, female 5 – not diseased, male 12 – Cf. fibrosis, female.

(15) a) Evolution – the fact that organism (living things) have changed over time.

b) Darwins theory of Natural selection is that
- more offspring are produced than can survive
- these offspring are different from each other, (there is variation)
- some of these differences (variations) will offer an advantage, meaning these offspring are far more likely to survive and reproduce
- the differences (variations) are genetically transferred (inherited)
- the offspring of the next generation will generally be individuals with the new trait or advantage.

c) Fossil record – allows older life forms to be organised from oldest to youngest
– shows how a species has changed over time

Comparative Anatomy – different species appear to have very similar anatomical structures
– suggest different species had a common ancestor

Embryology – the very early ages of the embryos of diffrent species appear to be very very similar
– suggest these spcies had a common ancestor

DNA/GENETICS – Species which appear similar share very similar DNA/genes. All species share some genes.
– All species have a common ancestor.