

**QUESTIONSHEET 1**

- (a) A - oviduct (fallopian tube); 1  
B - ovary; 1  
C - uterus 1  
D - vagina; 1
- (b) (i) B; 1  
(ii) A; 1  
(iii) D; 1  
(iv) C; 1
- (b) 2 of:  
both have nucleus;  
both have cell membrane;  
both have cytoplasm;  
both have 23 chromosomes/1/2 normal number of chromosomes; 2

**TOTAL 10****QUESTIONSHEET 2**

- (a) A - cell membrane; 1  
B - cytoplasm; 1  
C - nucleus; 1
- (b) C/nucleus; 1
- (c) (i) sperm; 1  
(ii) eggs/ova; 1
- (d) 14; 1

**TOTAL 7**

**QUESTIONSHEET 3**

- |     |       |  |   |
|-----|-------|--|---|
| (a) | (i)   | 145 to 184 cm;                         | 1 |
|     | (ii)  | 5;                                     | 1 |
|     | (iii) | 14;                                    | 1 |
|     | (iv)  | $\frac{30}{50} \times 100$ ;<br>= 60%; | 2 |
| (b) |       | genetic factors/genes/chromosomes/DNA; | 1 |

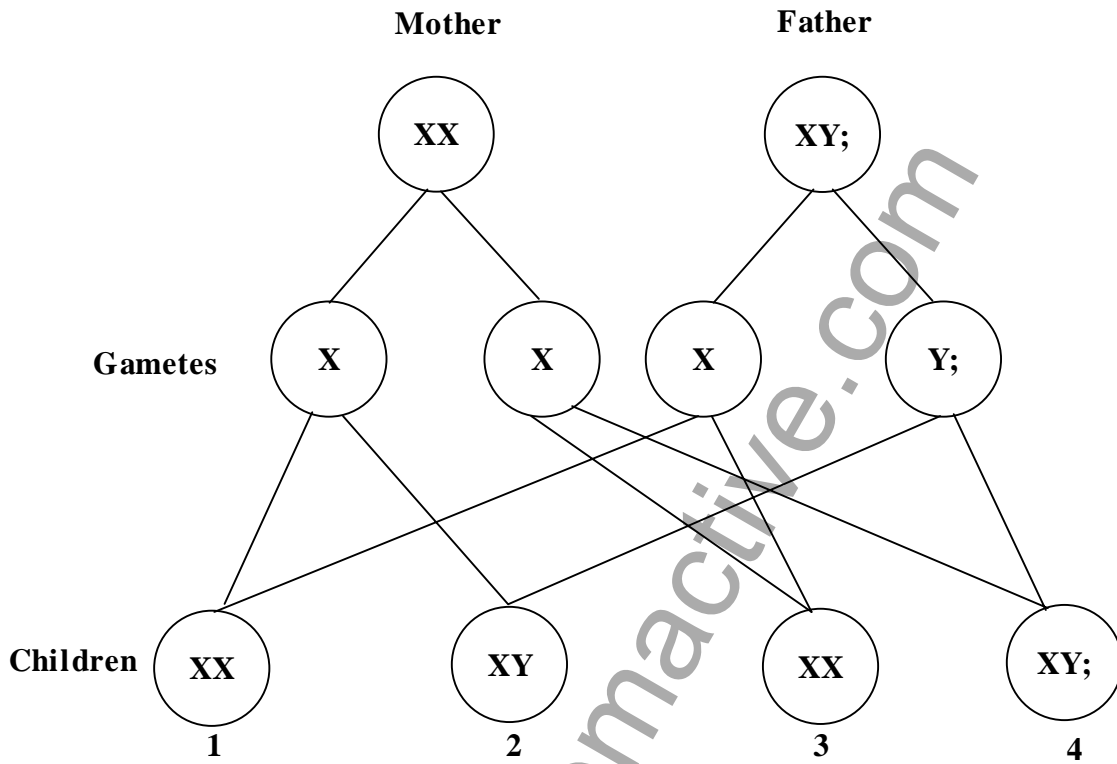
**TOTAL 6****QUESTIONSHEET 4**

- |     |      |  |   |
|-----|------|--|---|
| (a) |      | height;  | 1 |
| (b) |      | 3/10;  | 1 |
| (c) |      | 1;   | 1 |
| (d) |      | all plants with variegated leaves have hairy stems;            | 1 |
| (e) |      | $\frac{4}{10} \times 100$ ;<br>= 40%;                          | 1 |
| (f) | (i)  | plants 1 and 7;  | 1 |
|     | (ii) | both plants have both the characters breeder is selecting for; | 1 |

**TOTAL 7**

QUESTIONSHEET 5

- (a) (i) C; 1  
 (ii) has half the number of chromosomes as skin cell; 1  
 (b) (i)



- 3  
 (ii) female; 1  
 (iii) male; 1

**TOTAL 7**

**QUESTIONSHEET 6**

(a)	A - bladder;	
	B - sperm duct;	
	C - testis;	
	D - urethra;	
	E - penis;	5
(b)	(i) C;	1
	(ii) D;	1
	(iii) B;	1
(c)	Lower temperature outside of body cavity; is more suitable for the development of sperm;	2
		<b>TOTAL 10</b>

**QUESTIONSHEET 7**

(a)	January 1; to January 5;	2
(b)	lining breaks down/is shed from body;	1
(c)	level of progesterone falls;	1
(d)	January 14;	1
(e)	ovulation occurs when oestrogen level is rising/near its peak;	1
(f)	(i) oestrogen level reaches a peak; and then falls;	2
	(ii) progesterone level remains constant; and then rises;	2
(g)	lining breaks down/will be shed from body;	1
		<b>TOTAL 11</b>

**QUESTIONSHEET 8**

(a)	A - placenta;	
	B - umbilical cord;	
	C - amnion;	
	D - uterus/womb;	4
(b)	protects baby from physical damage;	1
(c)	(i) 2 of: glucose; amino acids; vitamins/named example; minerals/named example; oxygen; antibodies;	2
	(ii) carbon dioxide; urea;	2
(d)	D/uterus/womb;	1
		<b>TOTAL 10</b>

**QUESTIONSHEET 9**

(a)	A - ovary; B - testis;	2
(b)	C - egg/ova; D - sperm;	2
(c)	(i) fertilisation;	1
	(ii) egg and sperm fuse/combine; to form zygote/fertilised egg cell;	2
(d)	mitosis;	
(e)	(i) 23;	1
	(ii) 46;	1
		<b>TOTAL 10</b>

**QUESTIONSHEET 10**

- |     |       |  |                 |
|-----|-------|--|-----------------|
| (a) | (i)   | radiation causes mutation;<br>genes/chromosomes/DNA is altered;<br>this affects character of fruits;   | 3               |
|     | (ii)  | mutation/change in genes/alleles/chromosomes/DNA is permanent;<br>and is passed onto seeds;<br>plants produced from these seeds show same variation; | 3               |
|     | (iii) | 2 of:<br>amount of light;<br>availability of nutrients/minerals;<br>amount of water;<br>amount of carbon dioxide;<br>changes in temperature;         | 2               |
| (b) | (i)   | selective breeding/artificial selection;   | 1               |
|     | (ii)  | faster rate of growth;<br>resistance to disease;   | 2               |
|     |       |  | <b>TOTAL 11</b> |

**QUESTIONSHEET 11**

- |     |       |   |                 |
|-----|-------|---|-----------------|
| (a) | (i)   | increase in the number of species;  | 1               |
|     | (ii)  | numbers stayed relatively constant;<br>then fell sharply;<br>then increased;  | 1<br>1<br>1     |
|     | (iii) | 2 of:<br>competition/or specific example;<br>appearance of new predators;<br>disease;<br>climatic/environmental change; | 2               |
| (b) | (i)   | suitable temperature/warmth/heat;   | 1               |
|     | (ii)  | water/moisture/dampness;  | 1               |
|     | (iii) | oxygen;   | 1               |
| (c) |       | evolution;  | 1               |
|     |       |   | <b>TOTAL 10</b> |

**QUESTIONSHEET 12**

- (a) genes/DNA; 1
- (b) mutation had occurred; 1  
causing change in genes/DNA/chromosomes; 1
- (c) cross breed Ancon ram with normal sheep;  
select offspring with short, crooked legs;  
cross breed these;  
continue selection and cross breeding for many generations;  
until all offspring had short, crooked legs; 5
- TOTAL 8**

**QUESTIONSHEET 13**

- (a)
- vagina;

→

cervix;

→

uterus;

→

fallopian  
tube
- 3**
- (b) sperm is unable to reach the egg/egg is unable to travel down fallopian tube;  
fertilisation cannot take place; 2
- (c) woman is treated with hormones to stimulate egg production;  
eggs are collected when they are released;  
eggs are fertilised in dish/test tube;  
woman is given further hormone treatment to prepare uterus lining;  
fertilised eggs are screened for genetic faults/correct stage of cell division;  
fertilised eggs are placed into uterus/womb of woman; 6
- TOTAL 11**

**QUESTIONSHEET 14**

(a)	(i)	cc;	1
	(ii)	Cc;	1
	(iii)	CC;	1
(b)	(i)	Joan is Cc and Michael is Cc;	1
	(ii)	CC;	1
	(iii)	25% /1 in 4 /1/4/3 to 1;	1
	(iv)	50% /1 in 2 / 1/2 / 1 to 1;	1
(c)	(i)	Graham;	1
	(ii)	normal;	1
			<b>TOTAL 9</b>

**QUESTIONSHEET 15**

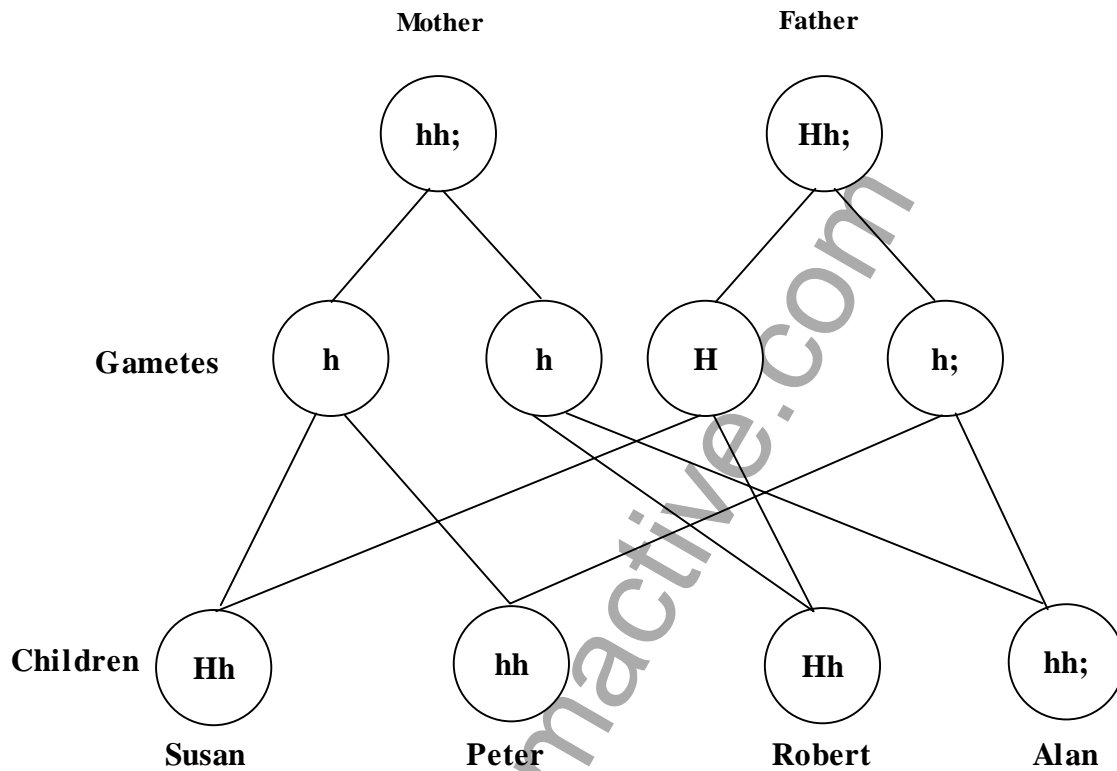
(a)	(i)	23;	1
	(ii)	46;	1
	(iii)	46;	1
(b)	(i)	sex chromosomes;	1
	(ii)	combination 2;	1
	(iii)	combination 1;	1
(c)	(i)	female;	1
	(ii)	have XX chromosomes;	1
(d)		two eggs released;	1
		each fertilised by separate sperm;	1
		each zygote develops into separate foetus;	1
			<b>TOTAL 11</b>



QUESTIONSHEET 16

- (a) HH; 1  
Hh; 1

(b) (i)



- (ii) 2 to 2/1 to 1; 1  
(iii) 25% / 1 in 4 / 1/4 / 3 to 1; 1

TOTAL 7

QUESTIONSHEET 17

- (a) a mutation; 1  
(b) black form of moth was not camouflaged on tree bark; easily seen and eaten by birds; 2  
(c) as tree bark became blackened, black form was camouflaged while speckled was not; speckled form of moth was eaten by birds, while black form survived predation better; black moths breed and pass their genes for black colouration onto their offspring; over many generations black form survives better while speckled form does not; this results in the black form making up most of moth population; 5  
(d) natural selection; 1

TOTAL 9

**QUESTIONSHEET 18**

- (a) (i) by the umbilical cord; 1
- (ii) nutrients present in mothers' blood;  
pass by diffusion;  
into foetal blood; 3
- (iii) waste products would build up in blood of foetus;  
and reach toxic levels if not removed; 2
- (b) (i) 7 correct plots;;; (-1 each incorrect plot) 4  
plots joined by line;
- (ii) 950 grams; 1
- (iii) month 9 to birth; 1
- (iv)  $\frac{150}{50} \times 100$ ;  
=300 %; 2

**TOTAL 14**

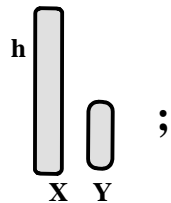
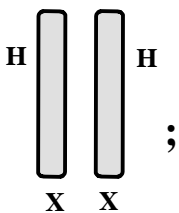
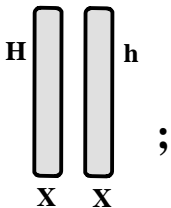
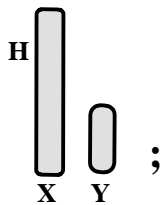
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QUESTIONSHEET 19

- (a) (i) person who does not suffer from the disease;  
but who carries a single allele for the condition;

2

(ii)



4

- (b) men only need to inherit one allele for haemophilia to develop the disease;  
women need to inherit two recessive alleles for haemophilia;

2

- (c) son with haemophilia has one allele h for haemophilia;  
this allele cannot be inherited from father (who is normal) and must have the genotype **X<sup>H</sup> Y**;  
therefore son must have inherited haemophilia allele from mother;  
since mother is normal, she must have the genotype **X<sup>H</sup> X<sup>h</sup>**;

4

TOTAL 12

**QUESTIONSHEET 20**

- |     |   |   |
|-----|---|---|
| (a) | in nucleus;   | 1 |
| (b) | (i) G-T-A-C-A-T-G;;   | 2 |
|     | (ii) sequence of three bases forms code for an amino acid;<br>order of bases in DNA molecule;<br>(is code for) order of amino acids in protein; | 3 |
| (c) | (i) virus is used to transfer gene to a bacterium;  | 1 |
|     | (ii) contains gene for human insulin;   | 1 |
|     | (iii) to produce large numbers of bacterium and therefore large amounts of insulin;   | 1 |

**TOTAL 9**

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