Inheritance

Mark Scheme 7

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Inheritance
Paper Type	(Extended) Theory Paper
Booklet	Mark Scheme 7

Time Allowed: **56 minutes**

Score: **/46**

Percentage: **/100**

<table>
<tr>
<td>1 (a)</td>
<td>
<table>
<tr><td>function</td><td>name of organ</td><td>letter from Fig. 3.1</td></tr>
<tr><td>production of gametes</td><td>ovary</td><td>T ;</td></tr>
<tr><td>site of implantation</td><td>uterus</td><td>X ;</td></tr>
<tr><td>site of fertilisation</td><td>oviduct / fallopian tube</td><td>R ;</td></tr>
<tr><td>dilates during birth</td><td>cervix</td><td>V</td></tr>
</table>
</td>
<td>[3]</td>
<td>ignore lining / endometrium – not an organ
R uterus wall
R ‘egg, canal / tube’</td>
</tr>
<tr>
<td>(b) (i)</td>
<td>ovary / ovaries ; ignore T</td>
<td>[1]</td>
<td>R follicle – not an organ</td>
</tr>
<tr>
<td>(ii)</td>
<td>makes (Graafian) follicle, form / develop / mature / be produced ;
causes, secretion / release / production, of oestrogen ;</td>
<td>[max 1]</td>
<td>A egg / ovum / gamete for follicle
R ovulation / described</td>
</tr>
</table>

<table>
<tr><th></th><th colspan="2">Answer</th><th>Marks</th><th>Guidance for Examiners</th></tr>
<tr><td>1 (c) (i)</td><td colspan="2">
<table>
<tr><td>award the following to max 3</td><td>award max 2 for data quotes including changes in concentration over stated number of days - units must be used at least once in the answer</td></tr>
<tr><td>increase from, day 1 / first day, to day 11 ;
A peaks at day 11 / increases over first 10/11 days</td><td>155 / 156 (arbitrary) units on day 11 ;</td></tr>
<tr><td>decreases from day 11 to day 15 ;</td><td>54 / 55 (arbitrary) units on day 15 ;</td></tr>
<tr><td>increases to day 20 / peaks (again) at day 20 ;</td><td>136 (arbitrary) units on day 20 ;</td></tr>
<tr><td>decreases to, day 27 / last day ;</td><td>40 (arbitrary) units on day 27 ;</td></tr>
</table>
[max 4]
</td><td></td><td></td></tr>
<tr><td>(ii)</td><td colspan="2">release of, egg / egg cell / ovum / oocyte / female gamete ;

either
from, ovary / follicle
or
into fallopian tube / oviduct ;</td><td>[2]</td><td>R ovule</td></tr>
<tr><td>(d)</td><td colspan="2">
1 sperm cell digests way through, jelly coat / AW ;
2 uses enzymes (from acrosome) ;
3 sperm, attaches to / fuses with, egg / AW ; A fusion of gametes
4 whole sperm cell enters egg / head of sperm enters egg ;
5 (egg membrane changes so that) no other sperm can enter ;
6 haploid / 23 chromosomes ;
7 nuclei, fuse / join ; A ref to chromosomes ‘coming together’
8 diploid / 46 chromosomes ;
9 zygote ;
</td><td>[max 3]</td><td>ignore egg wall / cell wall

ignore events after fertilisation</td></tr>
</table>

	Answer	Marks	Guidance for Examiners
1 (e) (i)	length / molecule / thread / strand, of DNA (and proteins) ; made of (string of), genes / alleles ; **A** contains genes	[max 2]	**R** pair of genes
(ii)	46 ; **A** 23 pairs	[1]	

<table>
<tr><td>2 (a)</td><td>MP1 attach to virus / bacteria / antigens ;
MP2 prevent movement around the body ;
MP3 prevent entry into <u>cells</u> ;
MP4 stop division ;
MP5 combine with / neutralise, toxins ;
MP6 clump, bacteria / viruses, together ;
MP7 help phagocytes engulf virus / bacteria ;</td><td>[max 3]</td></tr>
<tr><td>(b)</td><td>kidney would be rejected ;
(lymphocytes produce anti-A) antibodies ;
(antibodies) attach to blood vessels ;</td><td>[max 2]</td></tr>
<tr><td>(c)</td><td>no, blood / capillaries / antigens / antibodies / white cells / lymphocytes, in the cornea ;</td><td>[max 1]</td></tr>
<tr><td>(d)</td><td>$I^AI^O \times I^BI^O$;
$I^A\ I^O + I^B\ I^O$;
I^OI^O ;</td><td>[3]</td></tr>
<tr><td>(e)</td><td><table>
<tr><td>term</td><td>example</td></tr>
<tr><td>a dominant allele</td><td>I^A</td></tr>
<tr><td>heterozygous genotype</td><td>I^AI^O / I^BI^O / I^AI^B ;</td></tr>
<tr><td>codominant alleles</td><td>I^A and I^B ;</td></tr>
<tr><td>phenotype</td><td>(blood) group, A / B / AB / O ;</td></tr>
</table></td><td>[3]</td></tr>
<tr><td colspan="2"></td><td>[Total: 12]</td></tr>
</table>

3	**(a**	$\frac{34/35/36\text{mm}}{0.14}$ answer = (x) 243 to 257 ;;	[2]	
	(b)	no, flagellum / tail ; no, acrosome / (digestive) enzymes ; has, food / energy, store ; more cytoplasm ; larger nucleus ; more membrane / larger surface area ;	[max 3]	*only accept structural points*
	(c)	reduces / halves, number of chromosomes ; so number of chromosomes does not double each generation ; gives variation ;	[max 2]	

3	**(d)**	*man* cannot produce sperm ; sperm cannot swim / defective sperm / AW ; few sperm / low sperm count ; blockage of, epididymis / vas deferens ; result of, STD / named STD ; AVP ; had a vasectomy / problem with ejaculation / not enough nutrient in semen *woman* low concentration of / no, FSH ; follicles do not develop / cannot ovulate ; damaged / blocked / cut, oviduct ; AVP ; e.g. post menopause / embryo cannot implant / uterine lining does not thicken	[max 1] [max 1]	
	(e)	to increase chances of fertilisation ; fertilisation occurs in the oviduct ; sperm can only survive for a few days (in the oviduct) ; placed in the uterus and not in the vagina as sperm less likely to die / AW ; AVP ; e.g. ref to female's immune system takes 1–2 days for sperm to reach, egg / oviduct	[max 3]	
	(f)	to maintain, endometrium / lining of uterus ; for implantation ; prevent loss of embryo (through menstruation) ; inhibits, secretion / release, of FSH / LH ; no development of (more) follicles / AW ;	[max 3]	
	(g)	number of women who become pregnant out of all women who have AI ; as a percentage / out of every 100 ;	[2]	
			[Total: 17]	