

Question		Marks	Guidance Notes
1 (a) (i)	testes ;	[1]	A adrenal gland / ovaries
(ii)	increases, muscle mass / strength / power ; improved recovery of muscle damage / promotes protein synthesis ; increase, competitive drive / aggression / AW ; increases bone, density / mass ;	[max 1]	
(iii)	maintains, uterine lining / endometrium ; inhibits, FSH / LH (release) ;	[max 1]	R uterus wall. I thickens lining
(iv)	oestrogen ;	[1]	
(b)	A is most polluted because: greater (overall) concentration of hormones ; all hormones at higher concentration except oestrogen ; comparative data quote with units ; (but) similar levels of oestrogen / (natural) progesterone (to B) ; B is most polluted because more oestrogen (than A) ; more <u>types</u> of hormones ;	[max 3]	
(c) (i)	Lake B oestrogen decreases (slightly) ; progesterone / testosterone, increases (slightly) ; Lake A or Lake B <u>no / little</u> , effect on oestrogen / progesterone / testosterone <u>without</u> ozone; Lake A chlorine <u>with ozone</u> caused, decrease in testosterone / synthetic progesterone / increase in natural progesterone ;	[max 2]	A mp 1, 2, 4 as data quotes R little effect on testosterone <u>with ozone</u>
(ii)	make the water safe, to return to the environment / for human use ; kill, pathogens / (harmful) microorganisms / bacteria ;	[1]	I germs A disinfectant / sterilisation

Question	Answer	Marks	Guidance Notes
1 (d)	<p><u>eutrophication</u> ;</p> <p>(aquatic) plants, die / cannot photosynthesise (due to blocked light) algae / (aquatic) plants / organic material, decayed by bacteria ;</p> <p>(aerobic) respiration (by bacteria / decomposers) ; decreased pH / increased acidity (due to low oxygen) ;</p> <p>oxygen concentration decreases (due to bacteria / decomposers) ; (aquatic) animals / fish, migrate / die, due to lack of oxygen ;</p> <p>disrupted / altered, (aquatic) food chains / habitats ; more, flies / mosquitoes ; (more) waterborne (named) disease ; e.g. cholera / typhoid smelly / visual pollution ; toxicity / mutations caused, by heavy metals / sewage ;</p> <p>(female contraceptive) hormones cause feminisation of (aquatic) organisms ; (female contraceptive) hormones cause reduced sperm count (in aquatic animals) ;</p>	[max 6]	<p>I marine and other non-lake ecosystems I unqualified death / extinction throughout</p> <p>A growth of, floating aquatic plants / algae / algal bloom A nutrients in sewage as organic material A microorganisms / decomposers for bacteria</p> <p>I <u>all</u> oxygen used up</p> <p>A diseases / pathogen in humans or aquatic organisms</p> <p>A biomagnification / bioaccumulation / death of (aquatic) organisms by, heavy metals / toxins / poisons, in sewage</p> <p>A hormone may cause gender change in fish</p>
		[Total : 16]	

2	(a)	<i>either</i> KMJ ; ON ; <i>or</i> KMO ; JN ;	[2]	
	(b) (i)	release of an, egg / ovum / oocyte ; <i>either</i> from, follicle / ovary ; <i>or</i> into, oviduct / fallopian tube ;	[2]	A 'follicle and egg'
	(ii)	<u>zygote</u> ;	[1]	
	(c)	zygote / fertilised egg, divides ; mitosis / cell division ;	[max 5]	ignore embryo forming after implantation

Question	Answers	Marks	Additional Guidance
2	<p>forms, an embryo ; A blastocyst/blastula</p> <p>(hollow) ball/collection/group/AW, of cells ;</p> <p>goes/moves, down oviduct/down fallopian tube/towards uterus ;</p> <p>detail, e.g. ciliary action/peristalsis/muscle contraction ;</p> <p>implants/AW, into, lining of the uterus/endometrium/wall of uterus ;</p> <p>growth/development, of <u>placenta</u> ;</p> <p>follicle becomes, yellow body/corpus luteum/remains of follicle/AW ;</p> <p>yellow body/corpus luteum/ovary/AW, secretes/releases/produces <u>progesterone</u> ;</p> <p>progesterone maintains, endometrium/lining of uterus/wall of uterus/AW ;</p> <p>progesterone, prevents menstruation ;</p> <p>inhibition of FSH (secretion/release) ;</p> <p>prevents, production of more eggs/production of follicles ;</p>		<p>A 'embeds/sinks in'</p> <p>R 'zygote implants'</p> <p>A any suitable description of yellow body</p>
(d)	<p>corpus luteum/yellow body/ovary ;</p> <p>placenta ;</p>	[2	
(e) (i)	<p>(named) drug, injected/taken, early in menstrual cycle ;</p> <p>inhibits action of oestrogen ;</p>	[ma 3]	e.g. FSH/clomiphene/clomid

Question	Expected Answers	Marks	Additional Guidance
2	<p>stimulates, production/release, of FSH ;</p> <p>makes sure that FSH concentration is high enough ;</p> <p>to stimulate production/development/maturation of, follicles/eggs/ova/oocytes ;</p> <p>more eggs are released ;</p> <p>LH stimulates, ovulation/release of eggs ;</p>		
(ii)	<p><i>idea that</i> stress is associated with difficulty having children ;</p> <p>stated problem with multiple births ;</p> <p>problems with unused embryos (when used with IVF) ;</p> <p>issues with elderly parent(s) ;</p> <p>religious objections to use of fertility drugs ;</p> <p>any reference to cost of the treatment ;</p> <p>increases populations/any negative effect of population increase ;</p> <p>can be used to increase populations/any positive effect of population increase ; e.g. in countries with falling birth rates</p>	[max 2]	ignore 'interfering with a natural process'
		[Total: 17]	

Question	Expected Answers							Marks	Additional Guidance																					
3 (a) (i)	Y	W	V	T	S	X	U	[2]	2 wrong = 1 mark more than 2 wrong = no marks																					
(ii)	<table border="1"> <thead> <tr> <th data-bbox="338 353 510 435">letter from Fig. 5.2</th> <th data-bbox="510 353 757 435">name</th> <th data-bbox="757 353 1285 435">function during pregnancy</th> </tr> </thead> <tbody> <tr> <td data-bbox="338 435 510 485">P</td> <td data-bbox="510 435 757 485">amniotic sac</td> <td data-bbox="757 435 1285 485">encloses the amniotic fluid</td> </tr> <tr> <td data-bbox="338 485 510 535">Q</td> <td data-bbox="510 485 757 535">umbilical cord ;</td> <td data-bbox="757 485 1285 535">attaches the placenta to the fetus</td> </tr> <tr> <td data-bbox="338 535 510 621">N</td> <td data-bbox="510 535 757 621">amniotic fluid</td> <td data-bbox="757 535 1285 621">protection / maintains temperature / allows fetus to move / AW ;</td> </tr> <tr> <td data-bbox="338 621 510 707">M</td> <td data-bbox="510 621 757 707">uterus (wall) ;</td> <td data-bbox="757 621 1285 707">contracts to push the baby through the birth canal</td> </tr> <tr> <td data-bbox="338 707 510 858">R</td> <td data-bbox="510 707 757 858">placenta</td> <td data-bbox="757 707 1285 858">immune protection / exchange of (named) nutrients or wastes or gases / secretes hormone to maintain lining / separates blood of mother and fetus ;</td> </tr> <tr> <td data-bbox="338 858 510 973">O</td> <td data-bbox="510 858 757 973">cervix ; A vagina / birth canal</td> <td data-bbox="757 858 1285 973">widens during labour to allow the head of the baby to pass</td> </tr> </tbody> </table>							letter from Fig. 5.2	name	function during pregnancy	P	amniotic sac	encloses the amniotic fluid	Q	umbilical cord ;	attaches the placenta to the fetus	N	amniotic fluid	protection / maintains temperature / allows fetus to move / AW ;	M	uterus (wall) ;	contracts to push the baby through the birth canal	R	placenta	immune protection / exchange of (named) nutrients or wastes or gases / secretes hormone to maintain lining / separates blood of mother and fetus ;	O	cervix ; A vagina / birth canal	widens during labour to allow the head of the baby to pass	[5]	<i>each correct row = 1 mark</i>
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(b)	<p><i>difference:</i> protein ;</p> <p><i>similarity:</i> lipid ; energy content ; lactose ;</p>							max [2]	<i>1 mark for difference and 1 mark for similarity</i>																					

Question	Expected Answers		Marks	Additional Guidance
3 (c) (i)	1 2 3 4	increase in, size / length / mass / volume / AW ; increase in dry mass ; increase in cell number ; ref to permanent ;	max [2]	A reference to cell division / mitosis / reproduction of cells or tissues ignore development
(ii)	1 2 3 4 5 6	lower mass / slower growth, of breast-fed babies ; ora both (babies) show same increasing trend ; appropriate use of comparative data from table or figure with units stated at least once ; because less protein / less energy (in breast-fed milk) ; ora (protein / energy) is required for growth ; ora lower volume of milk drunk (by breast fed babies) ; ora	max [4]	

Question	Expected Answers		Marks	Additional Guidance
3 (iii)	1 2 3 4 5 6 7 8 9 11 12 13 14 15 16 17 18	<p><i>advantages:</i></p> <p>provides, best/complete/most suitable/AW, food ; easy to digest/less risk of colic ; no additives/less risk of allergies/child less likely to develop diabetes ; contains antibodies/reference to colostrum/provides passive immunity/provides protection against, pathogens/diseases/microorganisms ; sterile/less risk of infection ; is at, body/correct, temperature ; no preparation/always available ; bonding with mother ; it's free/'cheap' ;</p> <p><i>disadvantages:</i></p> <p>time consuming ; transfer of, viruses/HIV/hepatitis B ; painful/sore nipples/mastitis ; stressful/may be embarrassing/AW ; mother may not be able to produce enough milk ; cannot see how much baby has consumed ; task cannot be shared with other parent ; medications/drugs/alcohol, can pass to baby ;</p>	<p>max [4]</p>	<p><i>maximum 3 marks for advantages</i></p> <p><i>maximum 3 marks for disadvantages</i></p>
			[Total: 19]	