

Question	E	Answers	Marks	Additional Guidance
1 (a) (i)	R – corpus luteum/ yellow body ; S – (Graafian) follicle ;		[2]	
(ii)	ovulation ;		[1]	
(b) (i)	(o)estrogen ;		[1]	
(ii)	progesterone ;		[1]	
(c) (i)	1 flagellum / tail / streamlined ; 2 motile / swim / AW ; 3 smaller / reference to actual sizes ; 4 acrosome / enzymes in packet on head ; 5 no food store ; 6 less cytoplasm ; 7 contains X <u>or</u> Y (chromosome) ; 8 AVP ;		[max 3]	A contains Y chromosome
(ii)	haploid ;		[1]	
(iii)	oviduct ;		[1]	A fallopian tube
(iv)	1 (acrosome) enzymes break down, jelly layer / AW ; 2 sperm, head / nucleus, enters egg ; 3 fertilisation membrane forms / no more sperm can enter ; 4 (haploid) nuclei, fuse / join ; 5 (diploid) zygote formed ; 6 mitosis / cell division ; 7 (2 / more – celled) embryo forms ; 8 (hollow) ball of cells / embryo / zygote / fertilised egg, moves down the oviduct ; 9 ciliary movement / peristalsis, in the oviduct ;		[max 4]	

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1 (d) (i)	1 2 3 4	no / slight, change, at first / AW ; then exponential / AW, increase ; then levels off / peaks (after 1992) ; comparative use of figures with correct units stated at least once ;	[max 2]	
(d) (ii)	1 2 3 4	provide (named) fertility drug early in menstrual cycle ; e.g. when follicle(s) are developing / 14 days before AI collect, sperm / semen (from male) ; place, semen / sperm, into uterus / vagina / through cervix ; around the time of ovulation ;	[max 3]	
		Total:	[19]	

2 (a)	<p><i>method of pollination:</i> wind ;</p> <p><i>explanation to max 2:</i> Feathery / AW, stigma ; long, filament ; large, anthers / stamens ; anthers / stamens, hang outside flower ; anthers loosely attached (to filament) ; light pollen ; no petals ;</p>	[1] + max [3]	A 'only bracts'
(b)	cross (pollination) ;	[1]	
(c)	pollen tube ; delivers male gamete / pollen <u>nucleus</u> / male <u>nucleus</u> to ovule ; AW	[2]	A female gamete / egg / female nucleus / ovum.
(d)	<i>idea that</i> tip of pollen tube opens / AW ; gametes / sex cells / ova and pollen <u>nuclei</u> fuse / join / combine ; formation of zygote ; diploid ;	max [2]	A male nucleus for pollen nucleus ignore pollen unqualified ignore meet / mix
(e) (i)	ovule ;	[1]	
(ii)	ovary (wall) ;	[1]	
(iii)	colonise new areas ; reduce (intraspecific) competition ; reduce inbreeding ; ora	max [1]	
(f)	stored food / food reserves (in seed) broken down ; named enzyme plus substrate ; product plus use ; enzymes required in process of respiration ;	max [2]	
		[Total:13]	

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3 (a) (i)	<i>glucose</i> provides energy/required for (aerobic/anaerobic) respiration ; <i>amino acids</i> used, to make (named), proteins/polypeptides ;	[2]	R to produce / AW, energy A for (cell) growth / make new cytoplasm
	(ii) DNA / chromosome / genetic material, replicates / is copied ; cell membrane / cell wall, develops in the middle of the cell ; binary fission ; bacteria / cell / cytoplasm, divides into two ;	max [2]	ignore mitosis / RNA / chromosomes
(b)	some bacteria were resistant to antibiotic, S / T / both S and T ; fewer were resistant to antibiotic T / antibiotic T is more effective (than S) ; both antibiotics, killed / inhibited growth or reproduction of, (susceptible) bacteria ;	max [2]	R immune / antibodies
(c)	bacteria are resistant ; have reproduced / multiplied, (in culture) ; all genetically identical, so all resistant ;	max [2]	R 'growing / becoming, resistant'

Question		Mark	Additional Guidance
3 (d)	<p><i>antibiotic resistant bacteria are formed by</i> mutation ; change to, DNA/gene ; produces, new/different, protein ; ref to anything that increases risk of resistance ;</p> <p><i>spread</i> (when antibiotic is used) susceptible/AW, bacteria die ; ORA less competition/example ;</p> <p>ref to fewer limiting factor(s) ; resistant bacteria, reproduce/multiply ; pass on their (DNA/gene(s)/allele(s)) for (antibiotic) resistance ; ref to, (unprotected) sexual intercourse/many sex partners/AW ; any two methods of transmission (from host to host) ;;</p> <p>AVP ;</p>	max [5]	<p>e.g. not completing the full course /do or taking antibiotics when not necessary</p> <p>e.g. more food/resources (available for resistant bacteria)</p> <p>e.g. body fluids/droplets (in air)/blood/needles or syringes/food/water/(named) vector/across placenta/at birth/breast milk</p>
		[Total: 13]	