

Control and co-ordination in mammals

Mark Scheme 5

Level	International A Level
Subject	Biology
Exam Board	CIE
Topic	Control and co-ordination
Sub Topic	Control and co-ordination in mammals
Booklet	Theory
Paper Type	Mark Scheme 5

Time Allowed : 58 minutes

Score : / 48

Percentage : /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	77.5%	70%	62.5%	57.5%	45%	<45%

- 1 (a) (i) greater speed (if myelinated) ;
comparative figures with units ; [2]
- (ii) larger diameter greater speed / ora ;
comparative figures with units ; [2]
- (b) 1. myelin insulates axon ;
2. no myelin at node ;
3. action potentials / depolarisation, only at nodes (of Ranvier) ;
4. local circuits set up between node ;
5. action potentials 'jump' from node to node / saltatory conduction ;
6. myelination prevents leakage of ion ; **ora** [max 3]
- (c) (i) 1. (sheath) treated as, 'foreign' / non-self ;
2. ref. role of, antibodies / phagocytes / lymphocyte ; [2]
- (ii) 1. less insulation of axon ;
2. action potentials, slow down / stop ; [2]

[Total: 11]

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- 2 (a) idea that sperm can survive for several days ;
so fertilisation can occur, at / after, ovulation ; [2]
- (b) (i) low until around day 13 then one peak returning to low at around day 28 ;
peak around day 22 ; [2]
- (ii) began: day 1 *and* ended: day 14 ; [1]
- (c) (i) 1. ref. to irregularity of cycle ;
2. example of factor affecting cycle e.g. illness / travel / stress / synchronicity [2]
- (ii) 1. avoid sexual intercourse when LH level high ;
2. can predict next LH surge [2]
- (iii) 1. change in basal temperature (at ovulation) is only small ;
2. *idea of* continuous monitoring / avoids, misreading values / inaccuracy / missing temperature change ; ora for thermometer
- (d) 1. there is a possibility of becoming pregnant on most days of the cycle ;
2. guidelines should include more days before and after ovulation
3. not possible to become pregnant on days 1–3 and days 27–29
4. *idea of* days 10 to 17 are centred around the highest probability ;
5. ref. to day 18 having same probability as day 10
6. comparative figures ; e.g. probability on two different da
7. idea of women with irregular cycles have more variation (in fertile window) [max 4]

[Total:15]

3 (a)

correct order	letter of stage
1	E
2	H
3	A
4	J
5	C
6	F
7	B
8	G
9	D
10	I

H A J C all above F ;
H A J C in correct order ;

B G D I all below F ;
B G D I in correct order ;

[4]

- (b) (i) vesicles found **only** in presynaptic neurone /
ACh released **only** from presynaptic neurone or membrane ;

receptor (proteins) found **only** on postsynaptic membrane ;

[2]

- (ii) 1. allows more interconnection of nerve pathways / AW ;
2. for, memory / AW ; *ignore learning*
3. allows wider range of responses ;
4. AVP ; e.g. summation

[2 max]

[Total: 8]

4 (a) (i) A ; [1]

(ii) W - spermatogonium ;
X - primary spermatocyte ;
Y - secondary spermatocyte ; [3]

(b) 3 marks for correct labels ;;; [3]

(c) (i) fertility / number of offspring, decreases ;
at 20°C the number of offspring is 280 while at 25°C the number of offspring is 150
/ accept difference between figures ; [2]

(ii) smaller reduction in, fertility / number of offspring, in *alg-3* mutants than in
alg-4 mutants ; **ora**
manipulated data quote
either by 24% in *alg-3* **and** 61% in *alg-4*
or by 30 in *alg-3* **and** 135 in *alg-4* ; [2]

(iii) D ; [1]

(iv) at 20°C
difference due (only) to lack of (development of) motility (in mutants) / AW ;
R ref to numbers of sperm
at 25°C
difference due to fewer sperm(atids) **and** less (development of) motility ; [2]

[Total: 14]

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