1. (i) control explained/AW; **R** *control without explanationf* 1

(ii) mean number of errors reduced in subsequent trials;
in all trials rats with phenserine had fewer errors/ora;
ref. paired data for 2 trials; 2 max

(iii) ref. trial and error;
ref. associative learning;
ref. operant conditioning;
escape is reward/reinforcer; 3 max

(iv) inhibits acetylcholinesterase;
effect on enzyme;
in synapses;
slows down fall in ACh concentration/keeps some ACh at synapses/slows
breakdown of ACh;
in parts of brain associated with memory;
improved <u>short term</u> memory; 3 max

[8]

2. innate/instinctive/stereotypic;
inherited/genetic/inborn;
does not require, learning/conscious thought;
AVP; e.g. reflex *3 max*

searches for breast/bottle/AW; 4 max

[4]

3. (i) red light; 1

(ii) arm withdrawn (without a shock); 1

[2]

4. 1 rat, investigates cage / tries to escape;
2 presses lever by chance;
3 food / reward, appears;
4 ref to (positive) reinforcement;
5 ref to repetition;
6 associative learning;
7 AVP; e.g. trial and error 3 max

[3]

5. (i) habituation / associative ;   1

(ii) no threat ;
no waste of energy ;
less stress ;
AVP ;   2 max

                                                                                                  [3]

6. (a) transmit (information) between neurones ;
ensure one way transmission of impulses ;
integration of nerve pathways ; **A** allows, convergence / divergence /
summation filter out low level stimuli ;
prevent overstimulation and fatigue ;
ref to inhibition ;   2 max
AVP ; e.g. role in, learning / memory

(b) vesicles move to presynaptic membrane ;
vesicles fuse with presynaptic membrane ;
exocytosis / AW ;
neurotransmitter moves across synaptic cleft ;
neurotransmitter binds to receptor on postsynaptic membrane ;
recycling of neurotransmitter / channels for uptake of neurotransmitter ;   3 max

(c) **1**   to allow repolarisation to occur ;
2   by unblocking (neurotransmitter) receptor ;
3   prevents sodium channels remaining open ;
4   so more neurotransmitter can bind ;
5   new action potential is generated ;
6   to allow movement to occur ;
7   recycling of neurotransmitter ;
8   AVP ;

       or

1   permanently depolarised ;
2   receptors (permanently) blocked ;
3   sodium channels open ;
4   no more neurotransmitter can bind ;
5   no new action potential / action potentials continuously fired ;
6   continuous contraction / AW ;
7   no recycling of neurotransmitter ;
8   AVP ;   2 max

                                                                                                  [7]

7. (i) time taken (to make choice) decreases ;
as number of trials increases / AW ;
ref to figures ;
idea chamber **B** chosen more often towards end of investigation ;　　　2 max

(ii) same, apparatus / conditions ;
different experimental mouse ;
idea of same species / same age / same gender, of (experimental) mouse ;
no companion mouse / **B** and **C** empty ;
same number of trials ;
AVP ;　　　3 max

(iii) time taken does not decrease significantly ;
roughly equal choice of chamber **B** or **C** / AW ;　　　1 max

(iv) trial and error learning / operant conditioning ;
ref to associative learning ;
companion animal is, reinforcer / reward ;
no conditioned stimulus ;
no conditioned response ;
AVP ;　　　3 max

[9]

8. (a) (i) *automatic*
requires no (conscious) thought / AW;

(ii) *stereotyped*
carried out by all individuals in a species / always carried out in
same way / AW;

(iii) *conditioned*
(response) can be, modified / produced, following exposure to 'new'
stimulus / AW;　　　3

(b) **A** any response, provided correct stimulus is given;
R non-mammalian example　　　**R** examples of conditioned reflexes　　　1

(c)   **D1**   time spent in box decreases as number of trials increases / AW;
        D2   greatest change in response occurs in first few trials;
        D3   little / less, change in response time;
        D4   between trials 6 and 20;
        D5   ref to supporting paired data;
        D6   ref to 'fluctuations';   *max 4*

        E1   (at first) cat pulls, loop accidentally / AW;
        E2   ref to trial and error;
        E3   freedom is a, reward / reinforcer;
        E4   associative learning;
        E5   detail (of associative learning);
        E6   pulls loop sooner / AW;
        E7   correct ref to acclimatisation period
               (when cat placed in box) / AW;
        E8   AVP; e.g. other behaviours / inactivity, not,
               reinforced / rewarded   *max 5*   max 7

        **QWC – legible text with accurate spelling, punctuation and
        grammar;**   1

(d)   no reward / punishment (of behaviour), in classical; ora
      one stimulus in operant / two stimuli in classical;
      AVP;   max 2

                                                         [14]