

Animal behaviour past papers:

Jan 2002:

6 Read the passage below then answer the questions which follow.

Burrhus Skinner had no particular desire to watch animals. He was simply curious to discover as much as possible about how behaviour changes. To him, animals were a means to an end. He perfected a device, rather like an automated puzzle-box, in which a confined animal could record its own activity. By learning to press a lever when a light bulb shone, a rat or pigeon obtained a small pellet of food. Once the apparatus was set up, no one needed to watch the creature because its lever-pressing activity was displayed on ticker tape. The Skinner Box had many advantages. Several such boxes could provide huge amounts of information which could be collected by an untrained assistant.

Skinner made some surprising discoveries using his boxes. For example, he found one day that he was short of food pellets and needed to ration the rewards. He programmed one of his boxes to dispense a pellet after much lever pressing, rather than after each press. Skinner incorrectly thought that the pigeon would lose interest because the food would appear too infrequently. The bird worked even harder for its infrequent rewards, attacking the lever with enthusiasm. He realised that the scheduling of food rewards had a profound effect upon the speed of learning. Lever pressing was most heavily reinforced by infrequent rewards.

(a) Explain why Skinner's methods allowed easy collection of numerical data.

.....
.....
.....
.....[2]

(b) Describe the relationship between frequency of rewards and speed of learning in Skinner's experiment.

.....
.....
..... (2)

(c) In this example, the behaviour of the rat or pigeon changed because the animal linked or associated a stimulus and a response. Identify the stimulus and the response involved in this experiment.

stimulus

response[2]

(d) Name the term that is used for the type of behaviour (of the rat or pigeon) referred to in the passage.

.....[1]

(e) Suggest **two** criticisms, implied in this passage, which could be made of Skinner's work.

1

.....

2

.....[2]

Wolfgang Kohler, a German zoologist, is famous for his studies of insight learning in mammals, such as chimpanzees.

(f) Describe how Kohler's methods of investigation differed in principle from those of Skinner.

.....

.....

.....

.....

.....

.....[3]

Question	Expected Answers	Marks
6 (a)	many boxes which do not need observing; untrained persons can supervise; results, recorded / displayed, on 'ticker tape';	2 max
(b)	less frequent rewards; speeded up learning / lever pressing;	2
(c)	<i>stimulus</i> light bulb shines; <i>response</i> press lever / appearance of food reward;	2
(d)	learned / operant conditioning / positive reinforcement;	1
(e)	a study of how behaviour changes not, actual / natural, behaviour; situation very artificial / all work in laboratory; innate animal behaviour not observed; a very mechanistic approach;	2 max
(f)	<i>idea that</i> Kohler an ethologist, looking for different things; studied more natural behaviour of the animals; not 'changed' / 'experimental', behaviour; not in artificial lab. situation; studied larger number of species; Skinner only studied (small number of) lab. animals; A ref to subjective v objective approach; AVP;	3 max
		[Total: 12]

June 2002:

4 (a) Explain clearly, giving **one** example of each, what is meant by the following terms:

(i) *reflex action*

example

explanation

.....

.....

.....

.....

[3]

(ii) *conditioned reflex*

example

explanation

.....

.....

.....

.....

[3]

Question	Expected Answers	Marks
4 (a) (i)	<p>look for the examples anywhere in the answers to (i) and (ii) accept non-mammalian examples</p> <p><i>reflex action</i> suitable (mammalian) example; e.g. coughing due to irritation of pharynx lining / withdrawal of hand from hot object / pupil size / blinking / eardrum tightening to loud noise / knee jerk</p> <p>involuntary / no thought needed / (<i>if spinal reflex as example</i>) does not involve the brain / ref to nerve pathway (sensory + motor = minimum); innate / instinctive / genetic / non learned; short-lived response to a specific stimulus; stimulus always produces same response / A 'stereotyped'; protective / fast / rapid / quick;</p>	1
		2 max
	<p>(ii) <i>conditioned reflex</i> suitable (mammalian) example; e.g. Pavlov's dogs / described</p>	1
	<p>learning; ref to association of two stimuli / bell stimulates salivation / correct ref to conditioned stimulus and conditioned response; temporary / needs reinforcement; involuntary;</p>	2 max

Jan 2003:

- 1 The Russian physiologist, Ivan Pavlov, investigated conditioned learning by measuring the volume of saliva produced by dogs. The experiment, carried out in a controlled environment, consisted of 'puffing' meat powder into the dog's mouth through a tube and then measuring the dog's response.

Fig. 4.1 shows the apparatus he used.

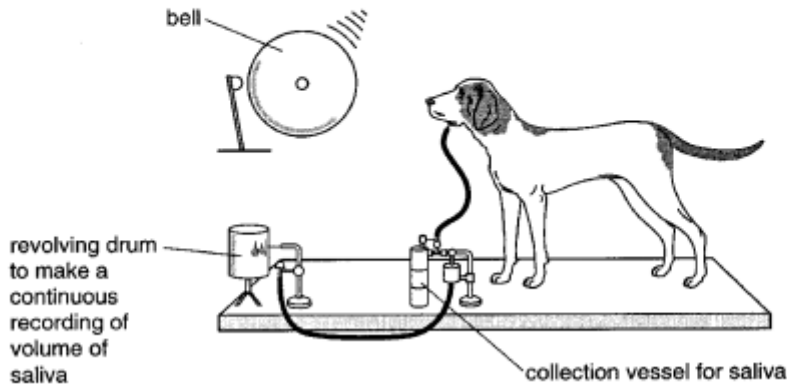


Fig. 4.1

- (a) In this question, one mark is available for the quality of written communication.

Describe and explain how the apparatus was used to demonstrate classical conditioning in dogs.

.....

.....

.....

.....

.....

.....

.....

.....

(8+1)

4 (a) A conditional throughout

- 1 dogs salivate to, other stimuli / e.g. of other stimulus ;
- 2 same time of day ;
- 3 dogs were hungry ;
- 4 dogs kept behind screen ;
- 5 could not see experimenter ;
- 6 used bell before conditioning to show no increase in salivation ;
- 7 before conditioning there is an unlearned reflex to salivate ;
- 8 unconditioned stimulus + qualification e.g. meat powder ;
- 9 unconditioned response + qualification e.g. salivation ;
- 10 use of bell described ; (= bell, before food)
- 11 conditioned stimulus + qualification ;
- 12 conditioned response + qualification e.g. salivation without meat powder ;
- 13 use of revolving drum explained ;
- 14 time between trials ;
- 15 several sessions / repeats ;
- 16 different dogs ;
- 17 AVP ; e.g. use of tube to collect saliva / correct ref to learning
- 18 AVP ;

max 8

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

June 2003:

5 (a) Suckling in young mammals is an example of innate behaviour.

Explain what is meant by *innate behaviour*.

.....

.....

.....[2]

Exam
Us

Question	Expected Answers	Marks
5 (a)	genetic ; A inherited / 'born with' R 'pre-set' / 'in built' not learnt ; instinctive ; reflex occurs when, lips are touched / milk is tasted or smelt ;	max 2

Jan 2004:

5 (a) Explain what is meant by *innate* behaviour.

.....

.....

.....

.....[2]

Fig. 5.1 shows an apparatus called a T-maze.

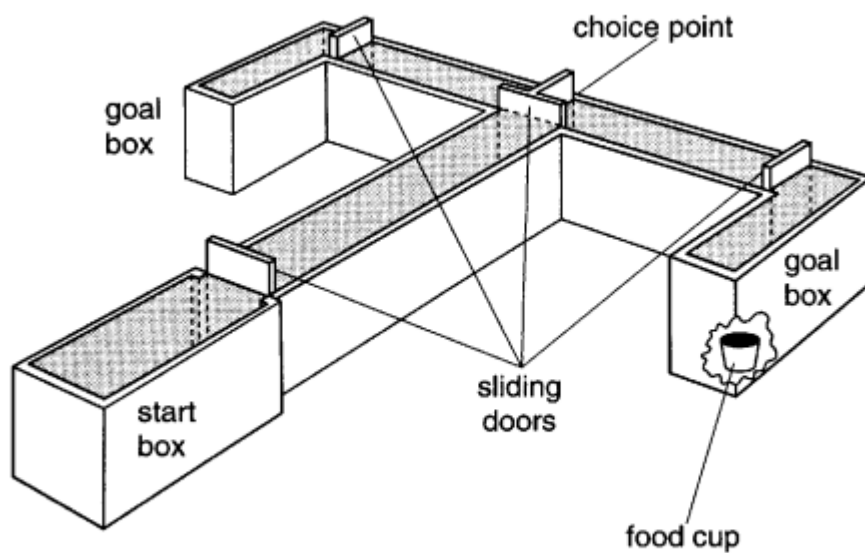


Fig. 5.1

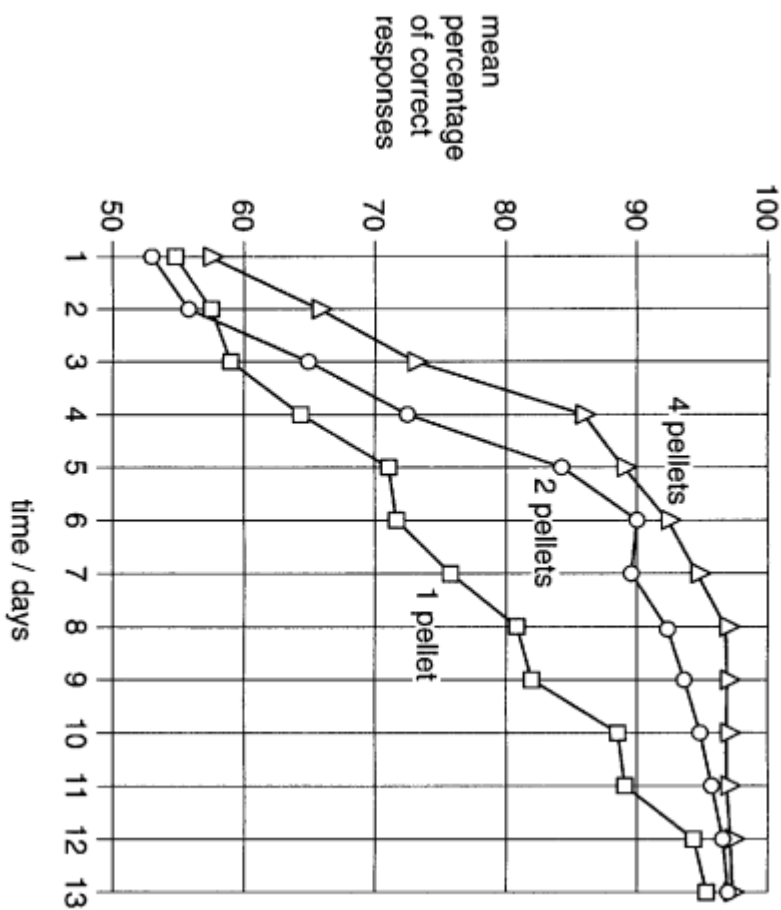


Fig. 5.2

A small mammal can be placed in the start box and then allowed to run to the choice point. At this point the animal has to decide between making a left or a right turn to enter one of the goal boxes. Food has been placed in one of the goal boxes. If the animal enters the goal box containing the food, this is recorded as a correct response. The sliding doors, which are operated by the experimenter, prevent the animal from retracing its path.

Two different series of experiments were performed using rats in a T-maze.

In the first experiment, thirty rats were divided into three groups of ten. The groups differed in the number of food pellets each rat received for the correct response.

Within each group, food for five of the rats was always placed in the right goal box and for the other five rats food was always placed in the left goal box. Each rat ran the maze several times a day for several days.

Fig. 5.2 on the insert shows the results of this experiment.

The second experiment was similar to the first except that when a rat produced a correct response it received one food pellet.

Rats in the first group received the pellet immediately.

Rats in the second group received it after five seconds and in the third group after 30 seconds.

Fig. 5.3 on the insert shows the results of this experiment.

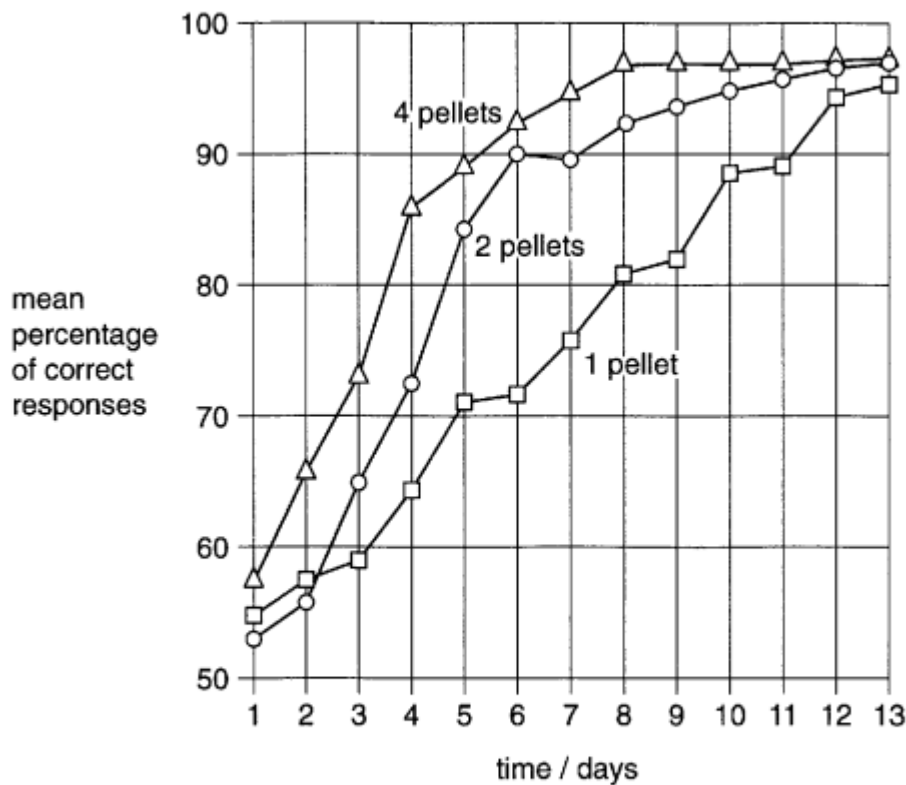


Fig. 5.2

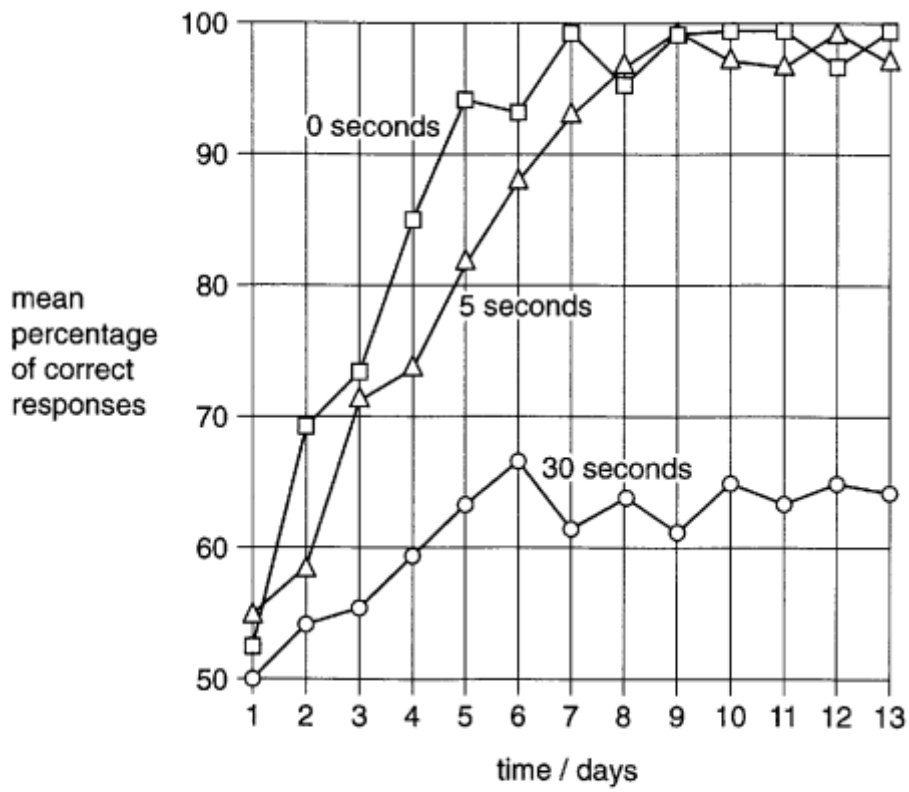


Fig. 5.3

(b) Explain how these experiments demonstrate operant conditioning.

.....
.....
.....
.....[2]

(c) Describe the effects of the number of pellets and the delay in receiving pellets on the learning ability of the rats. Use figures from the graphs to support your answer.

number of pellets.....

.....
.....
.....
.....
.....
.....

delay in receiving pellets

.....
.....
.....

(d) Several factors should be controlled in order to produce reliable results when these tests are carried out. Suggest **two** of these factors.

1

.....

2

.....[2]

(e) Explain why a statistical test must be applied to these data before any firm conclusions can be drawn.

.....

.....

.....

.....[2]

Question	Expected Answers	Marks
5 (a)	inherited / genetic / inborn; no, learning / practice needed; instinctive; (often) stereotyped / shown by all members of same species; R hard wired / pre-set / 'not taught'	max 2
(b)	trial and error; a chance (correct) response becomes more common / AW; rat <u>learns</u> to carry out a, behaviour / response; associated with a, <u>reward</u> / <u>food</u> ;	max 2
(c)	rats learn at faster rate if given more food; by day, 12 /13, all rats respond equally successfully (despite amount of food given); rats given one pellet learn more slowly; use of data for number of pellets; no difference between 0 and 5 second delay in receiving food; delaying food, by 30 seconds / 'long' time, slows learning; use of data for delay in receiving pellets;	max 5
(d)	controlled diet (outside of test runs); fasting of rats, before each trial / between trials; A 'hungry rats' <u>type</u> of food (as reward); age of rats; variety of rats; gender of rats; (environmental) temperature; (environmental) light intensity; environmental noise; random allocation of each rat to one of the groups; AVP; e.g. only use rats not previously tested in 'T -maze' use of a clean maze for each trial	max 2
(e)	idea of a random / chance correct response / 50% probability / chance of correct response; variation about mean; measure of significance;	max 2

[Total: 13]

(c) All newly born chimpanzees display the 'grip reflex' by holding onto an object with their hands.

The grip reflex is always made in the same way in response to the presence of any object near to the young chimp.

(i) Explain why the grip reflex is an example of an innate behaviour.

.....

.....

.....

.....

.....

.....[2]

(ii) Suggest **two** advantages of the grip reflex to the young chimps.

.....

.....

.....

.....

.....

.....[2]

(c) (i) performed by all chimps ;
 inherited / inborn / genetic ; *treat hard-wired as neutral*
ignore preset, inbuilt
 instinctive ;
 no, learning / practice / not modified by environment ;
ignore unlearned / not taught
 stereotyped / response is always the same ;

max 2

(ii) *look for two correct answers*

more likely to, grip onto / be carried, by parent / hold onto branch;
R refs to climbing
 avoid danger / AW ; *must be linked to first point*
 find food ;
 retain food ;
 AVP ; e.g. bonding (to parent)

max 2

2 Reflexes are automatic, stereotyped responses to stimuli that can also be conditioned.

(a) Explain the meaning of the terms

(i) *automatic*;

.....
.....[1]

(ii) *stereotyped*;

.....
.....[1]

(iii) *conditioned*.

.....
.....[1]

(b) Describe **one** example of a reflex response to a **named** stimulus.

stimulus

.....

response

.....

.....[1]

Fig. 2.1 shows a piece of apparatus called a puzzle box, used by Edward Thorndike to investigate operant conditioning in animals.

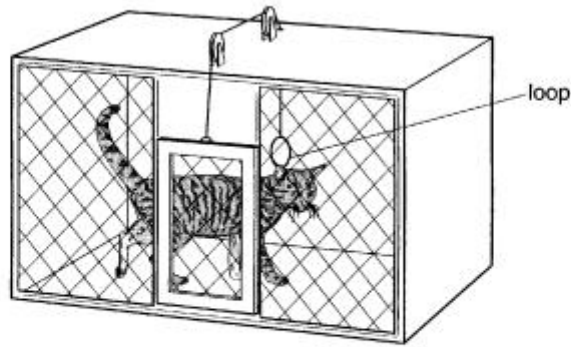
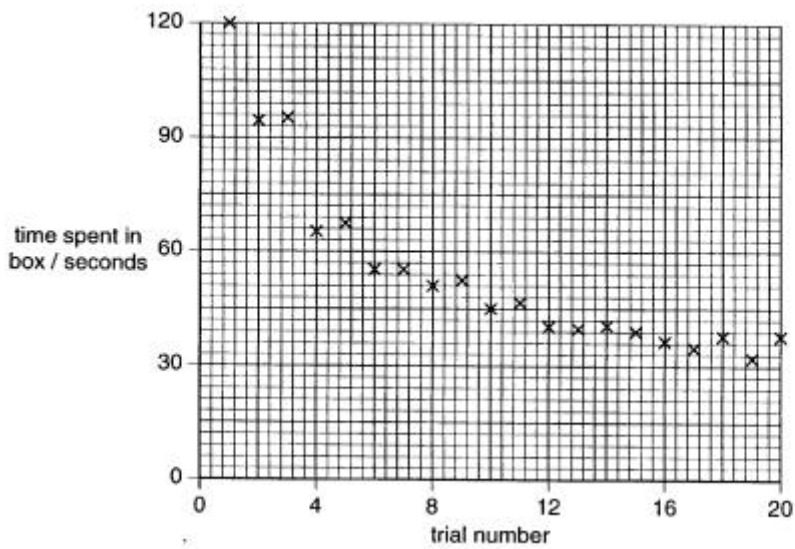


Fig. 2.1

During an experimental trial, a cat was placed inside the puzzle box. If the cat pulled the loop with its mouth or a paw, the door opened and it could escape. The time taken for the cat to escape was recorded. The experiment was then repeated several times with the same cat.

Fig. 2.2 shows a graph of the time taken for the cat to escape from the puzzle box during repeated trials.



(c) In this question, one mark is available for the quality of spelling, punctuation and grammar.

Describe **and** explain the data shown in Fig. 2.2.

Include in your answer a reason why the type of learning shown by the cat is operant conditioning.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(7+1)

(d) State **two** differences between operant conditioning and classical conditioning.

1

.....

.....

2

.....

.....

[2]

- 2 (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**

June 2005:

No questions ☹

Jan 2006:

2 Ten lambs, all nine months old, were placed in an enclosure. A scientist entered the enclosure carrying an umbrella which was opened and closed repeatedly in front of the lambs. The lambs' reaction was to back away nervously from the umbrella. It was noticed that as the activity continued, the behaviour of the lambs changed until they ignored the umbrella.

(a) (i) State the type of learning behaviour displayed by the lambs by the end of the experiment.

.....[1]

(ii) Suggest two advantages to the lambs of this change in their behaviour.

1

.....

2

.....[2]

(b) When a larger group of lambs was put in a field near to a busy road, the lambs tended to react nervously whenever a noisy vehicle drove by. Like the lambs in the previous investigation, they eventually ignored the unpleasant stimulus, in this case the traffic.

Once a day, the farmer drove to the field to fill up food containers with dried feedstuffs for the sheep. After two weeks, the lambs would run to the food containers as soon as the farmer's van approached the field, even though they could not see the vehicle.

Explain the learning process shown by the lambs in their response to the farmer's van.

.....
.....
.....
.....
.....

(4)

2 (a) (i) habituation / associative ; 1

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

(b) 1. hear sound of van / AW ;
2. sound is stimulus ;
3. ref to associate sound with food / AW ;
4. conditioned response ;
5. food acts as, reinforcer / reward ;
6. ref to association centre (in brain) ;
7. AVP ; 4 max

June 2007:

6 (a) Classical conditioning concerns learning by association and was discovered by the Russian scientist Ivan Pavlov, using dogs.

A study was carried out on a group of people to test classical conditioning.

- Each person was given a slight electric shock on the hand, which caused the arm to be jerked back.
- The procedure was carried out again but this time a red light was shone just before the electric shock was applied.
- This was repeated many times.
- Eventually, when presented with a red light, most people withdrew their arms even though a shock was not applied.

For **this** study state precisely:

- (i) the conditioned stimulus
(ii) the conditioned response [2]

(b) Operant conditioning was initially investigated by the scientist B.F. Skinner, using rats.

Explain briefly how a rat can learn to press a lever in its cage.

.....
.....
.....
.....
.....

[3]

Question	Expected Answers	Marks
6 (a)	(i) red light ;	1
	(ii) arm withdrawn (without a shock) ;	1
(b)	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

Jan 2008:

- (d) Mice on Gough Island in the South Atlantic are up to three times larger than mice of the same species on nearby islands. Gough Island is home to large populations of the Tristan albatross.

During the albatross breeding season many of the albatross chicks are attacked in the nest by the mice and are eaten alive as they cannot defend themselves while their parents are away feeding.

This species of mouse is not usually carnivorous and the mice on Gough Island are not displaying their innate behaviour.

Fig. 1.1 shows a mouse on Gough Island with the remains of a chick.



© Andrea Angel / Ross Wanless

Fig. 1.1

- (i) Explain why the carnivorous behaviour of the mice is thought **not** to be innate.

.....
.....
.....
..... [2]

- (ii) Suggest why the mice on Gough Island are up to three times larger than those on other islands.

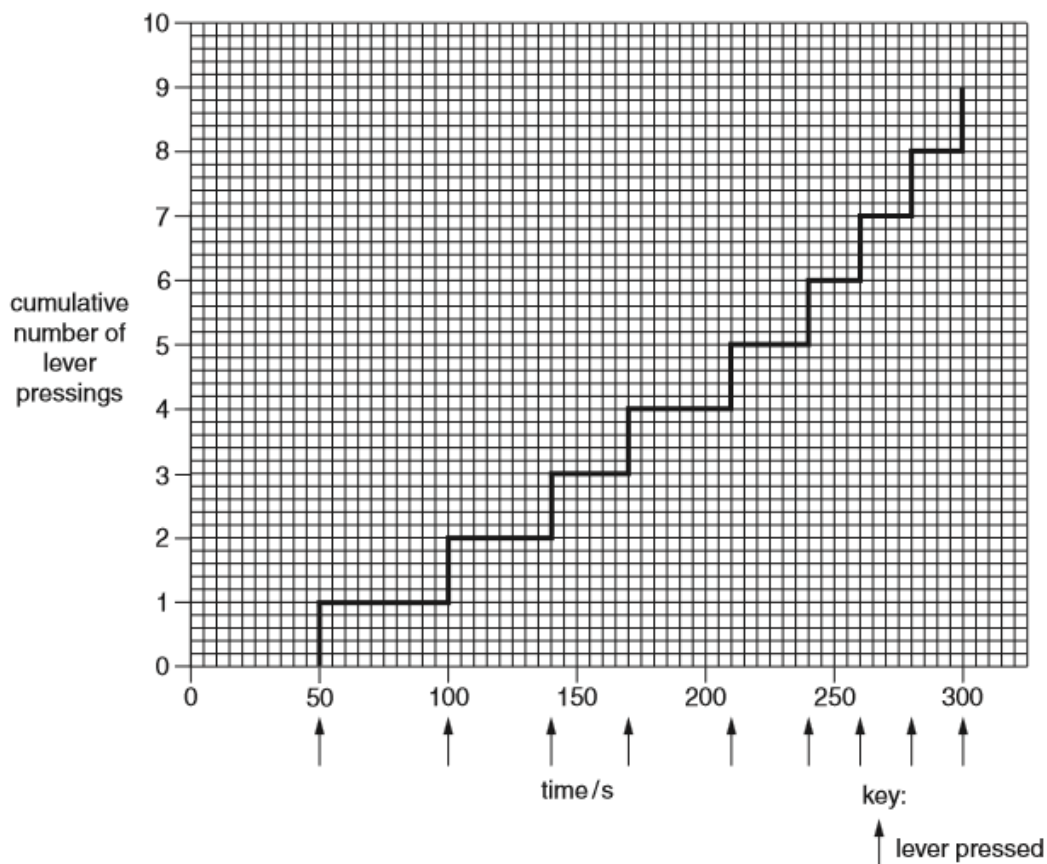
.....
.....
.....
..... [2]

- (d) (i) 1. not, inherited behaviour / genetic / instinctive ;
2. requires learning ;
3. behavior not shown by all members of the species / not stereotypic ;
4. adaptation to environment / AW ; **2 max**
- (ii) 1. eats, more / animal, protein / food ;
2. contains all essential amino acids / amino acids needed for (muscle) growth ;
3. easily digested / less fibre ;
4. gene mutation ; **2 max**

June 2008:

6 In an investigation on learning, a rat was placed in a cage equipped with a lever. The rat explored the cage and, by chance, pressed the lever. A food pellet was released which the rat ate.

Fig. 6.1 shows the times when the rat pressed the lever.



(a) (i) Describe **and** explain the results of the investigation.

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

[5]

(ii) Describe how you would carry out a control experiment for this investigation.

.....
.....
.....
..... [2]

(iii) Suggest the results you would expect from such a control experiment.

.....
..... [1]

(b) Learnt behaviour is stored in the areas of the cerebrum concerned with memory.

Calcineurin is an enzyme that limits the development of synapses between neurones in the cerebrum. Scientists have produced an inhibitor to calcineurin that leads to the formation of more synapses and better memory.

Suggest how the enzyme calcineurin may be inhibited.

.....
.....
.....
.....
.....
.....
.....
..... [4]

[Total: 12]

Question		Expected Answers	Marks
6	(a)	(i) <i>(description)</i> 1 time between lever pressings decreased / AW ; 2 comparative figs ; <i>(explanation)</i> 3 rat was hungry ; 4 operant conditioning ; 5 trial and error learning ; 6 associative learning ; 7 lever pressing produces reward ; 8 reinforcement ;	5 max
		(ii) same apparatus or rat of same, species / age / gender or conditions kept the same ; no food / no reward ;	2
		(iii) time between lever pressings, random / no pattern ;	1
	(b)	1 temporary / permanent / reversible / irreversible ; <i>(competitive)</i> 2 shape, similar to substrate / complementary to active site ; 3 blocks / binds to, active site / AW ; <i>(non-competitive)</i> 4 shape different from substrate ; 5 fits, allosteric site / different part of enzyme ; 6 changes shape of / alters, active site ; 7 fewer, enzyme substrate complexes / ESCs ; 8 reduces rate of reaction / less product formed ;	4 max
			[Total: 12]

Jan 2009:

6 (a) Wolfgang Köhler studied learning in chimpanzees, over 80 years ago.

Fig. 6.1 and Fig. 6.2 are drawings based upon photographs taken by Köhler.

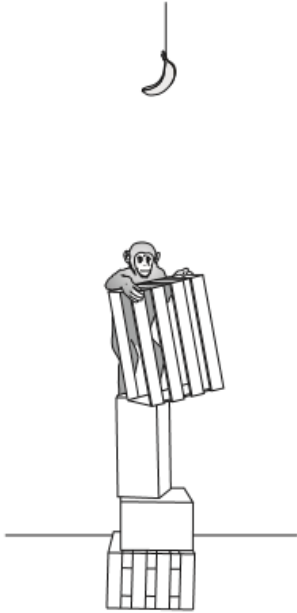


Fig. 6.1

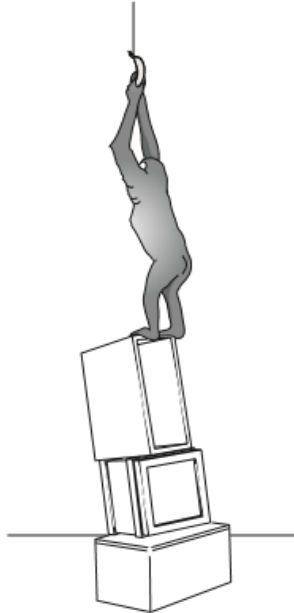


Fig. 6.2

Describe **and** explain the learning processes taking place in Fig. 6.1 and Fig. 6.2.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

[4]

(b) Describe what is meant by a reflex action **and** explain why reflexes are advantageous.

.....
.....
.....
.....
.....
.....
.....
.....
..... [4]

(c) Listed below are three situations. For each situation, state whether **classical conditioning** or **operant conditioning** has taken place **and** explain why you have made your choice.

(i) A dog jumps onto furniture, but never does this when its owner is present.
.....
..... [1]

(ii) After surviving a serious car accident, a woman's pulse rate increases whenever she hears screeching brakes.
.....
..... [1]

(iii) Sheep run to an empty food container when they hear a tractor engine.
.....
..... [1]

Question		Expected Answers	Marks
6	(a)	1 chimp stacks crates ; 2 uses same activity to reach bananas ; 3 problem solving ; 4 insight learning ; 5 use, previously learnt behaviour / experience ; 6 in novel situation / AW ; 7 trial and error ;	4 max
	(b)	1 rapid / immediate ; 2 automatic response / conscious thought not required / does not involve brain ; 3 innate / stereotypical / inborn / genetic ; 4 can be conditioned ; 5 not learned ; 6 involves fewer neurones than usual pathways / only 3 neurones used / 3 named neurones ; 7 response to, life threatening stimuli / potential damage or good survival value ;	4 max
	(c)	(i) operant – (negative / positive) reinforcement idea ; <i>A training</i>	1
		(ii) classical – associates brakes with crash ;	1
		(iii) operant – positive reinforcement idea ;	1
			[Total:11]

Jan 2010:

6 (a) The passage below outlines operant conditioning.

Use words in the box to complete the passage.

negative	positive	immediate	delayed	good
reward	bad	association	random	stimuli
visual	opposition	punishment	activities	

Operant conditioning forms an between a behaviour and a consequence, whereas classical conditioning links two different types of Consequences have to be for operant conditioning to work with animals. If the consequence is a, then the frequency of the behaviour will increase. This is called reinforcement. Also, reinforcement can be used to stop a behaviour by either using a or by removing something good. [7]

(b) Table 6.1 lists acts of behaviour that are carried out by mammals. For each act of behaviour, write down in the table the **type** of behaviour displayed by the mammal.

act of behaviour	type of behaviour
a dolphin is trained to perform a trick by being rewarded with a fish
a puppy searches for its mother's teat
a cat's foreleg jerks back when its paw touches a hot radiator
whenever the toilet flushes in a house the shower becomes very hot and the person jumps back; eventually the sound of the toilet flushing causes the person to jump back

[4]

(c) Wolfgang Köhler investigated the behaviour of chimpanzees.

Describe briefly his **conclusions** on the ways in which chimpanzees learn to solve problems.

.....

.....

.....

.....

.....

.....

.....

..... [3]

[Total: 14]

Question	Expected Answers	Marks										
6 (a)	association ; stimuli ; immediate ; reward ; positive ; negative ; punishment ;	7										
(b)	<table border="0"> <tr> <td><i>act of behaviour</i></td> <td><i>type of behaviour</i></td> </tr> <tr> <td>a dolphin is trained to perform a trick by being rewarded with a fish</td> <td>operant conditioning ;</td> </tr> <tr> <td>a puppy searches for its mother's teat</td> <td>innate / instinctive / stereotypic / not learned ;</td> </tr> <tr> <td>a cat's foreleg jerks back when its paw touches a hot radiator</td> <td>(spinal) reflex ;</td> </tr> <tr> <td>whenever the toilet flushes in a house the shower becomes very hot and the person jumps back; eventually the sound of the toilet flushing causes the person to jump back</td> <td>classical conditioning / conditioned reflex ;</td> </tr> </table>	<i>act of behaviour</i>	<i>type of behaviour</i>	a dolphin is trained to perform a trick by being rewarded with a fish	operant conditioning ;	a puppy searches for its mother's teat	innate / instinctive / stereotypic / not learned ;	a cat's foreleg jerks back when its paw touches a hot radiator	(spinal) reflex ;	whenever the toilet flushes in a house the shower becomes very hot and the person jumps back; eventually the sound of the toilet flushing causes the person to jump back	classical conditioning / conditioned reflex ;	4
<i>act of behaviour</i>	<i>type of behaviour</i>											
a dolphin is trained to perform a trick by being rewarded with a fish	operant conditioning ;											
a puppy searches for its mother's teat	innate / instinctive / stereotypic / not learned ;											
a cat's foreleg jerks back when its paw touches a hot radiator	(spinal) reflex ;											
whenever the toilet flushes in a house the shower becomes very hot and the person jumps back; eventually the sound of the toilet flushing causes the person to jump back	classical conditioning / conditioned reflex ;											
(c)	<table border="0"> <tr> <td>1</td> <td>ref. insight learning ;</td> </tr> <tr> <td>2</td> <td>use actions learned in unconnected situations / exploratory learning / AW, (to solve problems) ;</td> </tr> <tr> <td>3</td> <td>detail of activity ; e.g. stacking boxes</td> </tr> <tr> <td>4</td> <td>ref. planning ;</td> </tr> <tr> <td>5</td> <td>AVP ; e.g. higher form of learning / trial and error</td> </tr> </table>	1	ref. insight learning ;	2	use actions learned in unconnected situations / exploratory learning / AW, (to solve problems) ;	3	detail of activity ; e.g. stacking boxes	4	ref. planning ;	5	AVP ; e.g. higher form of learning / trial and error	3 max
1	ref. insight learning ;											
2	use actions learned in unconnected situations / exploratory learning / AW, (to solve problems) ;											
3	detail of activity ; e.g. stacking boxes											
4	ref. planning ;											
5	AVP ; e.g. higher form of learning / trial and error											
[Total:14]												

June 2010:

11

5 (a) Reflex actions form an important part of a mammal's behaviour.

All newly born chimpanzees display the 'grip reflex' by holding onto an object with their hands.

The grip reflex is always made in the same way in response to the presence of any object near to the young chimp.

(i) Explain why the grip reflex is an example of an innate behaviour.

.....
.....
.....
.....
..... [2]

(ii) Suggest **two** advantages of the grip reflex to the young chimps.

.....
.....
.....
..... [2]

(b) Fig. 5.1 shows a piece of apparatus called a puzzle box, used by Edward Thorndike to investigate operant conditioning in animals.

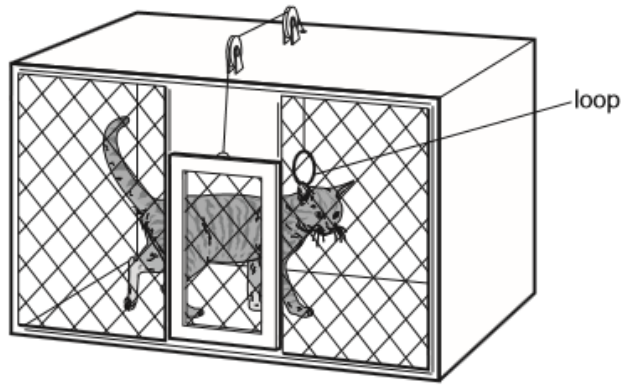


Fig. 5.1

During an experimental trial, a cat was placed inside the puzzle box. If the cat pulled the loop with its mouth or a paw, the door opened and it could escape. The time taken for the cat to escape was recorded. The experiment was then repeated several times with the same cat.

Fig. 5.2 shows a graph of the time taken for the cat to escape from the puzzle box during repeated trials.

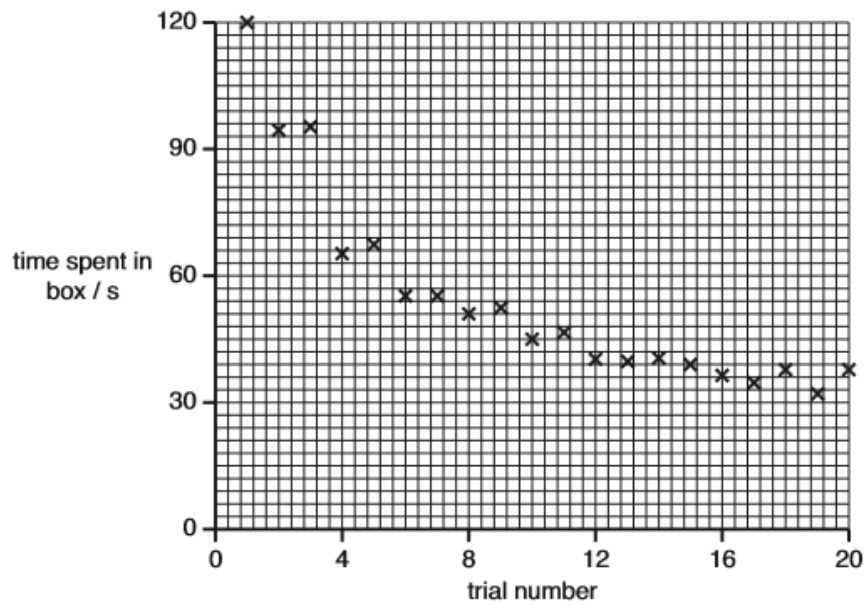


Fig. 5.2

(ii) operant conditioning

.....

.....

.....

.....

.....

.....

..... **[3]**

(iii) social behaviour in primates and its importance.

.....

.....

.....

.....

.....

.....

..... **[3]**

6	(b)	(i)	stimulus identified ; organism named and normal response described ; response , stops / lessens , after repeated stimulation / over time ;	1 3	eg • touch eg • sea anemone withdrawing tentacles 'learning to ignore' is not quite enough
		(ii)	organism named and voluntary behaviour described ; reinforcer / reward / punishment , identified ; behaviour , increases (for reward) / decreases (for punishment) , in frequency ;	3	eg • dog begging eg • food reward / treat

6	(b)	(iii)	primate species identified ; behaviour described ; purpose / importance , stated ;	3	Marks can be awarded in general context of social interaction instead of a specific piece of behaviour described. CREDIT English names eg chimpanzee, gorilla, orang-utan, (named) monkey, lemur or ape IGNORE humans eg • include dominance hierarchy interactions (play, aggressive, affiliative) • allogrooming • communication behaviours (vocal, facial, postural) • passing on of , cultural / tool-using, knowledge • idea of prolonged / frequent , mother-infant interactions CREDIT answers relating to benefit to group or to individual eg • with respect to access to food, resources or mates eg • reducing , disease / parasites
---	-----	-------	--	---	--

2 Animals behave in ways that enhance their survival and reproductive capacity. This behaviour may be innate or learned.

(a) Describe what is meant by:

(i) innate behaviour

.....
.....
.....
.....
.....
..... [2]

(ii) learned behaviour.

.....
.....
.....
.....
.....
..... [2]

(b) Describe the advantages to animals of innate **and** learned behaviour, with reference to specific examples of each type of behaviour.



Your answer should include both types of behaviour and make clear the advantages to the animals of your chosen examples.

.....
.....
.....
.....
.....
.....
.....
.....
.....

Question			Expected Answers	Marks	Additional Guidance
2	(a)	(i)	<p>1 <u>instinctive</u> ;</p> <p>2 genetic / genetically determined / inherited ;</p> <p>3 rigid / fixed pattern / inflexible ;</p> <p>4 <u>stereotyped</u> / <u>stereotypical</u> ;</p> <p>5 automatic / does not require thought / does not require learning ;</p>	2 max	<p>2 IGNORE born with it / present from birth</p> <p>3 ACCEPT description. <u>Same</u> in all members of species or performed the <u>same</u> all the time</p>
2	(a)	(ii)	<p>1 (behaviour) <u>changed</u> / <u>altered</u> / <u>learnt</u> , by experience ;</p> <p>2 ref. memory / association / reinforcement / practice ;</p> <p>3 variable ;</p>	2 max	<p>1 ACCEPT taught by parents / learnt by watching others 'due to experience' is not enough. They need to refer to past experience.</p> <p>3 ACCEPT description. Varies or is different in different members of a species or in one animal at different times</p>

Question	Expected Answers	Marks	Additional Guidance
2 (b)	<p><i>general innate behaviour advantages</i></p> <p>A1 rapid / automatic / correct , behaviour / response ; A2 idea that simple nervous system is enough ; A3 suits species with , short lifespan / no parental care / solitary lifestyle ;</p> <p><i>innate behaviour examples with specific advantages</i></p> <p>E1 an escape reflex described in a named animal ; E2 advantage of this escape reflex explained ;</p> <p>E3 a taxis described in a named animal ; E4 advantage of this taxis explained ;</p> <p>E5 a kinesis described in a named animal ; E6 advantage of this kinesis explained ;</p> <p style="text-align: right;"><i>continued</i></p>		<p>Note - The question relates to animal behaviour that is, in broad terms, advantageous for survival.</p> <p>A marks can be awarded in the context of an example</p> <p>E marks the name of the type of behaviour is not needed.</p> <p>Odd E numbers require the animal to be identified and the behaviour described.</p> <p>Even E numbers require an explanation of how the behaviour is advantageous e.g. to keep the animal in a suitable environment / to avoid predation or damage / to find food or a mate. Can be awarded even if corresponding odd E number has not been awarded.</p> <p>E3 ACCEPT motile protocist e.g. <i>Euglena</i> / <i>Paramecium</i></p> <p style="text-align: right;"><i>continued</i></p>

Question	Expected Answers	Marks	Additional Guidance
2 (b)	<p><i>continued</i></p> <p><i>general learned behaviour advantages</i></p> <p>A4 flexible / adaptable to , change / environment ;</p> <p><i>learned behaviour examples with specific advantages</i></p> <p>E7 habituation described in a named animal ; E8 advantage of this habituation explained ;</p> <p>E9 imprinting described in a named animal ; E10 advantage of this imprinting explained ;</p> <p>E11 conditioning described in a named animal ; E12 advantage of this conditioning explained ;</p> <p>E13 latent learning described in a named animal ; E14 advantage of this latent learning explained ;</p> <p>E15 insight learning described in a named animal ; E16 advantage of this insight learning explained ;</p> <p>QWC – relating types of behaviour to advantages ;</p>	<p style="text-align: center;">10 max</p> <p style="text-align: center;">1</p>	<p>A mark can be awarded in the context of an example</p> <p>E marks the name of the type of behaviour is not needed.</p> <p>Odd E numbers require the animal to be identified and the behaviour described.</p> <p>Even E numbers require an explanation of how the behaviour is advantageous e.g. to conserve energy (habituation) / access care (imprinting) / access food / safety or other reward or survival need</p> <p>E11 ACCEPT description of Pavlov's dogs for conditioning E12 IGNORE ref. to Pavlov's dogs</p> <p>QWC = any description mp (odd E) PLUS any advantage mp (even E or A) from both sections</p>
		15	

Jan 2012:

No questions

June 2012:

(d) Breeders of Colourpoint Persian cats are advised to be present at the birth of the kittens. In this breed, the mother cat may not perform essential maternal behaviour such as licking the newborn kitten to free it from its amniotic sac (the membrane surrounding it at birth).

Wildcat mothers, even when they are first-time mothers, perform this behaviour naturally.

(i) State the type of behaviour shown by these wildcat mothers.

Give **one** characteristic of this type of behaviour.

type of behaviour

characteristic

..... **[2]**

	(d)	(i)	<i>type of behaviour</i> innate / instinct(ive) / reflex ; <i>characteristic</i> automatic ; stereotyped / always performed in the same way ; no previous experience necessary / not learned ; genetic(ally programmed) / AW ;	1 max 1	FA for each prompt line IGNORE maternal (as given in question) IGNORE instinctive in characteristic section ACCEPT same in all members of the species ACCEPT unlearned, not taught ACCEPT inherited
--	-----	-----	--	------------------------	--

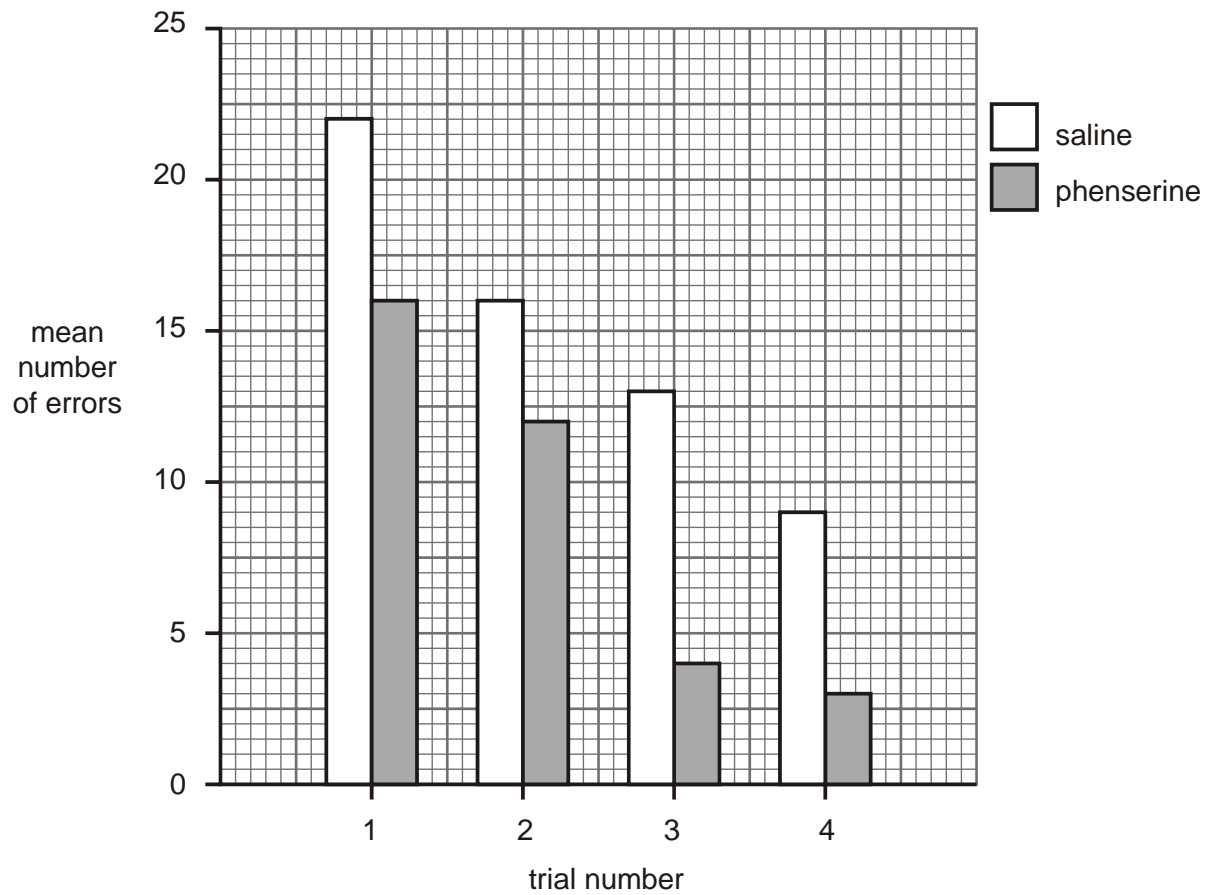
Other questions:

1. One form of treatment for people with Alzheimer’s disease is to use drugs that act on acetylcholinesterase.

A study using one of these drugs, phenserine, was carried out on elderly rats.

- Ten rats were given injections of saline and another ten were given injections of phenserine.
- Each rat was placed in a maze and the entrance was shut.
- Each rat was allowed to find its way to the exit.
- The number of errors made was recorded.
- The experiment was repeated a further three times with each rat.

The results of the experiment are shown in the following figure.



(i) Explain why some rats were given an injection of saline.

.....

.....

[1]

(ii) Describe the results shown in the figure above.

.....

.....

.....

.....

[2]

(iii) Explain briefly the type of learning taking place.

.....

.....

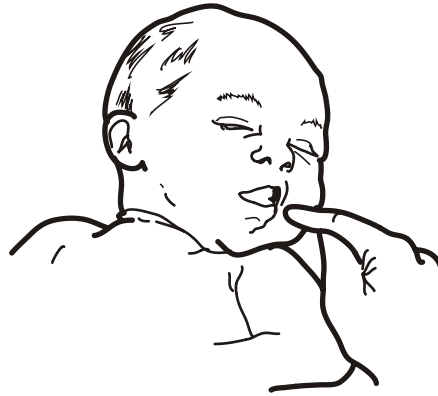
.....

.....

.....

.....

- 2. If the cheek of a newborn baby is brushed with a finger, as shown in the figure below, the baby will turn its head towards the finger.



Describe the type of behaviour shown by the baby and suggest an advantage of this response.

.....

.....

.....

.....

.....

.....

.....

.....

.....

[Total 4 marks]

- 4. Operant conditioning was initially investigated by the scientist B.F. Skinner, using rats. Explain briefly how a rat can learn to press a lever in its cage.

.....

.....

.....

.....

.....

.....

[Total: 3 marks]

5. Ten lambs, nine months old, were placed in an enclosure. A scientist entered the enclosure carrying an umbrella which was opened and closed repeatedly in front of the lambs. The lambs' reaction was to back away nervously from the umbrella. It was noticed that as the activity continued, the behaviour of the lambs changed until they ignored the umbrella.

(i) State the type of learning behaviour displayed by the lambs at the end of the experiment.

.....

[1]

(ii) Suggest **two** advantages to the lambs of this change in their behaviour.

.....
.....
.....
.....

[2]

[Total 3 marks]

7. Fig. 1 shows an apparatus called a double-choice learning box with sound-proofed walls and doors.

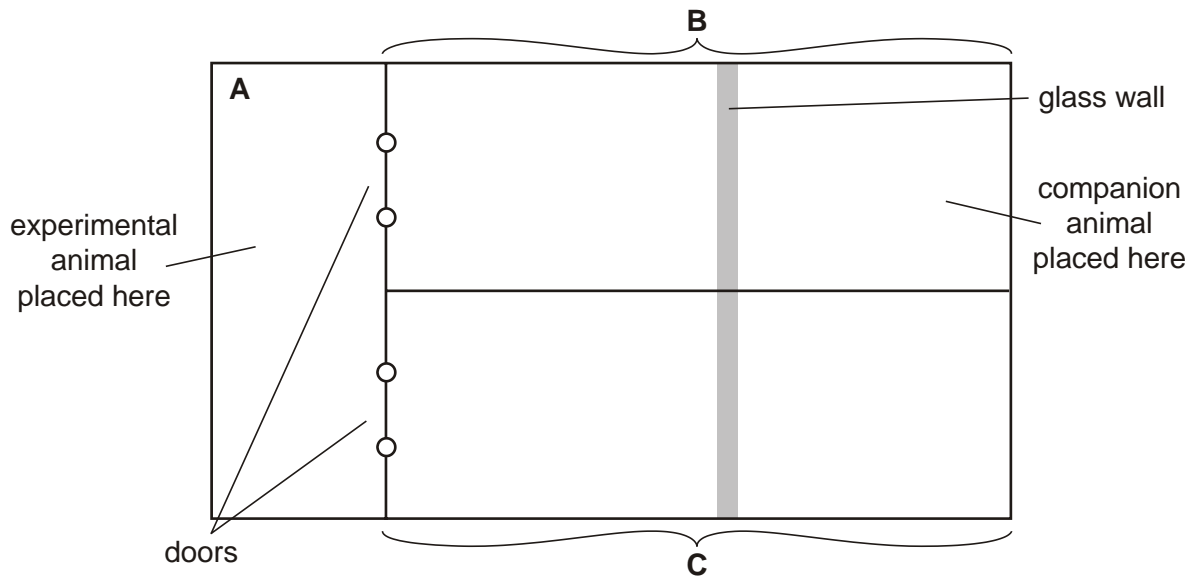


Fig. 1

- Two young mice were kept in separate, identical home cages and were accustomed to being handled.
- One mouse was used as the experimental subject and the other acted as a companion.
- The companion mouse was placed in chamber **B** behind a glass wall.
- Chamber **C** was left empty.
- The experimental mouse was placed in chamber **A** and the stop clock was started.
- The time taken for the experimental mouse to enter chamber **B** or **C** was noted.
- The experimental mouse was allowed to explore chamber **B** or **C** for 10 seconds and was then removed.
- The experiment was repeated a further 14 times with the same two mice.

Fig. 2 shows the results of this experiment.

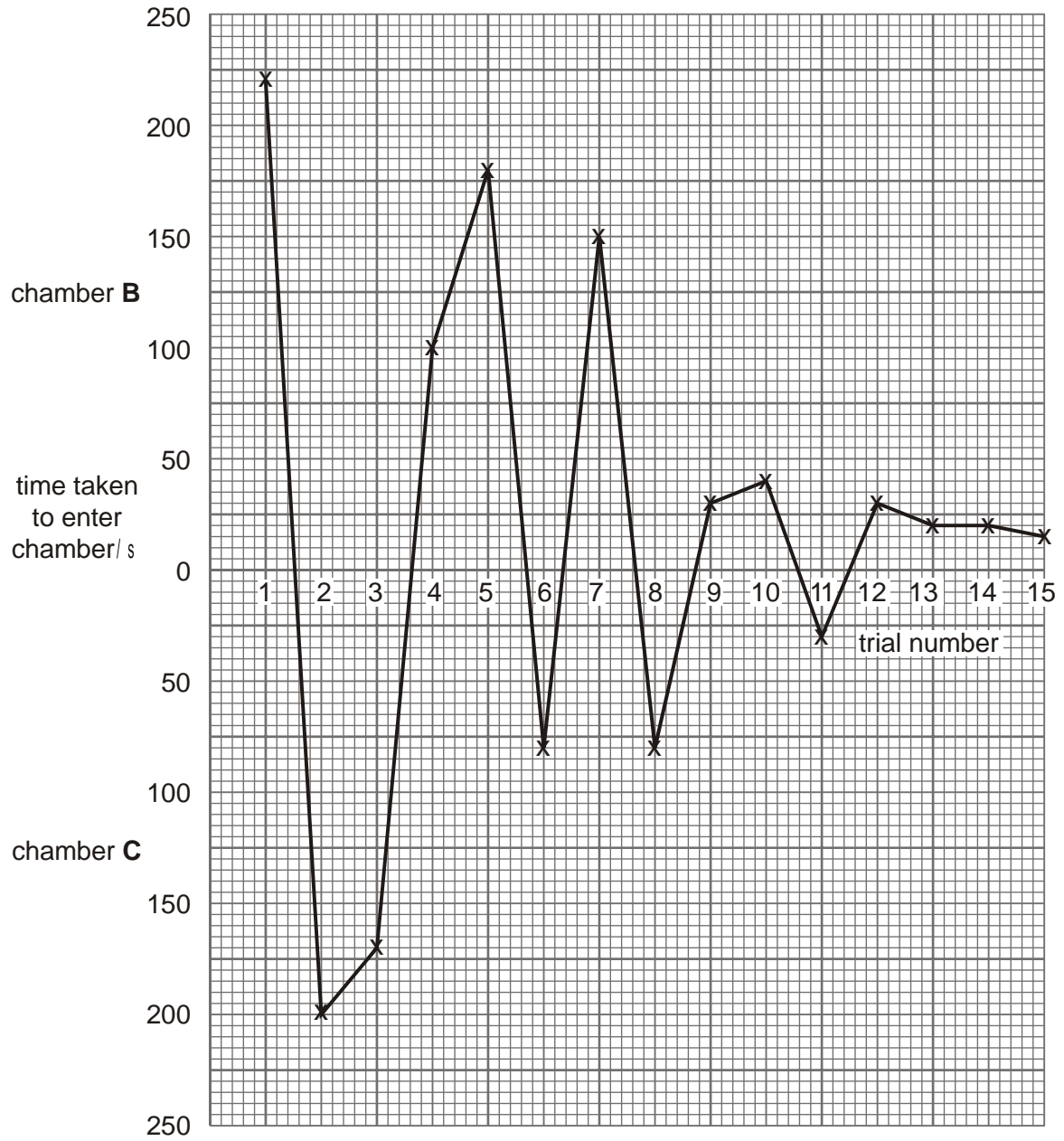


Fig. 2

(i) Using information in Fig. 2, describe the results of this investigation.

.....
.....
.....
.....

[2]

(ii) Describe how you would carry out a control experiment for this investigation.

.....
.....
.....
.....
.....

[3]

(iii) Suggest the results you would expect from such a control experiment.

.....
.....
.....

[1]

- 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

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]

- 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
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

[3]

[9]