

Candidate Number:

The Institute of Animal Technology



MEMBERSHIP EXAMINATION 2001

Section A - ANIMAL TECHNOLOGY

Morning, Tuesday 12th June

(TOTAL TIME: 3 HOURS)

Part I

Short Answer Questions

(One third of the total marks)

Part II

Long Answer Questions

(Two thirds of the total marks)

Write your candidate number at the top of this cover

Read the instructions for each part carefully

Part I

Attempt ALL Questions

You are advised to spend one hour on this part

Write your answers in the spaces provided

Numbers in brackets indicate the marks available for each question

***Hand in this book, together with your answers for Part II,
at the end of the examination***

Attempt ALL parts

1. List **five** essential features of an automated incubator for hatching domestic fowl.

i)

ii)

iii)

iv)

v)

(2½)

2. State **two** factors that influence the onset of egg laying in a flock of pullets.

i)

ii)

(1)

3. What are the main objectives of euthanasia?

.....

.....

.....

(3)

4. List **ten** factors which might influence your choice of method for carrying out euthanasia in laboratory animals.

- i)vi)
- ii)vii).....
- iii)viii).....
- iv)ix)
- v)x)

(5)

Questions 5-8 relate to the Animals (Scientific Procedures) Act 1986

5. Complete the following table as indicated by (*) of euthanasia methods listed in Schedule1:

Method	Animal for which Appropriate	Weight of animal
Overdose of anaesthetic	*	No limit
Exposure to carbon dioxide gas	Rodents, rabbits and birds	*
Dislocation of the neck	Rodents	*
	*	Up to 1 kg
	Birds	*
Concussion of the brain	*	Up to 1 kg
	Rabbits	*
	*	Up to 250g
	Amphibians and reptiles(with destruction of the brain)	*
Decapitation of foetal, larval and embryonic forms	*	Up to 50g

(5)

6. How does the Act define the following terms?

Regulated procedure.....
.....
.....
(3)

Protected animal.....
.....
.....
(2)

Immature form.....
.....
.....
(3)

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

7. What do the following codes signify in a personal licence?

(a) AA
.....
(1)

(b) AB
.....
(1)

(c) AC
.....
(1)

(d) AD
.....
(1)

8. A Named Animal Care and Welfare Officer (NACWO) has correctly determined that the following procedures are **not regulated**. In each case give the reason why the NACWO has reached that conclusion.

(a) Administration of an anthelmintic to a group of cats.

.....
.....
(1)

(b) Removal of the liver from a dead rat for homogenate preparation.

.....
.....
(1)

(c) Subcutaneous implantation of a micro chip in a mouse.

.....
.....
(1)

(d) Trialling a 'new recipe' diet in a group of dogs.

.....
.....
(1)

9. What are the main differences between the following features of an Isolation Unit and of a Specified Pathogen Free Unit?

(a) Ventilation system

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

(b) Staff entry to and exit from the unit

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

(2)

(c) Disposal of waste materials

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

(1)

10. List **ten** areas of work in the animal facility which are covered by Good Laboratory Practice Regulations.

i).....
ii).....
iii).....
iv).....
v).....
vi).....
vii).....
viii).....
ix).....
x).....

(5)

11. Give **two** advantages and **two** disadvantages for each method of administering substances to animals, as listed below:

Dose route	Advantages	Disadvantages
By gavage		
Inhalation		
Intraperitoneal		
Subcutaneous		
Intramuscular		
Intravenous		

12. Complete the following table.

Species	Age at first mating	Average litter size weaned	Length of oestrous cycle	Gestation period	Weaning age
Guinea pig					
Syrian hamster					
Mouse					
Rabbit					
Ferret					
Chinese hamster					
Mongolian gerbil					

(17½)

13. Give **eight** factors to be considered in the selection of rodent breeding stock.

- i).....
- ii).....
- iii).....
- iv).....
- v).....
- vi).....
- vii).....
- viii).....

(4)

14. Give **two** reasons why antibiotics are sometimes routinely added to diets.

i).....

ii).....

(1)

Give **two** reasons why this may not be a good practice.

i).....

ii).....

(1)

15. State **two** disadvantages of feeding cats with a proprietary canned complete catfood when compared with a proprietary dry diet.

i).....

ii).....

(1)

16. What is the principal constituent of dietary fibre?

.....

(½)

What is the function of fibre in the diet of;

(a) a dog?

.....

(1)

(b) a rabbit?

.....

(1)

17. Primates are usually offered fresh fruit and vegetables as a part of the diet in addition to a compound pelleted diet. Give **two** reasons for this practice.

i).....
.....

ii).....
.....

(1)

18. Suggest **three** methods of providing fluid to laboratory rodents during transport.

i).....

ii).....

iii).....

(1½)

19. List **five** factors which might influence the type of container selected for transporting laboratory animals.

i).....

ii).....

iii).....

iv).....

v).....

(2½)

20. Give **two** main ways that the mammalian body defends itself against infection.

i).....

ii).....

(1)

21. Give **three** signs that would indicate to you that an animal has an external parasitic infestation.

i).....

ii).....

iii).....

(3)

22. List **six** factors which may lead to non-infectious disease in laboratory animals.

i).....

ii).....

iii).....

iv).....

v).....

vi).....

(3)

23. Define the term 'aseptic technique' in relation to surgical procedures.

.....

.....

.....

(3)

24. Describe **one** method (**different in each case**) by which the following may be prepared and/or presented in an acceptable form for use in aseptic procedures.

(a) a surgical procedures room and its fittings (i.e. tables, trolleys etc.)

.....
.....
.....
.....
.....
(3)

(b) surgical gloves for use by personnel performing procedures
.....
.....
(1½)

(c) surgical instruments
.....
.....
.....
.....
(3)

25. List **three** chemical groups of disinfectants most commonly used within the animal facility.
i).....
ii).....
iii).....
(1½)

26. List **six** factors which may affect the efficiency of a disinfectant.
i).....
ii).....

- iii).....
 - iv).....
 - v).....
 - vi).....
- (3)**

27. List **three** different methods of monitoring the efficiency of an autoclave.

- i).....
 - ii).....
 - iii).....
- (1½)**

28. What is the standard dose of gamma-irradiation used to sterilize material entering a SPF unit?

-
- (½)**

29. Which **three** characteristics of the irradiation process determine the dose received?

- i).....
 - ii).....
 - iii).....
- (3)**

30. State **four** aims of general anaesthesia.

- i).....
- ii).....
- iii).....

iv).....
(2)

31. List **three** methods by which depth of anaesthesia of an animal can be assessed. For each method suggest an appropriate species.

i).....
ii).....
iii).....
(3)

32. The integrity of a SPF unit barrier has been compromised. Suggest **five** possible reasons for this occurrence.

i).....
ii).....
iii).....
iv).....
v).....
(2½)

33. List **five** samples you would send for routine microbiological testing from a SPF unit.

i).....
ii).....

iii).....

iv).....

v).....

(2½)

End of Part I

Part II

Attempt FOUR Questions from six

This part should take approximately two hours to complete

Equal marks are available for each question

***The approximate percentage of marks available
for each section of the question is indicated***

Start each new answer on a fresh sheet of paper

***Write your candidate number in the top right hand corner and the
question number in the top left hand corner of every answer sheet***

Credit will be given for diagrams which make your answer clearer

***You must hand in all answer sheets together with this book
at the end of the examination***

Please turn over →

Attempt FOUR questions

1. (a) Discuss the important features of a post-operative recovery area. **50%**
(b) What clinical signs might an animal exhibit that indicate to you that recovery during the post-operative period is not progressing smoothly? **30%**
(c) What provisions should be in place to ensure an animal's welfare in the event of problems with post-operative recovery arising? **20%**

2. Describe the process for the introduction of mice to a SPF unit by hysterectomy technique with reference to the following:
 - (a) Timed matings **25%**
 - (b) Hysterectomy **50%**
 - (c) Fostering **10%**
 - (d) Record keeping **10%**
 - (e) Legal constraints **5%**

3. 'We control the environment of the laboratory animal in order to meet the physiological and psychological needs of the animal, to limit experimental variation and to comply with animal welfare legislation'.

Explain the implications of this statement. **100%**

4. A diet designed for laboratory rodents has the composition shown in the table below.

Component	Quantity in diet (g/kg)	Protein content of component (%)
Ground barley	200	12
Ground oats	200	14
Ground wheat	300	15
Soybean meal	100	32
White fish meal	100	65
Dried skimmed milk	90	40
Supplement	10	nil

- (a) From these figures, calculate the percentage of protein in the diet. **30%**
- (b) Assuming that the protein provides 17kJ of energy per gram, calculate the percentage of energy provided by the protein, if the total energy content of the diet is 15MJ per kilogram. **10%**
- (c) What is the difference between high-quality and low-quality protein? **10%**
- (d) What would be the effect of feeding a diet that contained protein in an adequate amount, but of poor quality? **30%**
- (e) Apart from protein, what other nutrients are provided by the cereal components of this diet? **10%**
- (f) What should be included in the supplement? **10%**

Please turn over →

5. You are required to care for a group of calves.

- (a) Discuss what physical checks should be made on each calf that is being selected for growing on, identifying the areas to be specifically inspected and giving examples of what problems may be identified. **35%**
- (b) Describe the routine care of the calves for the first month of life. **25%**
- (c) Explain the routine husbandry techniques applied during this period, stating the constraints on who may carry these out. **40%**
- 6.** (a) What does a personal licence, granted under the Animals (Scientific Procedures) Act 1986, qualify the holder to do? **10%**
- (b) A personal licensee may seek permission to use unlicensed assistants to perform regulated procedures that do not require technical knowledge or special skills. Give **three** examples of procedures to be carried out in conscious animals that can be delegated in this way and explain how the permission to delegate is given. **20%**
- (c) Describe the responsibilities of the personal licence holder that have a direct influence on animal welfare. **70%**

End of Part II