

# **AMTRA MARKETING AUTHORISATION HOLDERS REPRESENTATIVES TRAINING MANUAL**

## **Introduction and specimen papers**

### **Introduction**

Animal medicines are vital for the care of domestic animals, whether on the farm or in the home. At the same time they are potent materials which need treating with respect if they are to be used to best effect and without harm to the animal patient, user, consumer or environment. In recognition of this fact, Governments around the world have developed a series of laws, codes and guidelines to control their sale, supply and use.

Medicinal products, and the complex laws which surround them, require properly trained personnel to handle them at every stage in the supply chain. Manufacturing and wholesale premises are inspected and licensed, merchants' and saddlers' and pharmacy premises must be registered with the Royal Pharmaceutical Society of Great Britain (RPSGB) or the Department of Health and Social Security in Northern Ireland (DHSS(NI)) and staffed by qualified personnel, holding the Animal Medicines Training and Regulatory Authority (AMTRA) Certificate, and of course veterinary surgeons and pharmacists have strict professional requirements of education and ethical conduct.

Since 1974 the Codes of Practice of first the Association of the British Pharmaceutical Industry (ABPI) and then National Office for Animal Health (NOAH) have required the sales staff of animal medicine manufacturers to be trained, but until 1992 that training has not been defined, nor has there been any specific qualification.. In 1989 the Board of NOAH recognised this anomaly and created a Training Committee to devise a scheme of training and qualifications.

The Committee recognised the vital role of the manufacturer's representative in transmitting knowledge about the products themselves, the law and codes which control their use and indeed the basic principles of animal physiology and animal husbandry and care. It is also recognised that any qualification awarded should be independent of the industry itself and capable of commanding the respect of those who sell and use animal medicines, as well as the public at large.

This Foundation Syllabus and course notes are the result of those deliberations. Candidates who pass the examination will have demonstrated that they have a solid foundation of knowledge with which to support their work, assist and advise their customers. The Examination, set and supervised by AMTRA, will be a truly independent assessment of their abilities. AMTRA itself is recognised by the Department for the Environment, Food and Rural Affairs (DEFRA) who appoints two of its directors; and observers from the Veterinary Medicines Directorate (VMD) attend its meetings.

Those who pass the examination will hold a unique qualification, specifically designed to support them in their key role, their knowledge and understanding will make them ambassadors for the industry - we wish them well.

## Course contents

This manual has been produced to be the main reference source for preparation of candidates for the AMTRA Manufacturers' Examination. In order to enable candidates to cope with such a large body of text the manual has been divided into sections.

The first seven sections comprise the **Foundation Course**, knowledge of which is required by all candidates. Sections Eight, Nine and Ten contain the **specialist sections** (see below).

**Section 1** sets out the legal background information, putting into context the organisations and practices associated with the distribution and sales of animal medicines.

**Sections 2** deals with body functioning and describes anatomical and physiological aspects of the body systems.

**Section 3** describes the body defence mechanisms which act against infections.

**Sections 4** gives an introduction to what happens to medicines in the body and what are the effects of formulation on drug absorption.

**Section 5** contains the principles of nutrition.

In **Section 6** the various causes of disease are described.

**Section 7** presents an introduction to the principal infectious diseases of animals.

**Sections 8, 9 and 10** are the specialist sections, a companion animal section, a farm animal section and an avian section. Candidates will be expected to study either section 8 or section 9. Those studying section 10 will also need to be able to answer at least one essay question from either section 8 or section 9.

It is not intended that the examples used are an exhaustive list; they are there to illustrate and aid understanding. In many cases this manual will be used in conjunction with in-house tuition or revision courses, but it may equally be used for individual study.

An extra wide margin has been included on the right hand side of each page. This should be used for notes. The making of short notes on each page will aid the learning process. In addition small boxes containing **Key Points** have been included to help with study.

Due to the volume of material covered, it is suggested that you tackle small sections at a time. Although the sequence in which sections appear in the manual is a logical development of the subject, you may study sections in the order which suits you best. It is advisable, however, that you first read Section 1.

## Assessment

The assessment of candidates for the AMTRA Certificate takes the form of three Examinations, two written and one oral.

**Paper I** (an example copy is included) Duration 2 hours.

Short questions requiring single word or short sentences showing breadth of knowledge of the whole syllabus i.e. sections 1-7

**Paper II** (an example copy is included) Duration 2.5 hours. Three longer answers requiring two or three sides of A4 to be produced per answer. (i.e. in 50 minutes). The paper will be divided into Part A and Part B. Part A will be based on sections 1-7, from which candidates will be required to answer one question. Part B will be based on sections 8 – 10, from which candidates will be expected to answer two questions - at least two questions will be based on section 8, at least two questions will be based on section 9, and at least one question will be based on section 10.

**NB** A common fault is to spend too much time on the first question. You should practise timed answers over 50 minutes' duration. It is important that you complete the answer in the time allocated. If you are only able to write two sides in 50 minutes then you must aim to get all that is required into those sides. Diagrams should be used when appropriate and referred to in your answer. 3 average answers are always better than 2 good answers in total marks!!

**Oral Exam** (Duration approx. 20 minutes)

Wide ranging and searching questions across the whole syllabus are asked. As with all examinations these are aimed to find out what you know and understand and not what you do not know. Your time during examination is best spent on the former rather than the latter.

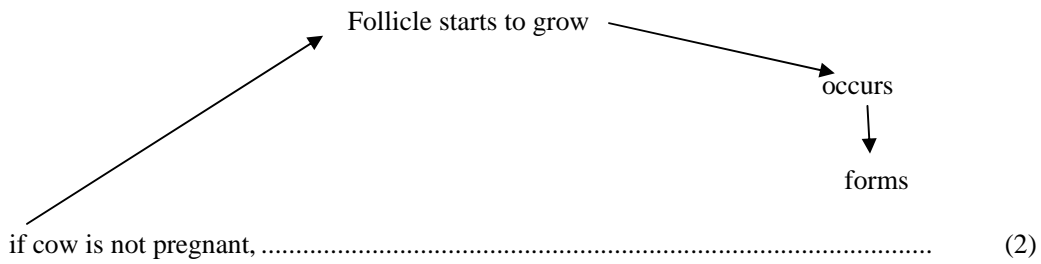
On the following pages are examples of Paper I and a Paper II question and answer.

PAPER I

Questions

1. What do you understand by 'Disease'?  
.....  
.....  
..... (1)
  
2. List 3 types of cells that may be found in the blood and briefly indicate their function.
  - i) .....
  - ii) .....
  - iii) .......... (3)
  
3. Give 4 important ways in which vaccines differ from antisera.  
.....  
.....  
..... (2)
  
4. Name 3 functions of the digestive system:  
.....  
..... (3)
  
5. List the information which should be recorded by the farmer in his veterinary medicines record.
  - a).....
  - b).....
  - c).....
  - d).....(4)
  
6. State the major effects of ectoparasites on animals.  
.....  
.....  
..... (2)
  
7. Name 4 routes by which vaccines are given.
  - i) .....
  - ii) .....
  - iii) .....
  - iv) .....(2)
  
8. What do you understand by the term 'passive immunity'?  
.....  
.....  
..... (2)

9. Complete the flow diagram below to describe the sequence of events in the ovaries of a female mammal (e.g. cow) during the course of one oestrous cycle.



10. What is the function of tissue fluid in the body?  
 .....  
 ..... (1)

11. Name 3 structures present in (or associated with) the digestive system of an animal that facilitate digestion of the food.  
 .....  
 ..... (3)

12. Name THREE organs in the body which can be infected by helminths.  
 .....  
 ..... (3)

13. Give a different example of a mange mite for each of the following species:  
 a) Dog .....  
 b) Sheep .....  
 c) Horse ..... (3)

14. What do the following stand for and who may sell each category?  
 P .....  
 POM .....  
 PML ..... (3)

15. Give 4 signs associated with Helminth infections:  
 i) .....  
 ii) .....  
 iii) .....  
 iv) ..... (2)

16. Why is an adjuvant incorporated in some vaccines?  
 .....  
 ..... (2)

17. What do you understand by the term “half life” in relation to a drug?  
 .....  
 .....  
 .....  
 ..... (2)
18. Name 4 non infectious causes of disease  
 .....  
 .....  
 .....  
 ..... (4)
19. Name 4 actions of the sympathetic nervous system  
 .....  
 .....  
 .....  
 ..... (4)
20. What do the following sets of initials stand for?  
 VMD.....  
 .....  
 COSHH .....  
 .....  
 RPSGB .....  
 ..... (3)
21. Name two legal requirements that you would expect to see on the label of an authorised veterinary medicine.  
 .....  
 ..... (2)
22. Describe two differences between an artery and a vein  
 .....  
 ..... (2)
23. What is the function of a glomerulus?  
 .....  
 .....  
 ..... (2)
24. Give an example of a notifiable disease associated with a virus.  
 ..... (1)
25. Name three functions of the skin  
 .....  
 .....  
 ..... (3)

26. Name 4 hormones involved in the oestrous cycle.  
 .....  
 .....  
 .....  
 ..... (4)
27. Put the following organs in the order in which food should pass through them.  
 Jejunum: rectum: stomach: colon: oesophagus: ileum: duodenum.  
 .....  
 ..... (2)
28. What hormones are produced by the pancreas?  
 .....  
 ..... (2)
29. What do the following sets of initials stand for?  
 MRL .....  
 SARSS .....  
 ..... (2)
30. What are the functions of alveoli?  
 .....  
 .....  
 ..... (2)
31. What is a reflex arc?  
 .....  
 .....  
 ..... (2)
32. Name four hormones secreted by the anterior pituitary gland.  
 .....  
 .....  
 .....  
 ..... (4)
33. Name two hormones secreted by the posterior pituitary gland.  
 .....  
 ..... (2)
34. What is the gestation length of?  
 a) a cow .....  
 b) a mare .....  
 c) a bitch ..... (3)

35. What are the classic signs of inflammation?  
 .....  
 .....  
 .....  
 .....  
 ..... (5)
36. What methods does the body use to inactivate a drug?  
 .....  
 .....  
 ..... (3)
37. Name three characteristics of a benign tumour.  
 .....  
 .....  
 ..... (3)
38. Name of a tumour of the following tissues.  
 Glands.....  
 Fat.....  
 Bone ..... (3)
39. Name a deficiency disease in the following species  
 Cattle .....  
 Sheep .....  
 Guinea pigs..... (3)
40. Name a nematode, trematode and a cestode which affect sheep.  
 Nematode.....  
 Trematode.....  
 Cestode ..... (3)
41. What are the stages in the life cycle of a fly?  
 .....  
 .....  
 ..... (3)
42. Name three bacteria associated with disease in animals.  
 .....  
 .....  
 ..... (3)
43. Name three ways in which bacteria can be transmitted from animal to animal.  
 .....  
 .....  
 ..... (3)

44. What is a zoonosis? Name one.  
.....  
.....  
..... (2)
45. Name a common poison of  
Dogs and cats.....  
Herbivores ..... (2)
46. Name two components of blood which are involved with the clotting mechanism.  
.....  
..... (2)
47. Name 3 hormones are secreted by the adrenal gland?  
.....  
.....  
..... (3)
48. Name the four stomachs of a ruminant.  
.....  
.....  
.....  
..... (4)
49. What is an enzyme? Name one.  
.....  
.....  
.....  
..... (2)
50. Name three functions of the liver.  
.....  
.....  
..... (3)

## Sample Essay Answers

### Question 1

#### **How does a vaccine produce immunity and give the reasons why a vaccine may fail to protect an animal from disease?**

Vaccine contains antigen and possibly an adjuvant. An antigen is a substance capable of inducing the production of antibodies in an animal. It may contain part of the organisms to be vaccinated against, be the entire organism killed or inactivated, may be the organism live but attenuated or a closely related organism.

The antigen is deposited in the animal, usually subcutaneously but some vaccines are given by other means e.g. intradermally, orally or on mucus membranes. The animal's immune system recognises the antigen as foreign and antibodies are produced. These antibodies are large protein molecules specific for the antigen. They can combine with the antigen (invading organism) and kill, inactivate or disable the organism. Different classes of antibody work at different sites e.g. IgA in mucus secretions. IgG in the blood and IgM early in the immune response. Antigenic stimulation produces specifically committed white blood cells which become memory cells for that particular antigen and as plasma cells they circulate in the blood. If their particular antigen is introduced, antibody formulation is stimulated.

After injection of an antigen, there is a latent period where no antibody is present in the blood. Then antibody levels rise and fall off - the primary response. A second dose of antigen, given at the correct time (often 2-6 weeks after the first) will cause an immediate and much greater rise in antibody levels (the secondary or anamnestic response). Although these antibody levels also drop this takes much longer (months or years depending on the vaccine). When antibody levels are low, further stimulation of the memory cells by a 'booster' is required.

A live vaccine may produce a long lasting high level of antibodies after just one dose because the organism will multiply in the animal stimulating the immune system over time. Adjuvant may also increase the immune response by releasing antigen slowly from the injection site.

Vaccines may not protect an animal from disease. There are many reasons. The correct vaccine may not have been used for the disease (antibodies are specific). The vaccine may not have been administered correctly i.e. into the wrong site or injected all the way through the skin. The vaccine may have been out of date, inactivated by incorrect storage conditions or contaminated by re-use of a multipack. The wrong dose may have been given. The vaccine may not have been given according to manufacturers' instructions. e.g. the primary course not given, or too long a period between 1st and 2nd doses. A booster dose may meet the disease before the secondary response has been achieved. The organism may be protected from circulating antibodies i.e. inside body cells. Animals in poor health or with concurrent disease may not respond well. All animals are individuals and some may just not respond to vaccination.

### Question 2

#### **Describe methods of control of major ectoparasites.**

Ectoparasite control can be considered under three headings: prevention, control by management and control by treatment.

Control of ectoparasites by prevention can involve a number of methods. Isolation of a flock or an animal away from any potential source of ectoparasites can be effective but can only be done under strict management conditions e.g. the high health status pig herd or the companion animal that never leaves its cage or *owner's* house or mixes with other animals. Unfortunately

some parasites may be acquired before purchase or even at birth e.g. Demodex and Sarcoptic mange mites. Isolation may also be used as part of an eradication programme. When sheep dipping was compulsory, dipped and undipped sheep had to be kept separate. Eradication of a parasite is a long term method of control and appears to have been successful in warble fly infestation but not in sheep scab. Prevention of ectoparasite infestation may also be achieved by the use of chemicals e.g. some sheep dips contain compounds which deter blow flies and ticks.

Management methods can control ectoparasite infestations. Methods can be simple: shearing sheep helps rid them of sheep keds. Cleaning the environment at the time of treatment helps prevent re-infestation by some parasites e.g. hoovering carpets and washing pets bedding aids control of fleas. As many ectoparasites such as mites and lice complete their life-cycle on the host animal and survive only for short periods off the animals, treatment for infestation of a batch will prevent re-infestation or infestation of subsequent batches.

Preventing conditions that encourage infestation is also a useful management tool. Grazing of tick infested pasture may be avoided during the spring or autumn months when the ticks feed. Blowfly strike is more likely on animals with damaged skin or neglected animals e.g. pet rabbits with matted fur or soiled bedding, sheep left undagged or scratched by brambles. The most severe lice infestations are often seen on individuals which don't groom themselves well or aren't groomed by the owner.

When considering treatment as a method of control, the chemical has to be suitable for both the species of ectoparasite and the species of animal concerned. This may be a particular problem with small companion animals. The life cycle of the parasite has to be considered: if an egg layer, then treatment has to be repeated to kill the parasites once they hatch, e.g. lice and mites.

All susceptible animals in a group or household should be treated at the same time as inapparent carriers may harbour infestation and re-introduce it to the group. Some chemicals have a long lasting effect preventing re-infestation during this period.

Treatment for ectoparasites comes in many forms. Dips or washes are used when the chemical has to come in contact with the entire surface of the animal. Sprays can be used both spraying a wash preparation on a large animal (though some areas may be difficult to reach) or spraying a companion animal against fleas for example. Pour on products are available both for farmed animals e.g. cattle for warble fly and companion animals. In these cases the active chemical is absorbed through the skin and distributed through the body. This is also achieved by an injectable chemical. Other methods of administration include collars and powders.

**N.B.** *This question can be answered in several different ways. The above example is only one of many that would be acceptable.*