

**STUDY GUIDE:**  
**RED MEAT EXAMINATION**

**In Collaboration with The Directorate Veterinary Services  
National Department of Agriculture**

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## **PROJECTS**

### **Part 1 - Project no. 1**

Critically discuss the following, explaining the correct method of operation. Describe corrective actions to be taken in cases of non-compliance – give examples.

- Receiving and offloading of animals at the abattoir
- Vehicle inspection
- Procedures for handling dead animals.
- Ante mortem procedures and use of ante mortem findings in post mortem inspections
- Structure of lairages
- Humane handling of animals e.g.: food, water, bedding, cleanliness and behaviour of lairage staff

### **Part 1 - Project no. 2**

Why is it important to separate clean and dirty areas, functions and products? Give examples.

### **Part 1 - Project no. 3**

Discuss general structural requirements to eliminate contamination

### **Part 2 - Project no. 1**

Draw up a basic sanitation program for your project abattoir and provide corrective actions for the program in use.

### **Part 2 - Project no. 2**

Draw an organogram of management in a high throughput abattoir. Indicate where meat inspection and quality control fits in.

### **Part 2 - Project no. 3**

Draw up a thermo control program for your project abattoir. Make a list of all temperatures that must be monitored in the abattoir including:

Water temperature (hot /cold)  
Room temperatures (chiller/freezer)  
Product temperature (chilled/frozen)

Describe the methods used.

**PART 1 – ABATTOIR PRACTICE  
MODULE 1**

**MICROBIOLOGY**

**OBJECTIVE**

To introduce learners to the science of microbiology relating to abattoirs

**Study aim**

At the end of this theme you must be able to:

**1. INTRODUCTION, TYPES OF ORGANISMS, IMPORTANCE OF BACTERIA AND ELEMENTARY BACTERIOLOGY**

- Describe the size, shapes and habits of bacteria
- Name the requirements for bacterial growth
- Shortly name the 4 phases of the growth cycle.

**2. GROUPS OF BACTERIA, BACTERIAL SPORES, BACTERIA ISOLATED FROM MEAT**

- Name some food-borne pathogens
- Briefly discuss spoilage bacteria and give an example
- Name some bacteria isolated from poultry.

**3. SPOILAGE BACTERIA**

- Name one spoilage bacteria
- Explain the importance of spoilage bacteria in the meat industry
- Explain the importance of chilling of meat in relation to meat spoilage.

**4. FOODBORNE DISEASES**

- Define food borne diseases
- Name the agents of food borne diseases
- Discuss events necessary for food - borne illness to occur.

**5. FOOD POISONING**

- Define food poisoning and name symptoms
- Distinguish between the main types of food poisoning
- Discuss preventative measures for food poisoning

**6. BACTERIA MOST FREQUENTLY ASSOCIATED WITH FOOD-BORNE DISEASES**

- Name 5 of the most common pathogens causing food borne illness.
- Discuss the source, mechanism, foods involved, symptoms and preventative measures for the food poisoning organisms mentioned in the manual

**PART 1 – ABATTOIR PRACTICE  
MODULE 2**

**GENERAL ABATTOIR LAYOUT AND CONSTRUCTION**

**OBJECTIVE**

To acquaint candidates with the structural requirements, the product flow and the use of water in an abattoir

**Study aims**

At the end of this theme you must be able to:

**1. INTRODUCTION**

- What is the definition of an abattoir in the Regulations under the Meat Safety Act.

**2. LAYOUT, CLEAN AND DIRTY PRODUCTS AND AREAS**

- Distinguish between “dirty” and “clean” areas of an abattoir
- Distinguish between clean and dirty products – give examples

**3. BUILDING AN ABATTOIR, REQUIREMENTS FOR PREMISES, FACTORS AFFECTING ABATTOIR WORK AREAS, FACILITIES FOR STAFF**

- Explain the factors to be considered when building an abattoir
- Discuss the requirements for premises
- Discuss the factors affecting abattoir work areas
- Discuss the requirements for “facilities for staff”

**4. USE OF WATER IN THE ABATTOIR**

- Discuss the legal aspects regarding the use of water in abattoirs
- Discuss the guidelines for the testing of water in abattoirs (what tests and how often).

**5. DISPOSAL OF ABATTOIR EFFLUENT AND SEPTIC TANK SYSTEMS**

- Briefly discuss the regulatory requirements for the disposal of abattoir effluent
- Discuss the functions of the components of septic tank systems

**PART 1 – ABATTOIR PRACTICE  
MODULE 3**

**PERSONAL HYGIENE**

**OBJECTIVE**

To inform the candidate about the importance of personal hygiene

**Study aims**

At the end of this theme you must be able to:

**1. INTRODUCTION**

- Explain why food handlers must be healthy
- Explain why food handlers must wear clean protective clothes

**2. HEALTH REQUIREMENTS FOR WORKERS**

- Discuss the legal requirements regarding the health and hygiene of workers
- Distinguish between pre-employment medical examination and daily fitness checks

**3. SOME PRACTICAL WAYS TO IMPROVE PERSONAL HYGIENE AND NEATNESS**

- Name some practical ways to improve personal hygiene and neatness in the abattoir

**4. PROTECTIVE CLOTHING**

- Explain the importance of protective clothing and the responsibility of the workers towards it
- Name the different components of protective clothing.

**5. PERSONAL EQUIPMENT**

- Discuss the personal equipment used in an abattoir
- Name 4 uses for knives.

**6. CLEANING OF HAND EQUIPMENT**

- Explain how hand equipment must be cleaned
- Explain the meaning of employment medical examination
- Explain the difference between pre-employment medical examination and daily fitness checks
- Explain when additional medical examination is required
- Explain the importance of personal hygiene and hygiene of personal equipment
- Give at least 5 examples of when workers must wash their hands in an abattoir
- Discuss what must be done in case of an injury
- Discuss the requirements for the washing of hands
- Name a few undesirable hygienic practices workers tend to do in an abattoir
- Pre-slaughter inspections regarding the personal hygiene of workers are carried out daily. What things should be noted?

**PART 1 – ABATTOIR PRACTICE  
MODULE 4**

**HANDLING OF WASTE & CONDEMNED MATERIAL**

**OBJECTIVE**

To give the candidate an understanding of the handling of waste & condemned/ inedible material and the disposal thereof

**Study aims**

At the end of this theme you must be able to:

**1. LEGAL ASPECTS REGARDING CONDEMNED MATERIAL**

- Draw a diagram to indicate which types of waste and by products can derive from an abattoir
- Describe handling condemned material in the abattoir
- Describe the different methods of disposal of condemned material
- Discuss the requirements for sterilising plants including the unclean and clean areas
- Describe the requirements for vehicles transporting condemned material
- List the 4 points that must be indicated in writing when removing specimens from an abattoir
- Discuss requirements for the personnel working in the dirty area of a sterilisation plant
- Discuss the requirements that the facilities for condemned/ detained material should comply with
- Discuss the marking of condemned material and containers
- Discuss the requirements that the “unclean” and “clean” areas of a sterilizing plant should comply with

**2. METHOD OF PREPARING ANIMAL FEED AND CONDEMNED MEAT FOR APPROVAL FOR ANIMAL FEED**

- Describe which materials can be used to recover for the manufacture of animal feed

**3. RENDERING AND THE COLLECTION OF RENDERING BLOOD.**

- Describe the principles of collection of rendering blood
- Describe the principles of rendering and the different methods of rendering

**4. FLOW DIAGRAM OF STERILISATION PLANT**

- Draw a flow diagram to indicate the different process steps at a sterilisation plant

**5. DISPOSAL OF ABATTOIR EFFLUENT AND SEPTIC TANK SYSTEMS**

- Briefly discuss the regulatory requirements for the disposal of abattoir effluent
- Discuss the functions of the components of septic tank systems

**PART 1 – ABATTOIR PRACTICE  
MODULE 5**

**PEST CONTROL**

**OBJECTIVE**

To acquaint candidates with the practice of pest control in an abattoir

**Study aims:**

At the end of this theme you must be able to:

- Describe preventing of pests through design
- Describe preventing pest entry to the food facility
- Describe preventing pests through good sanitation
- Describe preventing pests through good housekeeping
- Describe storage practice
- Describe thresholds
- Describe self assessment or auditing programs
- Describe bird management procedures
- Describe recognizing rat and mouse signs
- Describe rodent management procedures
- Recognize cockroach infestations
- Recognize stored product pests
- Describe domestic fly control programs
- Understand occasional pests

**PART 1 – ABATTOIR PRACTICE  
MODULE 6**

**SANITATION**

**OBJECTIVE**

To acquaint candidates with the practice of cleaning and sanitizing an abattoir

**Study aims**

At the end of this theme you must be able to:

**1. DEFINITIONS**

1.1 Define/ explain the following:

- Sanitation
- Disinfection
- Detergents
- Disinfectants/ Sanitizers

**2. REQUIREMENTS FOR CLEANING AND DISINFECTING THE ABATTOIR AND EQUIPMENT**

- Discuss the requirements for cleaning and disinfecting the abattoir and equipment

**3. SOURCES OF CONTAMINATION**

Name and discuss sources of contamination

**4. THE PRACTICE OF CLEANING AND DISINFECTION**

- Discuss the 7 basic steps of cleaning and disinfecting
- Explain the importance of slaughtering “clean” animals/birds
- Distinguish between detergents and disinfectants/ sanitizers
- Explain the importance of the pre-slaughter sanitation inspection and bacteriological monitoring

**PART 1 – ABATTOIR PRACTICE  
MODULE 7**

**MEAT QUALITY AND SAFETY**

**OBJECTIVE**

To make students aware of the need for quality control, record keeping as well as the importance of HACCP, HAS and HMS

**Study aim**

At the end of this theme you must be able to:

**1. DEFINITIONS**

- Define:
  - Quality
  - Quality assurance (QA)
  - Good manufacturing practice (GMP)
  - HACCP
  - CCP

**2. THE NEED FOR QUALITY SYSTEMS, HACCP AS A FOOD SAFETY MANAGEMENT SYSTEM, QUALITY SYSTEMS AS PRE-REQUISITES FOR HACCP**

- Explain the need for quality systems
- Discuss HACCP as a food safety management system
- Name the quality systems needed as pre-requisites for HACCP
- Name the 7 principles of HACCP
- Name the 12 stages of HACCP.

**3. HYGIENE MANAGEMENT SYSTEMS (HMS)**

- Discuss the management responsibilities in terms of Hygiene Management Systems
- Name and discuss the Hygiene Control Programs that must form part of the Hygiene Management System

**4. KEEPING OF RECORDS**

- Briefly discuss the keeping of records.

**5. HAS**

- Explain what HAS is
- Name the 10 areas covered by the HAS
- Do a Hygiene assessment at your abattoir using the HAS forms provided
- Discuss water monitoring as a prerequisite for HACCP
- Explain which steps correspond to the different principles
- Explain how a CCP is determined
- Distinguish between QA and GMP
- Draw examples of check registers.

**PART 2 – MEAT INSPECTION  
MODULE I**

**ABATTOIR LAYOUT AND CONSTRUCTION: RED MEAT ABATTOIRS**

**OBJECTIVE**

To acquaint candidates with the structural requirements, the product flow and the use of water in a red meat abattoir

**Study aims**

At the end of this theme you must be able to:

- 1. SPECIFIC AND ADDITIONAL REQUIREMENTS FOR RED MEAT ABATTOIRS AND CUTTING AND PROCESSING PLANTS**
  - Discuss the general requirements for premises, structures and equipment
  - Discuss the specific requirements that red meat abattoirs must comply to.
  
- 2. DESIGN DRAWINGS**
  - Evaluate a design drawing of a low throughput red meat abattoir and give comments on the layout.

**PART 2 – MEAT INSPECTION  
MODULE 2  
SLAUGHTER AND DRESSING**

**OBJECTIVE**

To acquaint candidates with the slaughter process steps and the animal welfare aspects at abattoirs

**Study aims**

At the end of this theme you must be able to:

**1. FLOW DIAGRAM OF PROCESS STEPS**

- Draw a flow diagram of the different process steps in the dirty and clean areas respectively.

**2. ANIMAL WELFARE ASPECTS AT ABATTOIRS**

- Briefly discuss the legislation governing the prevention of cruelty to animals
- Discuss the effect of injuries, during transport on livestock
- Name the requirements for vehicles transporting live animals
- Discuss the requirements for lairaging of animals
- Discuss the requirements for emergency slaughter
- Discuss the requirements for feeding of animals at abattoirs
- Discuss procedures with animals that gave birth at the abattoir
- Discuss the welfare of animals during stunning
- Explain the effect of stress on the meat.

**3. STUNNING**

- Explain the aim of stunning
- Discuss facilities and equipment needed for stunning the different species
- Discuss procedures and methods applied with the captive bolt pistol method of stunning and also consider the mistakes and problems that may occur
- Briefly discuss correct positions where the captive bolt must be applied in the various species
- Discuss requirements for stunning by electric tongs

**4. HOISTING**

- Discuss the procedure for hoisting a carcass and consider the, mistakes and problems that may occur .Provide corrective actions

**5. THROAT CUTTING (BLEEDING INCISION)**

- Discuss the procedure of throat cutting and consider mistakes and problems that may occur
- Provide corrective actions

**6. BLEEDING**

- Provide reasons for the necessity of bleeding directly after stunning
- Discuss the bleeding of carcasses and name the requirements for bleeding, Name the mistakes and problems that may occur. Provide corrective actions

## **7. ELECTRICAL STIMULATION**

- Give the advantages of electrical stimulation
- Explain what happens to the pH of meat if an animal is sick, excited or exhausted before slaughter
- Explain how electrical stimulation is done
- Discuss factors affecting the effectiveness of electrical stimulation.

## **8. DEHEADING AND DRESSING**

- Discuss the following steps of dressing:
  - De-heading
  - removal of hides/skin
- Discuss hygiene factors to be remembered during the dressing process
- Discuss additional requirements for dressing of pigs
- Explain how the opening lines during the removal of the hide/ skin must take place hygienically.

## **9. EVISCERATION, OFFAL HANDLING, SPLITTING, MARKING AND FINISHING OF CARCASS**

- Explain the object of evisceration
- Discuss the important hygiene points to consider during evisceration
- Discuss red offal handling
- Discuss rough offal handling
- Describe the splitting of a carcass
- Describe specifications for stamps, marks and ink used
- Describe the way beef carcasses are marked
- Describe the final trimming of a carcass
- Discuss washing of carcasses
- Why is it necessary to wash hands regularly during evisceration?
- Why is it necessary to loosen the anus before evisceration?
- What is a spear cut and what is its importance in the flaying process?
- What are the results of bad flaying procedures? List some examples and indicate how you would rectify it.

## **10. SLAUGHTER PROCESS FOR CATTLE, SHEEP AND PIGS (RMAA)**

- Discuss the slaughter process for cattle, sheep and pigs with regard to hygienic slaughter methods and identify the process/flaying points where of contamination is likely to occur.

**PART 2 – MEAT INSPECTION  
MODULE 3**

**ANATOMY OF RED MEAT ANIMALS**

**OBJECTIVE**

To acquaint the candidate with the anatomy of red meat animals in order to assist with meat inspection

**Study aim**

At the end of this theme you must be able to:

**1. ANATOMY OF RED MEAT ANIMALS**

- Discuss the anatomy of red meat animals with regards to:
  - Skeleton
  - Muscular system
  - Blood and vascular system
  - Respiratory system
  - Digestive system
  - Urinary tract
  - Nervous system
  - Fatty tissue
  - Genital tissue
  - Lymphopoietic system
  - Endocrine system (glands of the body)
  
- Label and discuss the following sketches:
  - Skeleton
  - Heart
  - Digestive tract (tongue, oesophagus, stomach and intestines)
  - Respiratory system (lungs)
  - Liver
  - Kidney
  - Spleen
  - Carcass - indicating lymph nodes
  
- Distinguish between the following organs for the different species:
  - Heart
  - Lungs
  - Liver
  - Stomach
  - Tongue
  - Kidney
  - Spleen
  
- Explain the carcass differences between species
- Explain gender characteristics for the different species
- Explain age determination for the different species

**PART 2 – MEAT INSPECTION  
MODULE 4**

**PATHOLOGY**

**OBJECTIVES**

- To acquaint the candidate with the pathological conditions that may be harmful to the consumer
- Enabling the candidate to identify the above and to deal with it in the correct manner

**Study aim**

At the end of this theme you must be able to:

**1. GENERAL PATHOLOGY**

- Discuss the following conditions in terms of:
  - Definition
  - Cause(s)
  - Symptoms / lesions
  - Judgement

<ul style="list-style-type: none"> <li>• Abscess</li> <li>• Anaemia</li> <li>• Arthritis</li> <li>• Bacteraemia</li> <li>• Bruising</li> <li>• Cachexia/Emaciation</li> <li>• Calcification</li> <li>• Caseation</li> <li>• Cirrhosis/Fibrosis</li> <li>• Degeneration</li> <li>• Emphysema</li> <li>• Enteritis</li> <li>• Fatty degeneration</li> <li>• Fatty infiltration</li> <li>• Fever versus poor bleeding</li> <li>• Gangrene</li> <li>• Hepatitis</li> </ul>	<ul style="list-style-type: none"> <li>• Hydronephrosis</li> <li>• Hypostasis</li> <li>• Icterus</li> <li>• Incomplete bleeding</li> <li>• Immaturity</li> <li>• Infarcts</li> <li>• Inflammation (all types)</li> <li>• Mastitis</li> <li>• Metastasis</li> <li>• Meat odours</li> <li>• Meat of unborn animals</li> <li>• Melanosis</li> <li>• Metritis</li> <li>• Myopathy</li> <li>• Necrosis</li> <li>• Nephritis</li> <li>• Nephrosis</li> </ul>	<ul style="list-style-type: none"> <li>• Neoplasm (tumour)</li> <li>• Oedema</li> <li>• Omphalophlebitis</li> <li>• Oversticking</li> <li>• Pericarditis</li> <li>• Peritonitis</li> <li>• Petechia, echinosis, suggilations</li> <li>• Pleuritis</li> <li>• Poorness versus emaciation</li> <li>• Purulent</li> <li>• Pyaemia</li> <li>• Rigor mortis</li> <li>• Septicaemia</li> <li>• Talangictasis</li> <li>• Toxaemia</li> <li>• Uraemia</li> <li>• Valvular endocarditis</li> </ul>
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**PART 2 – MEAT INSPECTION  
MODULE 5**

**DISEASES AND CONDITIONS**

**OBJECTIVES**

- To acquaint the candidate with the pathology, conditions, diseases and parasitology that may be harmful to the consumer.
- Enabling the candidate to identify the above and to deal with it in the correct manner

**Study aim**

At the end of this theme you must be able to:

**1. RED MEAT DISEASES**

- Discuss the following diseases listed below with regards to:
  - Cause
  - Species
  - Symptoms (ante mortem)
  - Post mortem lesions
  - Judgment

<b>Viral diseases</b>	<b>Rickettsiae</b>	<b>Bacterial diseases</b>
<ul style="list-style-type: none"> <li>• African swine fever</li> <li>• Classical Swine fever</li> <li>• Lumpy skin disease</li> <li>• Foot and mouth disease</li> <li>• African horse sickness</li> <li>• Rabies</li> <li>• Blue tongue</li> <li>• Rift valley fever</li> <li>• Wesselsbron disease</li> <li>• Bovine malignant catarrh</li> <li>• Three day stiff sickness</li> </ul>	<ul style="list-style-type: none"> <li>• Heart Water</li> </ul>	<ul style="list-style-type: none"> <li>• Actinomycosis</li> <li>• Actinobacillosis</li> <li>• Anthrax</li> <li>• Botriomycosis</li> <li>• Black quarter</li> <li>• Botulism</li> <li>• Brucellosis</li> <li>• Calf diphtheria</li> <li>• Glanders</li> <li>• Johne's disease</li> <li>• Omphalophlebitis</li> <li>• Paratyphoid</li> <li>• Spirochaetosis</li> <li>• Swine erysipelas</li> <li>• Tail bite necrosis</li> <li>• Tetanus</li> <li>• Tuberculosis</li> </ul>
<b>Protozoal diseases</b>	<b>Fungal infections</b>	
<ul style="list-style-type: none"> <li>• Besnoitiosis</li> <li>• Coccidiosis</li> <li>• Sarcosporidia</li> <li>• Red water</li> <li>• Biliary fever in horses</li> <li>• Gall sickness (Anaplasmosis)</li> <li>• East Coast fever</li> <li>• Nagana</li> <li>• Dourine</li> </ul>	<ul style="list-style-type: none"> <li>• Cladosporium spp.</li> <li>• Sporotrichon spp.</li> <li>• Mucor and Thamodium spp.</li> <li>• Penicillium spp.</li> </ul>	

## 2. RED MEAT PARASITOLOGY

- Make a classification of internal parasites
- Discuss the life cycles, final host, intermediate host and importance for meat hygiene and judgement for each of the following:

### **Tape worms**

- *Taenia solium*
- *Taenia saginata*
- *Taenia multiceps*
- *Taenia hydatigena*
- *Taenia ovis*
- *Echinococcus granulosus*
- *Stilesia hepatica*

### **Round worms**

- *Ascaris suum*
- *Parafilaria*

### **Flukes**

- *Fasciola hepatica*

## 3. METABOLIC CONDITIONS

- Discuss the cause, ante mortem symptoms, post mortem lesions and judgement of the following:

### **Cattle**

Hypocalcemia  
Transport disease  
Ketosis

### **Sheep**

Pregnancy toxaemia  
Transport tetanus

### **Pig**

PSS and PSE

## 4. DIVERSE CONDITIONS

- Discuss the cause, ante mortem symptoms, post mortem lesions and judgement of the following:
  - Traumatic reticulitis in cattle/sheep
  - Tail bite necrosis in pigs
  - Scrotal sepsis
  - Telangiectasis in cattle liver
  - Foot rot
  - Uterine prolapse
  - Rectal prolaps
  - Tick toxicosis
  - White muscle disease
  - Wounds/Bruising/Fractures/haematomas
  - Contamination
  - Bone taint
  - Erythema
  - Mechanical damage
  - Blood splash

- Discuss your actions if you should find tail bite necroses during primary meat inspection and give motivations for your actions

## **5. ZONOSIS**

- Define zoonosis
- Classify the zoonotic diseases under the cause
- Discuss the zoonotic diseases that are commonly spread to abattoir workers and name some preventative measures

## **6. MOST COMMON CONDITIONS**

List the most common diseases that may be found in the body parts for the different species.

**PART 2 – MEAT INSPECTION  
MODULE 6**

**MEAT INSPECTION**

**OBJECTIVE**

To acquaint students regarding the importance of ante-mortem inspection. To demonstrate the primary meat inspection cuts on the different red meat species. To demonstrate the procedures for secondary meat inspection as well as laboratory techniques frequently used in red meat abattoirs

**Study aim**

At the end of this theme you must be able to:

**1. ANTE MORTEM INSPECTION**

- Discuss the purpose of “ante-mortem inspection”
- Discuss the aims of ante-mortem inspection
- Discuss the regulatory requirements for ante mortem inspection
- Describe the advantages of ante mortem inspection
- Name 10 notifiable diseases
- Discuss the responsibility, lairage facilities and staff required for ante mortem inspection
- Discuss the procedures and methods for ante mortem inspections
- Discuss C, T and F branded cattle
- Discuss the factors to be noted when doing an ante mortem inspection
- Discuss the decisions that can be taken during ante mortem inspection
- Discuss the factors to be considered during ante-mortem examination and explain why it is important to have good communication between the person doing ante mortem and the meat examiners doing primary meat inspection.

**2. PRIMARY MEAT INSPECTION**

- Discuss the routine primary meat inspection in terms of bovine, ovine and caprine, porcine and equine under the following points:
  - Carcass
  - Head
  - Abdominal cavity and viscera
  - Thoracic cavity and viscera
  - Udder
  - Testicles and penis
- Discuss the general aspects to be considered when performing primary meat inspection
- Name the diseases and conditions requiring total condemnation
- Discuss the aim of detaining and the ways in which carcasses and viscera are handled
- Explain when a carcass will be considered as immature
- Discuss the reasons why it is important to have excellent synchronisation between carcasses, heads, plucks and intestines on the process line.

**3. SECONDARY MEAT INSPECTION**

- Discuss the 4 kinds of judgements that can be taken with detained carcasses
- Discuss additional examination for Tuberculosis or a Pyaemic condition
- Discuss additional examination for Cysticercosis and treatment
- Discuss additional examination for emergency slaughtered animals

- Discuss the secondary inspection to be conducted with signs of Tuberculosis or a Pyaemic condition
- Explain the secondary inspection and handling of a carcass with Cysticercosis
- Explain what can be done with a carcass or organs depending on the judgement
- Discuss the facilities for secondary inspection and condemned products.

#### **4. LABORATORY TECHNIQUES**

- Identify the purpose of the different laboratory tests
- Explain the procedure and purpose for the following tests:
  - Preparation of blood smears
  - Phase test
  - Alcohol - Flotation test
  - Chlorine contents in water
  - pH determination of meat

#### **5. SAMPLING AND SAMPLING METHODS**

- Name 6 common surface count methods and briefly discuss each of them.