**Chapter 1: Meat Production and Abattoir Practices**

**Abattoir**

It is a place or premises where in slaughter of food animalsis carried out and is done exclusively to produce healthful meat for human consumption.

**Classification of abattoir:**

1. Based on the level of technology adopted:

* Traditional (Manual operation) Rural
* Semi-modern (Semi mechanized operation) -Urban
* Modern (Fully automated)

1. Based on the Throughput/ Capacity

* Small abattoirs - < 100 LU/day = 1-2 acres of land
* Medium abattoirs - 100-200 LU/day = 2-4 acres of land
* Large abattoirs - > 200 LU/day = 4-6 acres of land

1. Based on the management and Ownership

* Service abattoir (Municipal / Corporation)
* Factory Type (Privately owned)

**1 livestock Unit (LU)** = 1 adult bovine + 2 Pigs + 3 Calves + 5 Sheep & Goat

1 buffalo/cattle = 1.0 LU,

1 pig = 0.5 LU

1 calf = 0.33 LU

1goat/sheep = 0.2 LU

**Facilities required in the abattoir:**

* **Water requirement**:
* All areas of the plant need to receive potable water that is supplied through the main pipeline at a pressure of at least **20 psi**.
* Hot water with a minimum temperature of **82 ̊C** must be made available for cleaning.

Water requirement for different species:

* Pigs - 454 litres/day per pig
* Bovine - 272 litres/day per bovine
* Sheep/Goat - 45 litres/day per sheep/goat

Plus 25% at a reasonable pressure of 15 psi

Thumb rule – 20 L water/kg live weight

* **Electricity**: Industrial three-phase power is essential, and a backup generator must be available. Oil or gas can be utilised as a fuel source for steam boilers, provided that appropriate storage tanks are provided.

* **Drainage**:
* In wet areasslope to drains should be **1:50**.
* For every **40 m2 one drain** should be provided in the work floor.
* Under the dressing rail, where blood tends to collect the floor a gradient of **1:25** should be provided.
* **Lighting**:
* Throughout the area adequate natural or artificial lighting must be provided, which shall not distort the natural colour of meat.
* The recommended intensity of light is as under:
* **540 Lux (50 ft. candles) at all Inspection points**
* **220 Lux (20 ft. candles) at Workrooms**
* **110 Lux (10 ft. candles) in other areas.**

One footcandle ≈ 10.764 lux

* The intensity of light is usually read using **Luxmeter** at levels of 0.9m from the floor, at the inspection areas it is 1.5 m.

* **Slaughter equipment design:**
* Every piece of equipment that comes into direct touch with a carcass or piece of meat needs to be constructed of food-grade stainless steel.
* Other pieces of equipment, such as overhead rails, could be composed of iron and painted to resist corrosion.
* Equipment should be positioned and designed to make cleaning and disinfection simple and effective.

**Lairage**

It is the area for the reception of the animal meant for slaughter.

Space requirement:

A standard lairage shall hold

* 3 days' supply of cattle/buffalo and
* 2 days' supply of sheep/goat/pig

Recommended floor space for individually animal:

* Cattle (loose) - 2.3 -2.8 m2
* Cattle (tied) - 3.3 m2
* Pigs (bacon & small) - 0.6 m2
* Heavy hogs, calves, sheep, goat - 0.7 m2

General resting period considered ample is:

* minimum - 6 hrs for normal animal
* maximum - 24 hrs for tired & agitated animals, but it should not exceed 36 hrs.
* 4 hours rest for poultry

Sections in lairage:

* Livestock reception area
* Open and covered area
* Race

**Scalding**

Conventional methods of scalding are by two methods:

* **Horizontal (Immersion) method**: In these methods hot water **(62-64 ̊C)** is used either in water bath which can hold the bled carcass(immersion) or it is sprayed on the carcass. The disadvantage of the immersion method is that since the carcasses are dipped in the same water one after the other, it is very unhygienic
* **Vertical (Spraying) method**: Scalding temperature is controlled at **62-64 ̊C** with a thermostat and is done for **6 minutes**. For efficient utilization of water in a hygienic manner, the vertical scalding of pig carcass involves the use of double-walled tunnel in which steam generated from water bath in its bottom, is blown over the carcass and through ventilation located over the condenser.

**Effect of transportation on animals**

The most stressful and important phase in the chain of events between the farm or production site and the slaughterhouse is without a doubt the transport of livestock, which has a major negative impact on animal welfare and production loss.

1. Transportation stress -
2. Bruising

* one of the most important causes of downgrading of hides and carcasses
* the age of bruises can be estimated by using Fouchets’ reagent (25 % solution of trichloroacetic acid, containing 0.9 % ferric chloride)

1. Transportation mortality

* Pigs and sheep are frequently found dead due to suffocation
* Pigs are more susceptible to mortality during transit

1. Shrinkage or loss of weight

* Tissue shrinkage: results from an actual decrease in the carcass weight of the animal
* Excretory shrinkage: results from elimination of body waste and doesn’t change the weight of the carcass

**Type of weight loss in live animal during transportation**

|  |  |
| --- | --- |
| Calf | * 4 kg during first day of handling and * 1.8 kg on second day |
| Pigs | * Lose 2.2-5.4kg body weight during 24 hrs transport |
| Sheep | * Lose 0.9-1.8kg when kept in lairage for 24 hrs and * Up to 3.6 kg during transportation |
| Bullock | * Lose 30 -40 kg during 1st day * But only 5-7kg on subsequent days |

1. Effect of Stress on meat quality – Stress during transportation is manifested in conditions such as PSE in pigs and DFD in beef, as well as weight loss and poor meat quality. A portion of the weight lost during transit can be gained back with rest, hydration, and proper diet.

* **Pale, soft and exudative (PSE)**:
* Pale due to myoglobin denaturation
* Soft due to breaking of tropomyosin
* Exudative due to low pH, water holding capacity
* Generally observed in pigs
* Occurs due to acute stress prior slaughter
* Fast drop in pH to 5.3
* **Dark, firm and dry (DFD)**:
* Dark due to low refractive index
* Firm due to high pH
* Dark dur to more water binding, muscle fibres tightly packed
* Generally seen in beef cattle
* Occurs due to prolonged stress prior slaughter
* Very slow drop in pH from 6.8-6.2
* **Porcine stress syndrome (PSS)**: it is a fatal hyperthermia relatively common in Landrace and Pietrain bree of pig. It is also referred as herztod, fatal syncope and shock heart failure syndrome. The condition is characterized by sudden death; preceded by elevated temperature, erythema, skin blanching and dyspnoea in fat pigs, which has been subjected to stress.
* **Two- toning**: it refers to appearance of both dark and pale coloured areas in the red and white muscle fibres and their relative susceptibility to PSE and DFD. Red fibres are more prone to PSE than white fibres. Two-toning is mostly seen in Ham region of the pigs.

**Pre-slaughter care/resting in lairage:**

* Inadequate resting period may reduce the keeping quality of meat because of the incomplete development of acidity in the muscles and the early invasion of the system by putrefactive organisms from the intestinal tract. These bacteria cause ham taint in pigs and bone taint in cattle.
* Meat of exhausted animals appear dark and fiery and gives an impression of incomplete bleeding. The dark colouration of the meat is due to the decreased oxygenation of haemoglobin and myoglobin in the fatigued muscles.
* It is usual practice to withhold food from animals prior to slaughter (for a period of at least 6 hours) to reduce carcass contamination from stomach contents during dressing of the carcass.
* Pre-slaughter feeding of easily digestible carbohydrates(molasses) to pigs showed restoration of muscle glycogen and subsequent low muscle pH. Feeding of 1.3 kg of sugar for 3 or more days before slaughter of pigs and cattle has increased daily weight gain, dressing percentage and liver weight.

**Ante-mortem inspection (AMI):**

It is the examination/inspection of live animals and birds before they are slaughtered. It should be conducted within 24 hrs before slaughter preferably in daylight.

Decisions in Ante-mortem inspection (AMI):

* Passed – animals free from any signs of disease and physiological abnormalities should be passed for slaughter
* Suspect/detained – animals showing in conclusive symptom/evidence of disease. All animals having some local abnormalities are categorized as suspect an should be handled separately and special care should be given during PM inspection
* Delayed/postponed slaughter – when animals are showing sign of exhaustion, transport sickness, transit fever etc. they should be sent back to the holding pen for proper rest. They may be subjected to another AMI before slaughter
* Unfit/reject – animals which come under any of the following conditions are categorized as unfit/reject
* Advanced stage of pregnancy
* Not a food animal
* Recent parturition
* Immature animals
* Animal showing symptoms of infectious/contagious diseases
* Other conditions which maybe aesthetically unfit
* Casualty and emergency slaughter – emergency slaughter is required when an animal is in acute pain or is suffering from a condition where a delay in slaughter would be a contrary to the animal’s welfare, but the salvaging of carcass should not present any hazard to the consumers. E.g. severe injury, uterine prolapse, fractures and post-partum uterine haemorrhage in bovines

Casualty slaughter refers to the situation where an animal is not in an acute pain or immediate danger of death but affected with more chronic condition. E.g. obturator paralysis or post-partum paraplegia following milk fever or benign superficial tumours.

Significance if AMI:

* Tag ‘V’- unfit for slaughter
* Tag ‘S’ – suspect
* Tag ‘P’ – postpone slaughter and treatment
* Tag ‘CV’ - conditionally unfit
* Tag ‘D’- destroy and dispose

**Post-mortem inspection:**

It refers to the systematic examination of dressed carcasses and their organs including blood immediately after slaughter in the presence of adequate light by meat inspector with the object of providing wholesome meat to the consumers.

**Slaughtering and dressing of carcasses**

Two methods of slaughter:

* **Humane slaughter**: The act of killing must be carried out in such a way so as to cause minimum stress, distress or pain to the animals. It is normally a two-stage process i.e. Stunning and Bleeding

1. **Stunning**- it is the act of making the animals insensible or unconscious to pain while killing, slaughtering or sticking. The permitted methods of stunning of animals are:
2. Mechanical stunning –

* Penetrative Percussion stunning:
* Captive bold pistol: penetrative type captive bolt pistol produces insensibility by destruction of cortex and deeper parts of the brain. There is a sudden rise and fall in the intracranial pressure and sudden jerk caused due to the energy the bolt imparts in the head which is called as **Acceleration Concussion**
* Pneumatic stunner: in this the bolt is activated under a pressure of 80 – 120 psi and require complicated action to fire them. With proper pressure high bolt velocity can be achieved
* Non-penetrative percussion stunner: it uses a mushroom head and is used in calves where the brain tissue is collected for edible purpose. In this method since there is a high rise in the intra cranial pressure sticking should be accompanied within 30 secs of stunning otherwise it might lead to **Blood splashing**
* Water jet stunning: it uses a fine jet of water to penetrate the skull and mechanically destroy the brain by induction of laceration, crushing and or shockwaves to such an extent that immediate unconsciousness is induced. 0.5 mm jet is applied at pressures of 3500-4000 bars
* Pithing: after cattle are stunned, they are sometime pithed before bleeding by insertion of a long (0.6m) thin rod into the hole made by the penetrating bolt of the pistol. By inserting this rod, the motor centres of the brain are destroyed thereby causing cessation of reflex muscular action during sticking. This helps in avoiding injury to the operatives and increase the speed of carcass dressing. If the rod is longer than 0.6m, it may destroy the spinal cord root of the great splanchnic nerve, which is the major vasoconstrictor of the abdominal cavity. As a result, dilation of splanchnic blood vessels occurs resulting in congestion of liver, kidney, intestine and in addition causes the congestion and enlargement of spleen producing **Slaughter spleen**

1. Chemical or gaseous stunning

* Best suited for stunning of pigs
* Concentration of 65 – 70% CO2 for 45 secs in air is most suitable for preslaughter anaesthesia of pigs
* If the concentration is too low then the animals will be poorly stunned
* If the concentration is too high pigs have the tendency to become stiff show reflex muscular activity and bleed properly
* If the exposure time is too long, superficial congestion of skins occurs and on scalding the skin becomes bluish in colour
* 3 methods/ apparatus of gaseous stunning

1. The oval tunnel (combi)
2. The dip lift method
3. The compact carbon dioxide immobilizer or Ferris wheel
4. Electrical stunning

* Widely used method of stunning of poultry and pigs
* This method consists of passing of low voltage alternating electric current through the brain and is applied by means of two electrodes, which are placed on either side of the brain using tongs
* The current causes massive depolarization of neurons in the brain resulting in Epileptic seizures producing insensibility
* If the current employed is too high then the carcass quality will get reduced by production of haemorrhages and broken bones
* If the current applied is too low then the animal may be paralysed but still remained conscious called missed shock

Types of electrical stunning system

1. High voltage electrical stunning – it uses 300 V or above
2. Low voltage electrical stunning – it uses less than 150 V (commonly used for food animals)

Positioning of the electrodes:

1. Head only stunning (reversible)
2. Head to leg or head to back stunning (irreversible)
3. Water bath stunning

* **Religious/Ritual slaughter**

Ritual slaughter refers to the practice of slaughtering animals for food according to specific religious rites and regulations. These practices are typically defined by religious laws and traditions, which may require the animal to be conscious at the time of slaughter.

1. Jewish (Kosher) slaughter:

* Kosher describes food that meets Jewish dietary standards and is fit for consumption according to Jewish law, or Kashrut. The term "kosher" comes from the Hebrew word "kasher" which means "fit" or "proper."
* A single, quick thrust of a sharp knife is used to make the incision across the neck, protecting the trachea, oesophagus, carotid arteries, jugular veins, muscles, and skin.
* The incision should be completed without pause, pressure, stabbing, slanting or tearing
* The diaphragm should be exposed during dressing of carcass and allow manual examination of thoracic organs
* Before the retail sale of meat is undertaken blood vessels must be exposed off
* Kosher meat should be sold and consumed within 3 days of slaughter
* **Talmud**: the body of Jewish law and legend which specify the ritual method of slaughter as per Torah
* **Kosher meat**: meat fit for Jewish consumption
* **Shechita**: the act of killing animals for food
* **Shochet**: the person or the trained slaughtermen who perform shechita
* **Terefa**: the meat unfits for consumption by the Jewish community
* **Chalef**: the razor-sharp knife roughly twice the width of the animals neck, which is devoid of flaw and has been examined before the slaughter of each animal

1. Muslim (Halal) slaughter:

* Ritual method followed by Muslim community
* In this method the throat is transversely cut with a sharp knife, which serves the skin, muscles, oesophagus, trachea, carotid artery and jugular vein
* The method of killing an animal for the sole purpose of making its meat fit for human consumption is called **Zibah**
* Haram: meat unfit for human consumption by Muslim community

1. Jhatka (Sikh) slaughter:

* The head is separated from the body with a single swift cut made with the help of a large sword
* Bleeding remains incomplete due to damage of the medulla oblongata

1. Neck stab or evernazione method:

* In this method cattle are slaughtered by plunging a short double edge knife (puntilla) into the occipital-atlantal space at the nape of the neck severing the medulla oblongata

**Systems of Dressing of Food Animals:**

1. **Booth system –** the work is done in one place by one or two persons (butchers). No individual is allotted with a specific work. The entire operation is carried out on the floor or part of the flaying and evisceration is carried after hanging the carcass by chain hook or rope. The major disadvantage of this method is the hygienic condition, which remains poor and the operations congested.
2. **Line or on the rail dressing** – the method consists of conveying the carcass by gravity or power through an overhead rail to various places after stunning and sticking. Four types of line dressing systems are:
3. Gravity rail system:

* Carcass are suspended from a spreader and single-wheel runner or trolley, gravitated to each station and stopped by a manually operated stop on the overhead rail
* Used for lower slaughter rates of 10 - 40 cattle/hr
* Most compact and economical

1. Intermittent power system:

* Carcass is suspended on a spreader (gambrel) and trolley, and moved mechanically on a level rail at intervals by means of variable timing device which can be pre-set to suit the slaughter rate
* Used for slaughter rate of 10 – 75 cattle/hr

1. Continuous power system:

* Dressing is in continuous motion
* Carcass can be revolved to a full 360 ̊
* Used for slaughter rate of 40 – 120 cattle/hr

1. Canpak system:

* Continuous conveyor method where heavy beef runners or trolleys suspend the carcasses from the overhead rail
* No suspenders or gambrels are used as in other methods
* Used for slaughter rate of 50 – 150 cattle/hr
* Work divided into 32 divisions
* Each work carried out by one man specifically stationed at one place along the moving rail system
* When the carcass reaches his place, he will attend to only his allotted work
* Patented by Canada Packers Ltd., Canada

**Evaluation, grading and fabrication of dressed carcasses:**

Grading is defined as ranking as per quality with the help of prescribed standards or based on certain parameters.

The grade of an animal is determined on the basis of three grade factors:

* **Conformation-** refers to the build, shape and outline (contour) of an animal and its different primal cuts (wholesale cuts)
* **Quality-** refers to the firmness of the texture, freedom from coarseness to certain extent
* **Finish-** refers to the fatness of animal, which includes the fat on the outer surface of the carcass and inside of the abdominal and thoracic cavities and the inter and intramuscular fat.

Two grades used for judging the food animal carcasses:

1. **Quality grade:** based on the factors related to the palatability and acceptability of meat and meat products to the consumers.

The factors that are used to establish quality grades are:

* Kind and class
* Maturity
* Texture
* Marbling
* Firmness
* Colour and structure of lean
* Carcass defects

1. **Yield grade:** the factors that determine the cutability (indicates the proportionate amount of sealable retail cuts that can be obtain from a carcass) and yield grades (grading system established to segregate the carcass based on their expected retail yield) are:

* Amount of fat
* Muscle development
* Carcass size

**Rendering**

Rendering refers to the extraction of fat or oil by heat. It is the process of extraction of fat from animal tissues by the action of heat, which causes the cells to burst and release the melted fat to run out. The main objective of rendering in carcass byproduct plant is to separate the fat from proteinaceous material as cleanly as possible and minimize moisture content to avoid purification.

Methods of rendering:

1. Wet rendering –

* Produces good quality fat
* Pre-ground raw material is cooked in a closed digester under a pressure of 40-60 psi (120-140 ̊ C) for 3-4 hrs
* The pressure is closely released, the solid and liquid phare are separated
* The fat floats on top are drawn off and polished to remove residual water and fine particles
* Residual meat fibers/solid material left after extraction of the fat are called cracklings or greaves

1. Semi-continuous wet rendering-

* Produces high quality fat and low-fat meal
* Involves cooking of raw material in a conventional cooker under pressure for short time
* Cooked material is transferred to separate the liquor from wet solids
* Solids are dried and the fat is separated from liquor by disk centrifugation
* The process water (stick) is evaporated in multiple effect evaporator and recovered materials are added to the wet solids.

1. Dry rendering-

* Consists of both batch and continuous process
* The digester or cooker is double jacketed vessel
* Used to eliminate the unwanted moisture from raw material without loss of nutrients
* The cooker contents are then discharged into a percolating tank to remove free drain fat
* Then the solids material is pressed or centrifuged to remove additional fat
* The solid materials are ground in a mill to make meal

1. Low temperature rendering (LTR system)-

* The system based on wet rendering process with some modification to overcome some disadvantages of dry rendering process
* Heta treatment is minimized and separation is carried out at low temperature (70-100 ̊ C)
* It is a continuous process with materials passing through the size reduction equipment, heating unit, decanter, separation unit, evaporator and drier
* The flow of the materials is balanced by the use of surge bins and/or variable speed drivers

Yield of the product-

* Wet rendering process 4:1
* Dry rendering process 3:1
* Blood meal preparation 5:1

**Abattoir effluent treatment**

Most plant effluent denotes waste materials from slaughtering and processing departments and is derived by high organic matter, especially protein and fat, suspended solids and with abnormally high value of biologically oxygen demand (BOD)

Effluent or waste emanating through slaughter and processing operations re many and include both solid and liquid components. Discarded feed, faecal material, urine, blood, hairs, the waste water of clean-up operations and the wastes from the livestock holding pens and slaughter floor etc are the effluents.

The objective of the effluent is to produce a product that can be safely discharged in a waterway or sewer in compliance with the recommended limits for discharge.

Principles of effluent treatment:

1. Primary/preliminary effluent treatment –

* Primary filtration
* Secondary filtration
* Fat separation tank
* Equalization tank

1. Secondary treatment

* Anaerobic process
* Aerobic process
* Activated sludge process
* Channel aeration process (Pasveer)
* Biological filtration process

**Biological Oxygen Demand (BOD)**

It is the amount of oxygen required during the first five days for decomposition of organic matter at 20 **̊**C by aerobic biological demand. It is generally used to determine the concentration of pollutant remaining after treatment and prior to discharge.

**Chemical Oxygen Demand (COD)**

It is the measure of oxygen required for the oxidation of all organic matter in a known volume of effluent. The COD is a cheaper and more accurate means of determining the oxygen requirements of an effluent before treatment.

**Average BOD values for some food processing operations:**

|  |  |
| --- | --- |
| Pig meat plant | 1500-2000 mg/litre |
| Poultry meat plant | 1000-1200 mg/litre |
| Cattle/sheep | 1400-3200 mg/litre |
| Fish processing | 1000-3000 mg/litre |
| Dairy (washing) | 600-1300 mg/litre |

Higher the BOD level, higher the organic matter content and greater its pollution capability.

Domestic sewage BOD – 250-300 mg/L

Slaughterhouse BOD – 1500-2000 mg/L

**Indian Standard Specifications for an Abattoirs:**

|  |  |  |
| --- | --- | --- |
| **Sl.no** | **IS no** | **Category** |
| 1 | **IS 4393:1979** | Basic requirements for an abattoir |
| 2 | **IS 1982: 1971** | Code of practice for ante-mortem and post-mortem inspection of meat animals |
| 3 | **IS 6659: 1972** | Code of practice for ante-mortem and post-mortem practice for poultry |
| 4 | **IS 5236: 1962** | Code of transport of pigs by rail and road |

**Fill in the blanks**

1. In neck stab method, cattle are slaughtered by \_\_\_\_\_\_\_\_\_.
2. Masseters are incised during PM examinations of cattle for detection of \_\_\_\_\_\_\_\_\_.
3. Meat unfit for consumption is called as \_\_\_\_\_\_\_\_\_\_.
4. Age of bruising can be determined by \_\_\_\_\_\_\_\_\_\_\_.
5. Stamping ink for carcasses contain \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
6. Cathepsins are \_\_\_\_\_\_\_\_in nature.
7. To avoid muscle splashing animal should be bled within \_\_\_\_\_\_\_seconds after electrical stunning.
8. The working of the slaughterhouse in India is governed by \_\_\_\_\_\_\_\_\_.
9. Glue is a crude form of \_\_\_\_\_\_\_\_\_\_\_\_.
10. Long axis of an abattoir should face in \_\_\_\_\_\_\_\_\_\_\_\_ direction.
11. Incinerator temperature for carcass disposal is \_\_\_\_\_\_\_\_\_\_.
12. \_\_\_\_\_\_\_\_\_\_ method is preferred for disposal of an anthrax carcass.
13. \_\_\_\_\_\_\_\_\_\_\_ is the most tender cut of the beef carcass.
14. Pig skin is called as \_\_\_\_\_\_\_\_\_\_.
15. Bone collagen is called as \_\_\_\_\_\_\_\_\_\_\_\_.
16. Slaughtering of the animal without prior stunning is called as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
17. Puntilla is used in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ method.
18. Bleeding time for pig, sheep and goat is \_\_\_\_\_\_\_\_\_.
19. Appearance of petechial haemorrhages throughout subcutaneous tissue in pigs during electrical stunning is called as \_\_\_\_\_\_\_\_\_\_.
20. Recommended water requirement for a pig per day in an abattoir is \_\_\_\_\_\_\_\_\_\_\_.
21. The length of race in an abattoir is \_\_\_\_\_\_\_\_ meters.
22. Chlorine required for sanitation of abattoir plant is \_\_\_\_\_\_\_\_\_\_\_ ppm.
23. Commercial method used for stunning of poultry is \_\_\_\_\_\_\_\_\_\_\_\_.
24. Subcutaneous fat is commonly seen in\_\_\_\_\_\_\_\_\_\_\_.
25. \_\_\_\_\_\_\_\_ has maximum and minimum water content in the meat.
26. Intramuscular fat is commonly seen in \_\_\_\_\_\_\_\_\_\_.
27. Thaw rigor and cold shortening is commonly occurred in \_\_\_\_\_\_\_\_\_.
28. Dressing percentage is highest in \_\_\_\_\_\_\_.
29. Immersion of poultry in hot water for loosening the feathers is known as \_\_\_\_\_\_\_\_\_.
30. Improper sticking of pig results in aspiration of blood into the thoracic cavity is known as \_\_\_\_\_\_\_\_\_\_\_.
31. Processing of carcass immediately after slaughter without undergoing chilling is called as \_\_\_\_\_\_\_\_\_\_\_.
32. Scalding temperature for pigs is ­­­­­­­­­­­\_\_\_\_\_\_\_\_.
33. Head only electrical stunning is \_\_\_\_\_\_\_\_\_\_\_\_.
34. \_\_\_\_\_\_\_\_\_\_\_\_ slaughter method causes minimum pain to the animal.
35. Number of cattle slaughtered in gravity rail system is \_\_\_\_\_\_\_\_\_\_.
36. \_\_\_\_\_\_\_\_\_\_ is the father of meat inspection.
37. Humidity in meat chilling room should be \_\_\_\_\_\_\_\_\_.
38. Condensation of water vapour in chilled meat is known as \_\_\_\_\_\_\_\_\_.
39. Bone darkening caused by freezing and thawing is common in \_\_\_\_\_\_\_\_\_\_\_.
40. Secondary effluent treatment is carried out using \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ system.
41. Primary treatment is done based on the removal of \_\_\_\_\_\_\_\_\_.
42. The major product of activated sludge process is called \_\_\_\_\_\_\_\_\_\_\_.
43. Residual meat fibers or solid material left after all fat have been removed is called as \_\_\_\_\_\_\_\_\_\_\_.
44. Wet rendering produces \_\_\_\_\_\_\_\_ quality fat.
45. The digester or cooker of dry rendering process used a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ vessel.
46. In rendering the moisture percent should not exceed \_\_\_\_\_\_\_\_\_.
47. Marbling in pork is indicated by fine streaks of fat visible in inter-costal muscles between the ribs called as \_\_\_\_\_\_\_\_\_.
48. \_\_\_\_\_\_\_\_\_\_\_ refers to the fatness of the animals.
49. \_\_\_\_\_\_\_\_\_\_\_\_ refers to the flaying and evisceration of the animal after slaughter.
50. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ system, carcasses are suspended from a spreader and single wheel trolley or runner.

**Match the column:**

|  |  |
| --- | --- |
| **Table I** | **Table II** |
| 1. Terepha | 1. Double edge knife |
| 1. Schochet | 1. Unfit carcass |
| 1. Kosher | 1. Butcher |
| 1. Puntilla | 1. Act of killing in Jewish slaughter |
| 1. Schechita | 1. Carcass fit for Jewish consumption |



|  |  |
| --- | --- |
| **Table I** | **Table II** |
| 1. Suspect | a) Acute pain and fracture of limb |
| 2. CasualtySlaughter | b) Excited and transit sickness |
| 3. Emergency slaughter | c) Pneumonia |
| 4. Delayed slaughter | d) Emaciation |
| 5. Unfit for slaughter | e) Chronic condition |

|  |  |
| --- | --- |
| **Table I** | **Table II** |
| 1. Brain | a) Relaxin |
| 2. Stomach | b) Heparin |
| 3. Liver | c) Rennet and pepsin |
| 4. Ovaries | d) Insulin |
| 5. Pancrease | e) Cholesterol |

|  |  |
| --- | --- |
| **Table I** | **Table II** |
| 1. Neets foot oil | a) Fallen animal bones |
| 2. Ossein | b) Potteries |
| 3. Bone china | c) Freshly killed animal bones |
| 4.Desert bones | d) Shin bones |
| 5. Green bones | e) Bone protein |

|  |  |
| --- | --- |
| **Table I** | **Table II** |
| 1. Tankage | a) Skin of newborn calf |
| 2. Crackling | b) Collagen |
| 3. Slunk | c) Dry rendering |
| 4. Feathers | d) Keratin |
| 5. Skin | e) Wet rendering |

|  |  |
| --- | --- |
| **Table I** | **Table II** |
| 1. Porging | a) Downward rolling of eyeball |
| 2. Pithing | b) Removal of the filoplumes |
| 3. Searching | c) Removal of the major blood vessels |
| 4.Singeing | d) Puncturing the back of the neck prior to bleeding |
| 5. Electroleptic fit | e) Identification of adhesions in the thoracic cavity |

|  |  |
| --- | --- |
| **Table I** | **Table II** |
| 1. Two-toning | a) pH 5.3 |
| 2. DFD | b) Immediate and permanent insensibility |
| 3. PSE | c) Lungs contaminated with blood |
| 4. Acceleration concussion | d) Presence of both dark and pale coloured areas in the same muscle |
| 5. Back bleeding | e) pH 6.2 |

|  |  |
| --- | --- |
| **Table I** | **Table II** |
| 1. Missed shock | a) Poultry |
| 2. Electrical stunning | b) 80-120 psi |
| 3. Water bath stunning | c) Low electrical current |
| 4. Pneumatic stunner | d) Mushroom head |
| 5. Non-penetrative percussion stunner | e) Pigs and poultry |

**Multiple Choice Questions.**

1. Pale, soft and exudative meat is called as
2. Watery beef
3. Watery pork
4. Slimy beef
5. Slimy pork
6. Dark, firm and dry meat is common in
7. Buffalo
8. Pig
9. Beef
10. Sheep
11. PSE meat is an immediate outcome of
12. Neutral pH of muscle
13. Rapid fall of muscle pH
14. Very little decline in the muscle pH
15. None
16. Consumption of horse flesh is called as
17. Hippophagia
18. Kynophagia
19. Coprophagy
20. Caninephagy
21. Consumption od dog flesh is called as
22. Hippophagia
23. Kynophagia
24. Coprophagy
25. Caninephagia
26. Buffen is another name of
27. Mutton
28. Chevon
29. Beef
30. Carabeef
31. Prime pork refers to
32. Carcass of castrated male and virgin female of pig
33. Carcass of non-castrated male and virgin female of pig
34. Both of the above
35. None of the above
36. The process of extracting fat from a dead body is called
37. Bruising
38. Rendering
39. Simmering
40. None
41. The firmness of meat is measured by
42. Penetrometer
43. Shear force apparatus
44. Both
45. None
46. Slaughtering of the animal without prior stunning is called as
47. Ritual slaughter
48. Humane slaughter
49. Both of the above
50. None of the above
51. Puntilla is used in
52. Jhatjka method
53. Halal method
54. Evernazine method
55. None
56. In Muslims, eating of \_\_\_\_\_ is forbidden
57. Blood
58. Pork
59. Dead animal
60. All of the above
61. Jewish-approved carcasses are stamped with
62. Terepha on brisket
63. Kosher seal on brisket
64. Kosher seal on dewlap
65. None
66. Which of the following methods of ritual slaughter involves incomplete bleeding because the medulla oblongata is damaged?
67. Jhatka and Halal
68. Jhatka method
69. Jewish and Halal method
70. Jhatka and Evernazine method
71. Instrument(s) used in mechanical stunning is/are
72. Percussion stunner
73. Captive bolt pistol
74. Both
75. None
76. Best age to slaughter pig is
77. 9-12 months
78. 6-7 months
79. 13-14 months
80. 16-18 months
81. Best age to slaughter goat to obtain good quality meat yield is
82. 6-9 months
83. 12-16 months
84. 4-8 months
85. 18-20 months
86. Dressing percentage of poultry is
87. 65-70 %
88. 60-65 %
89. 70-75 %
90. 50-55 %
91. Dressing percentage of indigenous pig is
92. 65-70 %
93. 60-65 %
94. 70-75 %
95. 50-55 %
96. Dressing percentage of crossbred pig is
97. 65-70 %
98. 70-75 %
99. 60-65 %
100. 50-55 %
101. Percentage of meat yield after deboning is
102. 33%
103. 55 %
104. 50 %
105. 40 %
106. Dressing percentage of bone is
107. 10
108. 20
109. 30
110. 40
111. Dressing percentage of buffalo is
112. 45-50 %
113. 50-55 %
114. 60-65%
115. 65-70 %
116. There is an ammoniacal odour in the meat of
117. Goat
118. Pig
119. Buffalo
120. Sheep
121. Urine like odour meat is found is
122. Pork
123. Mutton
124. Beef
125. Chevon
126. Intramuscular fat is absent in
127. Pork
128. Mutton
129. Chevon
130. Beef
131. Presence of subcutaneous fat is abundant in
132. Pig
133. Chevon
134. Beef
135. Chicken
136. Lean meat is produced more by
137. Pig
138. Rabbit
139. Goat
140. Sheep
141. Pig gives higher dressing percentage because of
142. Inclusion of skin in meat
143. Higher meat bone ratio
144. More intramuscular fat
145. All
146. Water requirement for buffalo/cattle in the abattoir is
147. 1000 L/ buffalo or cattle
148. 450 L/ buffalo or cattle
149. 700 L/ buffalo or cattle
150. 300 L/ buffalo or cattle
151. Water requirement for sheep/goat in the abattoir is
152. 100 L/ sheep or goat
153. 250 L/ sheep or goat
154. 300 L/ sheep or goat
155. 450 L/ sheep or goat
156. Water requirement for pig in the abattoir is
157. 100 L/ pig
158. 250 L/ pig
159. 300 L/ pig
160. 450 L/ pig
161. Requirement of water pressure for slaughterhouse operations
162. 10 psi
163. 20 psi
164. 30 psi
165. 40 psi
166. The minimum ceiling height in an abattoir should be
167. 5 meters
168. 6 meters
169. 7 meters
170. 8 meters
171. A drainage inlet should be located on the floor of the slaughterhouse every
172. 16 m2
173. 26 m2
174. 36 m2
175. 46 m2
176. The following rail is most appropriate in Indian conditions.
177. Conveyor rail
178. Gravity rail
179. Feeder rail
180. None
181. There is no use of gambrel in
182. Canpak system
183. Feeder system
184. Gravity rail system
185. Conveyor system
186. Overhead rail is preferred in modern abattoir because
187. Moves the carcasses easily
188. attractive in appearance
189. It improves operational efficiency
190. All
191. Carcasses in the Canpak system are suspended by
192. Gambrel
193. Trolleys
194. Spreader
195. None
196. For large animal, space requirement in lairage should be
197. 2.8 m2
198. 2 m2
199. 1.5 m2
200. 1 m2
201. For small animal, space requirement in lairage should be
202. 0.3 m2
203. 0.6 m2
204. 0.8 m2
205. 1 m2
206. Minimum distance between slaughter house and lairage in small abattoir should be between
207. 10 m
208. 20 m
209. 30 m
210. 40 m
211. The chilling room's air velocity should be as follows for efficient chilling
212. >5 m/s
213. 2-5 m/s
214. 0.5-1 m/s
215. <0.5 m/s
216. The meat cutting room's temperature should be lower than
217. 3 ̊C
218. 0 ̊C
219. 7 ̊C
220. 10 ̊C
221. The chilling room temperature for chicken carcasses and retail cuts should be
222. -2 ̊C
223. 0 ̊C
224. 3 ̊C
225. 7 ̊C
226. There is maintenance of good hygiene in
227. Line system
228. Booth system
229. Both
230. None
231. Temperature of the offal room should be below
232. 3 ̊C
233. 0 ̊C
234. 7 ̊C
235. 10 ̊C
236. 18 hours before slaughter, feed is withheld because
237. Stunning gets more effective
238. It makes the removal of hides or skin easier
239. Reduces the amount of bacterial load in the intestine.
240. All
241. Slaughtering an animal in an emergency occurs when it is in
242. Suffering from fever
243. Suffering with an infectious disease
244. In acute pain
245. None
246. Maximum bleeding occurs in
247. Humane slaughter
248. Halal method
249. Jewish method
250. Jhatka method
251. Bleeding time of cattle
252. 2 min
253. 3 min
254. 5 min
255. 6 min
256. Stunning results in unconsciousness for a period of
257. 20 to 30 secs
258. 30 to 1 min
259. 1 to 2 min
260. 2 to 3 min
261. The procedure of inserting a thin steel rod (approx. 0.5 m) into the entire skull using a captive bolt gun is known as
262. Porging
263. Pithing
264. Searching
265. None of the above
266. Pithing in large animals is
267. Done before stunning
268. Done after stunning
269. Done after bleeding
270. None of the above
271. Pneumatic stunner
272. Penetrates the brain
273. Penetrates the frontal bone
274. Does not penetrate the frontal bone
275. Penetrate medulla oblongata
276. A captive bolt gun strikes an animal component
277. Frontal bone
278. Brain
279. Head
280. Medulla oblongata
281. A captive bolt pistol is frequently used to stun which of the animal
282. Pig
283. Cattle
284. Sheep
285. Goat
286. Free bullet pistol is used for stunning of
287. Horse
288. Large bull
289. Both of the above
290. Cattle
291. Pigs that receive gas stunning are subjected to
292. 80 % carbon dioxide
293. 80 % oxygen
294. 65 % carbon dioxide
295. 80 % oxygen
296. Electrodes in Elther apparatus are dipped in a solution to allow for easier current transmission
297. 20 % saline solution
298. 20 % alkaline solution
299. 20 % acidic solution
300. None of the above
301. Scalding for pig is done at
302. 70 ̊C for 6 min
303. 65 ̊C for 6 min
304. 60 ̊C for 6 min
305. 55 ̊C for 6 min
306. Soft scalding for poultry is done at
307. 40 ̊C for 3 min
308. 45 ̊C for 3 min
309. 50 ̊C for 3 min
310. 55 ̊C for 3 min
311. Hard scalding for poultry is done at
312. 40 ̊C for 3 min
313. 45 ̊C for 3 min
314. 50 ̊C for 3 min
315. 55 ̊C for 3 min
316. During dressing scrapping of skin is done for
317. Poultry
318. Goat
319. Cattle
320. Pig
321. Efficient bleeding doesn’t occur in Jhatka method because
322. Damage of the oesophagus
323. Damage of the carotid arteries
324. Damage of the medulla oblongata
325. Damage of the jugular vein
326. Seingeing is done to
327. makes the rinds firmer and gives better appearance
328. Sterilizes the cuticles
329. Burnt the filoplumes and small thick hairs
330. All
331. V-shaped area between lairage and slaughter house is called as
332. V-race area
333. V- hall
334. V- slaughter area
335. None of the above
336. \_\_\_\_\_\_\_\_is not a meat lymph node for buffalo and cattle
337. Mediastinal
338. Popliteal
339. Axillary
340. Prescapular
341. Most casings come from
342. Tunica submucosa
343. Tunica muscularis
344. Tunica serosa
345. Mucous coat
346. Which of the following does not belong in the sheep's pluck?
347. Liver
348. Kidney
349. Lungs
350. Heart
351. Fat surrounding intestine and stomach is called
352. Caul fat
353. Leaf fat
354. Pate fat
355. None of the above
356. Long-term exposure to salt in the stomach causes a defect
357. Salt burn
358. Nitrate burn
359. Freezer burn
360. None of the above
361. During dry rendering, the processing condition is
362. 75 psi for 3-4 hr
363. 75 psi for 6-8 hr
364. 85 psi for 3-4 hr
365. 85 psi for 6-8 hr
366. Elimination of the mucous lining from the casing is known as
367. Stripping
368. Sliming
369. Pulling
370. Fermentation
371. Variety meat is also called as
372. Inedible offal
373. Edible offal
374. Both of the above
375. None of the above
376. Give the accurate statement on the titre of rendered fat.
377. Sheep fat 44 to 48 ̊C
378. Lard 36 to 40 ̊C
379. Tallow 42 to 45 ̊C
380. All of the above
381. Sludge or tankage from wet rendering can be used as
382. Meal
383. Bedding components
384. Fertilizer
385. All of the above
386. Crackling is produced during
387. Wet rendering
388. Dry rendering
389. Both of the above
390. None of the above
391. Meat produced by halal method is known as
392. Dhabiha meat
393. Halal meat
394. Zabiha meat
395. All of the above
396. \_\_\_\_\_\_\_ feet of trickling filters are inserted, through which effluent is poured
397. 1-5
398. 3-10
399. 8-15
400. 13-19
401. In pneumatic stunner, the bolt is activated under a pressure of
402. 60-80 psi
403. 80-120 psi
404. 120-150 psi
405. 150-180 psi
406. Primary treatment of the effluent results in the reduction up to
407. 90% of fats, 35 % of solids and 65 % of BOD
408. 65 % of fats, 35 % of solids and 90 % of BOD
409. 90 % of fats, 65 % of solids and 35 % of BOD
410. 65 % of fats, 35 % of solids and 90 % of BOD
411. In aerobic process, oxygen assists bacterial action to reduce the
412. BOD
413. COD
414. Both
415. None
416. The aim of rendering is to produce a final product with the moisture not exceeding
417. 5 %
418. 6 %
419. 7 %
420. 8 %
421. The yield in dry rendering process is
422. 1:1
423. 2:1
424. 3:1
425. 4:1
426. The yield in wet rendering is
427. 1:1
428. 2:1
429. 3:1
430. 4:1
431. Contamination with bacteria that causes brine staining in cold-stored carcasses is
432. Calcium chloride
433. Sodium chloride
434. Calcium hydroxide
435. Sodium hydroxide
436. When muscles are in a pre-rigor stage and are treated to a chilling temperature, they contract severely. This phenomenon is known as
437. Two toning
438. Cold shortening
439. Thaw rigor
440. Short meat
441. The process of freezing at extremely low temperatures using condensed or liquified vapours is known as
442. Surface freezing
443. Blast freezing
444. Cryogenic freezing
445. Plate freezing
446. When thawing, drip losses are more in
447. Fast freezing
448. Intermediate freezing
449. Slow freezing
450. None
451. An excessive loss of moisture from the meat's surface during freezer preservation is referred to as
452. Nitrate burn
453. Nitrite burn
454. Cold shortening
455. Freezer burn
456. Condensation of water vapour from chilled meat is known as
457. Slime
458. Shrinkage
459. Sweating
460. Wilting
461. Cold shortening is caused by the release of stored
462. Potassium ions
463. Calcium ions
464. Chloride ions
465. Magnesium ions
466. When the main blood vessels in the neck area of food animals are severed, it is referred to as
467. Exsanguination
468. Bleeding
469. Sticking
470. All of the above
471. By using the Canpak rail system, the rate of killing animal is
472. 10-50 cattle/hr
473. 10-80 cattle/hr
474. 50-150 cattle/hr
475. 50-75 cattle/hr
476. Bleeding in cattle is more effective in
477. Rail system or vertical position
478. Horizontal position
479. Both
480. None
481. The region with the highest frequency of blood splashing is
482. Head to back electric stunning
483. Head only electric stunning
484. Gaseous stunning
485. Captive bolt stunning
486. The rod length used for pithing should not exceed
487. 0.3 m
488. 0.5 m
489. 0.6 m
490. 0.8 m
491. The electric stunner's electrodes need to be maintained moist by submerging them in
492. Water
493. Lime water
494. Brine
495. None
496. To restore glycogen \_\_\_\_\_\_\_\_\_\_ is fed to pigs prior to slaughter
497. Groundnut cake
498. Grains
499. Maize
500. Molasses
501. Two toning condition is most noticeable in
502. Ham
503. Bacon
504. Lamb
505. Beef
506. A more precise method for ascertaining an effluent's oxygen requirements is
507. BOD
508. COD
509. DOD
510. EOD
511. The BOD of blood is
512. 250 mg/L
513. 2500 mg/L
514. 25000 mg/L
515. 250000 mg/L
516. Too low and too high current during electrical stunning may causes
517. Missed shock and splash respectively
518. Splash and missed shock respectively
519. Both
520. None
521. Which of the following statement is/are true about abattoir
522. Humidity of the carcass chilling room should be 90 %
523. Temperature of cutting room should not exceed 10 ̊C
524. Chilling temperature should not exceed 4 ̊C for offal’s and 7 ̊C for carcasses
525. All of the above
526. Which of the following is true about the effluent treatment of abattoir
527. BOD in the effluent is decreased after primary treatment by up to 75-80%.
528. 95 % of the biochemical oxygen requirement can be reduced by biological filters
529. Both of the above
530. None of the above
531. Central cleaning system (CCS) is commonly used in
532. Dairy plant
533. Abattoir and meat processing plant
534. Fish industry
535. None
536. Vitamins lost during cold sterilization is
537. C
538. B1
539. B2
540. All of the above
541. Most commonly used humectants are
542. Propylene glycol
543. NaCl, Sugar
544. Glycerol, sorbitol
545. All of the above
546. Which is referred to as inspectors’ lymph node
547. Popliteal
548. Mediastinal
549. Bronchial
550. All of the above
551. Extended post-slaughter stress can result in
552. Slow rigor
553. Delay rigor
554. Faster rigor
555. No rigor
556. The maximal exposure period for pigs in gas stunning to be effective is
557. 15 sec
558. 60 sec
559. 90 sec
560. 120 sec
561. For non-penetrating concussion, the bolt used is
562. V shaped
563. Mushroom head
564. M shaped
565. Round shaped
566. A monorail-style or V-shaped restraining conveyor is used for except
567. Cattle
568. Goat
569. Pig
570. Sheep
571. Anatomical methods cannot identify the species from the meat sample of
572. Primal cuts
573. Sub-primal cuts
574. Retail cuts
575. Deboned meat
576. Meat with highest iodine value
577. Pig
578. Sheep
579. Goat
580. Poultry
581. Appropriate technique for identifying species in cooked beef samples
582. Electrophoretic method
583. Chromatographic method
584. Precipitation test
585. DNA hybridization technique
586. To identify the species of meat, a glycogen test needs to be performed
587. Immediately after slaughter
588. Any time after slaughter
589. After completion of rigor mortis
590. After proper ageing of carcass
591. Glue is obtained at
592. 60 ̊ C
593. 70 ̊ C
594. 80 ̊ C
595. 100 ̊ C
596. For hygienic recovery of blood \_\_\_\_\_\_\_\_ is used
597. Puntilla
598. Sword
599. Trocar and canulla
600. Butchers knife
601. Proteolytic changes in aging arise from the actions of
602. Casein
603. Calpain
604. Cathepsin
605. All of the above
606. Tying up the anus and intestinal contents to stop contents from spilling during the preparation of beef
607. Porging
608. Searching
609. Bunging
610. Tying
611. The product of value derived from animal hides is
612. Skin
613. Leather
614. Wool
615. All the above
616. Byproduct which is obtained from dry rendering of poultry is
617. Chicken fat
618. Blood meal
619. Feather meal
620. Poultry carcass meal
621. The thickness and distribution of depot fat and external fat are defined as
622. Finish
623. Feathering
624. Marbling
625. Conformation
626. Maintaining the pH at around -------- during effluent treatment is crucial for aerobic digestion
627. 5.2
628. 6.2
629. 7.2
630. 8.2
631. The process of preserving skin and hides by using salts is called
632. Sammoying
633. Bating
634. Staking
635. Curing
636. When a solid surface is cleaned, the removal of one fluid by another medium is referred to as
637. Wetting
638. Baiting
639. Cleaning
640. Sammoying
641. The process of removal of vegetable matter from wool is called as
642. Carbonizing
643. Skirting
644. Baiting
645. Sammoying
646. In sheep carcass the smallest primal cut is
647. Rack
648. Breast
649. Loin
650. Chuck
651. The testicular enzyme that is isolated and used as a spreading agent
652. Renin
653. Pepsin
654. Hyaluronidase
655. Lipase
656. The primary measure in fat rendering to stop the action of an enzyme known as
657. Renin
658. Pepsin
659. Hyaluronidase
660. Lipase
661. The richest source of blood meal is
662. Glycine
663. Methionine
664. Arginine
665. None
666. The back fat thickness is measured at
667. 1st rib
668. 2nd rib
669. Last lumbar vertebrae
670. All
671. Animal slaughterhouse biological wastes can be utilized to make the
672. Bone meal
673. Blood meal
674. Meat meal
675. Organic manure
676. The process of cleaning the grain surface of hides by using proteolytic enzymes is referred to as
677. Staking
678. Skirting
679. Bating
680. Carbonizing
681. Bone collagen from the following is
682. Gelatin
683. Ossein
684. Cellulose
685. Cystine
686. The primary factor causing detrimental alterations in the carcass quality is
687. Internal parasites
688. Bruise
689. Stress
690. Mites
691. The lymph nodes commonly incised to detect Tuberculosis is
692. Scapular
693. Prescapular
694. Mediastinal
695. Crural
696. Cases involving flaying are often handled in
697. Pig
698. Goat
699. Buffalo
700. Sheep
701. Effective stunning shows a sign of
702. Tonic spasm
703. Clonic spasm
704. Opisthotonos
705. None of the above
706. Central Leather research Institute is located in
707. Bangalore
708. Rajasthan
709. Chennai
710. Mumbai
711. In wet areas of the slaughterhouse, the floor gradient should be
712. 1:40
713. 1:50
714. 1:60
715. 1:70
716. The following way of stunning revealed the presence of the symptom "opisthotonus."
717. Electrical
718. Pneumatic
719. Percussive
720. CO2
721. Conditioning of meat is due to
722. Enzymatic action
723. Bacterial action
724. Both of the above
725. Atmospheric oxidation
726. In which method of stunning, the animal's hydration is more crucial
727. Electrical
728. Pneumatic
729. Percussive
730. CO2
731. Techniques of slaughter that cause insufficient bleeding is
732. Jewish
733. Jatka
734. Halal
735. Electrical stimulation
736. When heavy beef carcasses are not chilled quickly enough, spoiling conditions include
737. Bone taint
738. Ham taint
739. Both of the above
740. None of the above
741. Animals transported and their decreased live weight as a result of water loss from perspiration and breathing are referred to as
742. Incisional shrinkage
743. Inspiratory shrinkage
744. Excisional shrinkage
745. Excretory shrinkage
746. Bone taint-affected muscles emit ----------smell
747. Sour
748. Sweet
749. Sewage
750. Salty

**Answer Key**

**Fill in the blanksThe procedure used to extract vegetable materials from wool is known as**

1. Puntilla
2. Cysticercus bovis
3. Terepha
4. Bilirubin test
5. 2 % fuchsine in acetic acid
6. Proteolytic
7. 30 seconds
8. FSSAI
9. Gelatin
10. East or west
11. 600-800 **̊**C
12. Incineration
13. Sirloin
14. Rind
15. Demineralized bone
16. Ritual slaughter
17. Evernazine method
18. 5 minutes
19. Splash
20. 1000 L
21. 10 meters
22. 130-250 ppm
23. Electric water bath
24. Pig
25. Pork
26. Beef
27. Pre-rigor meat
28. Pig
29. Scalding
30. Back bleeding or over sticking
31. Hot processing
32. 62-64 **̊**C
33. Reversible
34. Humane
35. 10-40 cattle/hr
36. Ostertag
37. 85-90 %
38. Sweating
39. Young poultry
40. Biological treatment
41. Solids
42. Biomass
43. Cracklings or greaves
44. Good
45. Double-jacketed
46. 7 percent
47. Feathering
48. Finish
49. Dressing
50. Gravity rail system

**Match the column**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** |
| 1 b | 1 c | 1 e | 1 d | 1 c | 1 c | 1 d | 1 c |
| 2 c | 2 e | 2 c | 2 e | 2 e | 2 d | 2 e | 2 e |
| 3 e | 3 a | 3 b | 3 b | 3 a | 3 e | 3 a | 3 a |
| 4 a | 4 b | 4 a | 4 a | 4 d | 4 b | 4 b | 4 b |
| 5 d | 5 c | 5 d | 5 c | 5 b | 5 a | 5 c | 5 d |

**Multiple choice question**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 (b) | 2 (c) | 3 (b) | 4 (a) | 5 (b) | 6 (d) | 7 (a) | 8 (b) | 9 (c) |
| 10 (a) | 11 (c) | 12 (d) | 13 (b) | 14 (d) | 15 (c) | 16 (b) | 17 (a) | 18 (b) |
| 19 (a) | 20 (b) | 21 (a) | 22 (b) | 23 (b) | 24 (d) | 25 (a) | 26 (c) | 27 (a) |
| 28 (b) | 29 (a) | 30 (a) | 31 (a) | 32 (d) | 33 (b) | 34 (a) | 35 (c) | 36 (b) |
| 37 (a) | 38 (d) | 39 (b) | 40 (a) | 41 (b) | 42 (a) | 43 (b) | 44 (c) | 45 (d) |
| 46 (c) | 47 (a) | 48 (d) | 49 (c) | 50 (a) | 51 (d) | 52 (b) | 53 (b) | 54 (b) |
| 55 (c) | 56 (a) | 57 (b) | 58 (c) | 59 (c) | 60 (b) | 61 (c) | 62 (c) | 63 (d) |
| 64 (d) | 65(c) | 66 (d) | 67 (a) | 68 (a) | 69 (a) | 70 (b) | 71 (a) | 72 (a) |
| 73 (a) | 74 (b) | 75 (b) | 76 (d) | 77 (a) | 78 (b) | 79 (d) | 80 (b) | 81 (b) |
| 82 (c) | 83 (a) | 84 (c) | 85 (c) | 86 (d) | 87 (a) | 88 (b) | 89 (c) | 90 (a) |
| 91 (d) | 92 (c) | 93 (b) | 94 (d) | 95 (c) | 96 (a) | 97 (b) | 98 (c) | 99 (c) |
| 100 (d) | 101 (a) | 102 (b) | 103 (d) | 104 (b) | 105 (d) | 106 (c) | 107 (b) | 108 (d) |
| 109 (d) | 110 (c) | 111 (c) | 112 (c) | 113 (b) | 114 (a) | 115 (d) | 116 (a) | 117 (d) |
| 118 (a) | 119 (d) | 120 (c) | 121 (b) | 122 (c) | 123 (b) | 124 (d) | 125 (a) | 126 (c) |
| 127 (d) | 128 (a) | 129 (a) | 130 (a) | 131 (c) | 133 (b) | 134 (d) | 135 (d) | 136 (c) |
| 137 (b) | 138 (c) | 139 (c) | 140 (b) | 141(a) | 142 (c) | 143 (b) | 144 (d) | 145 (a) |
| 146 (d) | 147 (b) | 148 (c) | 149 (d) | 150 (c) |