

THE PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY

FIRST SEMESTER EXAMINATIONS - 2020

FOOD TECHNOLOGY - FOURTH YEAR DEGREE

FT 431 MEAT, EGG AND POULTRY TECHNOLOGY

MONDAY 22ND JUNE, 2020 – 08:20 A.M.

TIME ALLOWED: 3 HOURS

INFORMATION FOR CANDIDATES:

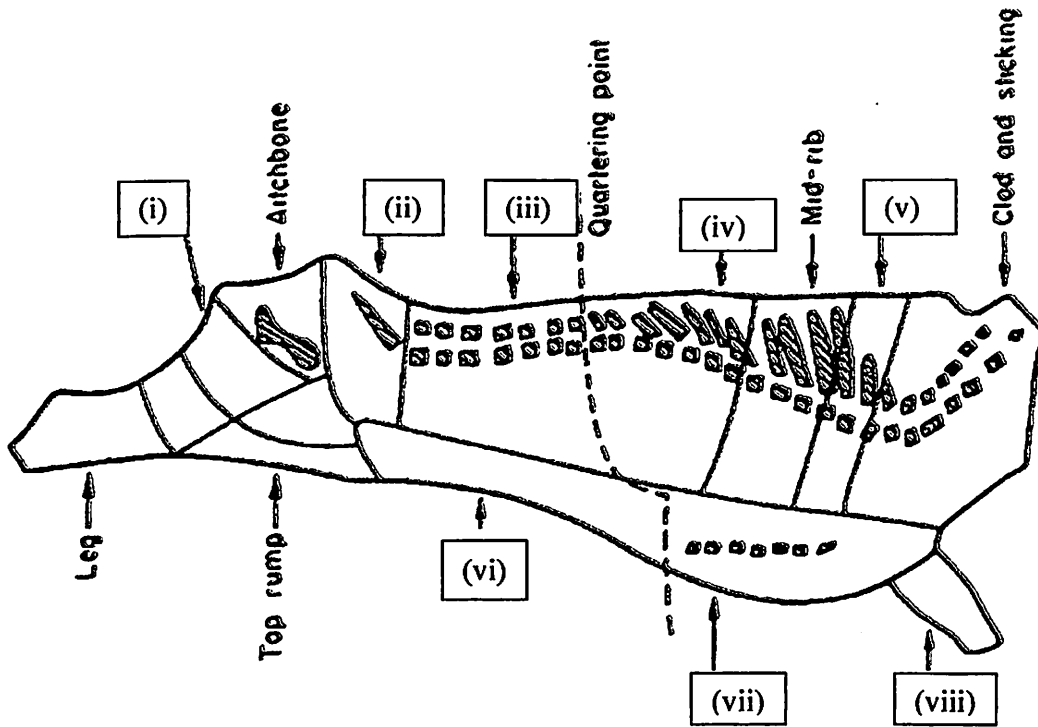
1. You have 10 minutes to read the paper. You must not begin writing in the answer book during this time.
2. **ANSWER ALL QUESTIONS**
3. All answers must be written in the answer books provided.
4. Write your name and number clearly on the front page. Do it now.
5. Calculators are permitted in the examination room. Notes and textbooks are not allowed.
6. Show all workings and calculations in the answer book.

MARKING SCHEME

QUESTION 1	[20 MARKS]
QUESTION 2	[28 MARKS]
QUESTION 3	[27 MARKS]
QUESTION 4	[10 MARKS]
QUESTION 5	[15 MARKS]
QUESTION 6	[15 MARKS]

PART A ANSWER ALL QUESTIONS

1. (a) Define the term meat and discuss the stages of animal domestication. Choose either a cattle breed, a pig breed or a sheep breed to expand your discussion. [6 marks]
- (b) Correctly label the missing cut portions of beef. [4 marks]



- (c) Discuss ANY ONE of the unit operations of abattoir. [5 marks]
- (i) Stunning.
 - (ii) Sticking.
- (d) Say you are a Supervisor of Ramu Abattoir, outline the ante mortem protocols you would put in place from farm to paddock and from paddock to freezer house to minimize biochemical changes that may render the quality of meat inferior. [5 marks]

(Total = 20 marks)

2. (a) Describe ANY ONE of the following: [10 marks]
- (i) The Structure of skeletal muscle.
 - (ii) The connective tissues that hold the muscles in place with the aid of a diagram.
- (b) Draw a full labeled diagram of a sarcomere. [5 marks]
- (c) Select ONLY ONE and answer. [9 marks]
- (i) The process of muscle contraction.
 - (ii) The mechanism of muscle contraction.
- (d) Correctly define the terms on the left column with definitions on the right column by matching the corresponding numbers on the left column to correct alphabets on the right column. [4 marks]

1	Tropomyosin	A	Aqueous fluid which surrounds myofibrils and contains organelles such as mitochondria, lysosome, myoglobin, sarcoplasmic reticulum t-tubules
2	Collagen	B	Surface membrane that lies beneath epimysium. Transversely invaginated at regular intervals to form "T-tubules"
3	Sarcoplasm	C	Highly specialized membrane system which stores Ca ⁺⁺ and release them when muscle is activated. Enwraps myofibril
4	Actin	D	A rod-shape protein, composed of two alpha-helical polypeptides wound together into a two-stranded coiled structure. Regulates muscle contraction in conjunction with troponin
5	Myosin	E	Long cylindrical protein comprising of 3-polypeptide chains wound around each other in a supra-helical coil. White, straight, inextensible and non-branching. Confer meat its physical properties and strength – meat become tough and insoluble in salt solution
6	Sarcoplasmic reticulum	F	Contractile Proteins. Main ones: Myosin and Actin. Soluble in concentrated salt solution
7	Sarcolemma	G	A long chain of fibrous-protein (F-protein) myofilament made from globular proteins (G-proteins). Second major protein of the myofibril, constitute about 15-30% of the total myofibrillar proteins
8	Myofibrillar proteins	H	A thread-shape protein with a head and a tail component Head: composed of two heavy chains (HMM) Tail: composed of four light chains (LMM). Head contains actin binding site , MgATP and ATPase complex. Constitute about 45% of the total myofibrillar proteins

(Total = 28 marks)

3. (a) Describe the TWO general categories of muscle fibres. [3 marks]
- (b) Complete the missing details in the table containing general chemical composition of the animal muscle. [2 marks]

Chemical	Wet weight (%)
(i)	3.5
(ii)	75
(iii)	2.5
(iv)	19

- (c) Discuss the biochemical changes at post mortem as muscle is converted to meat. [10 marks]
- (d) Compare and contrast between high pH_u and low pH_u on the quality of fresh meat. [4 marks]
- (e) Write notes on ANY TWO of the following: [8 marks]
- (i) Toughness due to connective tissues.
 - (ii) Tenderness due to aging.
 - (iii) Flavour due to cooking.
 - (iv) Colour due to action of oxygen on myoglobin.

(Total = 27 marks)

4. (a) Discuss ANY ONE of the following: [5 marks]
- (i) Critical zone in freezing and its effects if it is not monitored.
 - (ii) Effects of frozen storage for a long time.
- (b) If you were a Supervisor with Prima Small Goods Ltd and you were asked to choose a best drying method for the premium quality beef jerky (meat strips), discuss the best method of your choice. [5 marks]

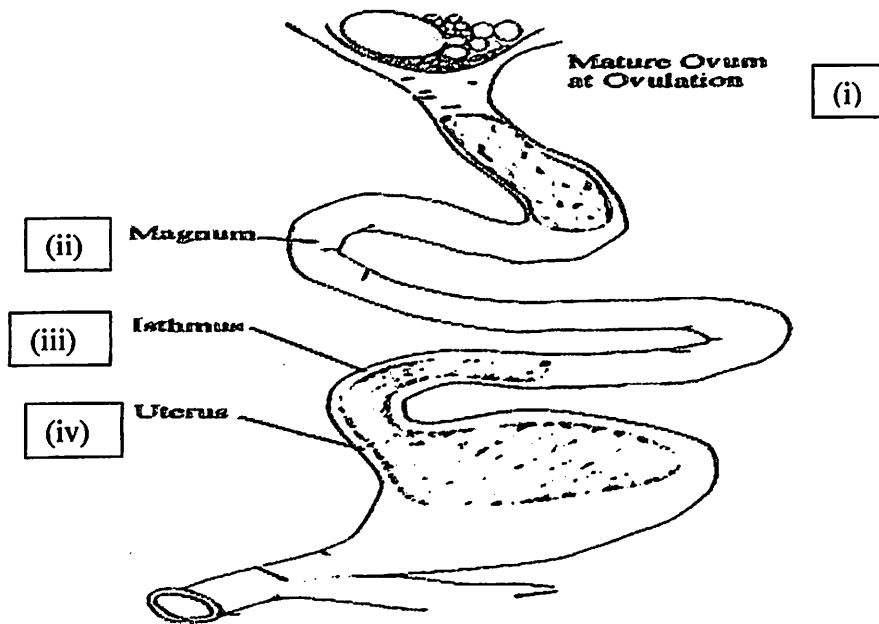
(Total = 10 marks)

**PART B ANSWER ONLY ONE QUESTION
EACH QUESTION CARRIES 15 MARKS**

5. (a) Differentiate between sausage, bacon and ham table-ready meat products. [3 marks]
- (b) Describe TWO named unit operation in sausage manufacture. [7 marks]
- (c) Describe ANY ONE of the following used for stuffing sausages. [5 marks]
- (i) Natural Casing.
- (ii) Artificial Casing.

(Total = 15 marks)

6. (a) The figure below is the reproductive system of a layer with labelled regions. Describe each region with its function. [8 marks]



- (b) Choose ANY ONE of the tables below and fill in the blanks with required information. [2 marks]

- (i) The quality attributes of unopened eggs.

Internal and External Quality attributes or factors			
Interior Appearance		Exterior Appearance	
Albumen	(i)	Shell shape	(iv)
Yolk	(ii)		
Air Cell	(iii)	Shell cleanliness	(v)

(ii) The composition of whole egg.

Average weight (g)	(i)
Albumen (%)	(ii)
Yolk (%)	(iii)
Shell (%)	(iv)

- (c) (i) List ANY TWO important attributes of economic breeds of poultry. [2 marks]
- (ii) Discuss the muscle fibre types found in poultry. [3 marks]

(Total = 15 marks)