

CHUKA



UNIVERSITY

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EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN ANIMAL PRODUCTS PROCESSING TECHNOLOGY

ANPT 464: LEATHER SCIENCE AND TECHNOLOGY

STREAMS: BSc ANPT

TIME: 2 HOURS

DAY/DATE: FRIDAY 12/4/2024

8.30A.M. – 10.30A.M.

INSTRUCTIONS: Attempt ALL Questions in Section A and any other TWO in Section B

SECTION A (30 marks)

QUESTION 1

(a) Define the following terms:

- i) Green hide or skin (2 marks)
- ii) Fallen hide or skin (2 marks)
- iii) Hair papilla (2 marks)

(b) Explain the major differences between grain layer and corium layer of the skin anatomical structure. (4 marks)

QUESTION 2

- (a) Describe the primary role of skin pigmentation (melanin). (2 marks)
- (b) Name two amino acids that are completely lacking in the leather making skin protein, collagen. (2 marks)
- (c) If collagen fibres are heated in water at 60-65°C, they shrink to about one-third of their original length. Explain the cause of this behaviour. (4 marks)
- (d) Explain why it is very difficult to remove albumins from sun-dried hides and skins during soaking in the tannery. (2 marks)

QUESTION 3

- (a) Fats, oils and waxes are classified together as lipids. What are their differences? (3 marks)
- (b) Describe the role of mucopolysaccharides in skin. (4 marks)
- (c) Give reasons why restoration of moisture to hides and skins is very important during soaking. (3 marks)

SECTION B: (40 MARKS)

QUESTION 4

- (a) Explain why it is important for the following purposes of liming to be achieved:
 - i) Splitting of the fibre structure at the level of the fibril bundles. (2 marks)
 - ii) Alkali swelling of the pelt. (2 marks)
 - iii) Hydrolysis of peptide bonds (2 marks)
 - iv) Removal of dermatan sulphate (2 marks)
 - v) Fat hydrolysis (2 marks)
- (b) Differentiate between pickling as a preservation method for hides and skins, and pickling as a preparatory process-step for chrome tanning. (10 marks)

QUESTION 5

Discuss the factors affecting vegetable tannage under the following sub-headings:

- (a) Tannin concentration (5 marks)
- (b) Acidity (5 marks)
- (c) Neutral salts (5 marks)
- (d) Temperature (5 marks)

QUESTION 6

- (a) Describe a simple formaldehyde tannage for the production of high-grade light coloured gloving leather from pickled skins. (10 marks)
 - (b) Give an outline of a typical semi-chrome tannage process. (10 marks)
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