

INTRODUCTION TO LEATHER TECHNOLOGY

Course Title :	INTRODUCTION TO LEATHER TECHNOLOGY	Course Code	LF-105
Year	I	Course Group	:CORE
Teaching Scheme in Hrs(L:T:P)	150periods(4:1:0)	Credits	: 3
Methodology	Lecture/ Tutorials study	Total Contact Hours	: (120:30) 150Pds
CIE	60marks	SEE	40 Marks

Pre requisites:

This course requires the basic knowledge of Basic Physics and Mathematics at Secondary school level

Course outcomes:

On successful completion of the course the student will be able to:

Course outcomes	
CO1	Explain Hide and Skin based on their characteristics such as region, size etc.
CO2	Classify the defects in Hides & Skins based on their occurrence such as Ante-mortem, Post-mortem and during Processing in to Leather
CO3	Explain the different procedure for the preservation of hides and Skins
CO4	Explain the Pretanning Operations in their sequence and significance of each operation
CO5	Classify Tanning Methods and Explain Mineral tanning Procedure w r t Chrome Tanning
CO6	Explain the Post tanning Operations and machine operations in their sequence and significance of each operation

COURSE CONTENT:

Unit I: Hides, Skins and Defects in Hides and skins:

Duration: 25 periods

Definition of Hides and Skins – exotic skins – difference between hides and skins - different source of hides and their classification based on region, size etc - and different materials present in hides and skins – flaying--Classification of Defects -Defects in hides - Defects in skins.- Ante-mortem defects and definition.- Post-mortem defects and definition -Ante-mortem defects and causes-Post-mortem defects and causes- Identify different defects present on hides and skins.-Important reasons for various defects.

Unit II: Preservation of hides and Skins and Pre-tanning Operations Duration: 25 periods

Structure of hides and skins – assortment of hides and skins - Curing – purpose of curing – and curing by different methods such as – salting, drying, freezing, fumigation, solvent dehydration, radiation, and change of pH .Soaking – methods of soaking and liming its objectives and method of liming, de-liming – objectives and method of de-liming drenching – bating, pickling, degreasing, de-pickling.

Unit III: Main Tanning methods:

Duration: 25 periods

Tanning – Purpose of tanning – Classification - Chrome tanning – Types of chrome tanning – Basification – Boil test – Shrinkage Temperature-List of vegetable tanning materials – Classification – Methods of Vegetable tanning – Suitable conditions of vegetable tanning

Unit-IV: Other Tanning methods:

Duration: 25 periods

Aluminiumtanning–propertiesofAluminiumtannedLeathers–Zirconiumtanning –properties of Zirconium tanned Leathers-Oiltanning–aldehydetanning–formaldehydeandGlutaraldehydetanning-Synthetic tanning– properties of oil, aldehyde, and synthetic tanned leathers.

Unit-V: Post Tanning Operations:

Duration: 25 periods

Re-tanning–Neutralisation–Dyeing–Fatliquoring and their objectives and method of performing operations –Finishing of leather – Classification of finishes and their constituents.

Unit-VI: Machine Operations and assortment:

Duration: 25 periods

Different machine operations in leather manufacture –their importance and method of doing each operations- Importance of assortment- Different stages of assortment.

RECOMMENDED BOOKS:

1. Introduction to the principles of leather manufacture - S.S.Dutta. Indian Leather Technology Association, Calcutta.
2. Practical Leather Technology - J.C. Thorstenson, E. Kreiger Publishing Company – Malabar, Florida – 1993.
3. Theory and practice of leather manufacture - K.T. Sarkar, Ajoy Sorcar, Madras.
4. Leather Technician hand book - J.H. Sharpouse Leather producer association, North Hampton – 1995.CLRI Publications, Madras.

SUGGESTED E- LEARNING REFERENCES:

1. <http://www.iltaonleather.org/jilta.html>
<https://www.clri.org/> <http://alcajournal.com/>

SUGGESTED LEARNING OUTCOMES:

Upon completion of the course, the student shall be able to

Unit – I: Hides, Skins and Defects in Hides and skins:

- 1.1 Define Hide and Skin
- 1.2 Define exotic skins
- 1.3 Differentiate hide and skin.
- 1.4 Mention the Sources of hides and skins i.e., fallen hides and skins and slaughter hides and skins
- 1.5 Mention the Characteristics of fallen hides and skins.
- 1.6 Mention the Characteristics of slaughter hides and skins.
- 1.7 Demonstrate the Flaying of large animals/hides
- 1.8 Demonstrate the Flaying of small animals/skins
- 1.9 Mention the different areas present in hide/skin
- 1.10 Describe the Grain pattern of cow
- 1.11 Describe the Grain pattern of buff
- 1.12 Describe the Grain pattern of goat
- 1.13 Describe the Grain pattern of sheep
- 1.14 Outline Assortment procedure of hides at raw stage
- 1.15 Outline Assortment procedure of skins at raw stage
- 1.16 List the different materials present in hides and skins–
- 1.17 Classify hides and skins based on region, size etc
- 1.18 Defects in hides and skins.
- 1.19 Explain the Need for study of defects in hides and skins.
- 1.20 Classify of the defects
- 1.21 Define Ante-mortem defects
- 1.22 Define Post-mortem defects
- 1.23 List the post- mortem defects
- 1.24 List the Ante-mortem defects and their occurrence.
- 1.25 List the ante- mortem defects
- 1.26 List the Post-mortem defects and their occurrence.
- 1.27 List the Processing defects and their occurrence

UNIT II: Preservation of hides and Skins and Pre-tanning Operations

- 2.1 Mention the composition of hides and skins.
- 2.2 List the substances present in hides and skins.
- 2.3 State the water content present in hide and skin.
- 2.4 State the importance of Collagen in hide/skin.
- 2.5 List the non-leather making materials present in hide and skin.
- 2.6 Mention the Favorable condition for purification and the nature of action of bacteria on Hides and skins.
- 2.7 Explain the methods of prevention of rawhides and skins from the bacterial growth and purification.
- 2.8 Mention the types of curing.
- 2.9 State the essential features of curing by drying.
- 2.10 Outline the methods of drying.
- 2.11 Mention the duration of drying.
- 2.12 List out the precautions to be taken during drying.
- 2.13 Mention the Advantages and disadvantages of each type of drying.
- 2.14 List the basic features of curing by salting.
- 2.15 Explain Curing by wet salting.
- 2.16 Explain Curing by dry salting.
- 2.17 Explain Curing by brining.
- 2.18 Mention the Quality of salt to be used for salting by different methods.
- 2.19 Mention the method of applying salt for different types of curing by salting.
- 2.20 List out the Precautions to be taken while curing by salting.
- 2.21 List out the preservatives to be added to the salt for better results.
- 2.22 Explain the Basic principles of curing by freezing.
- 2.23 Explain the Basic principles of curing by fumigation.
- 2.24 Explain the Basic principle of curing by solvent dehydration.
- 2.25 Explain the Basic principles of curing by radiation.
- 2.26 Explain the Basic principles of curing by change in P^H .
- 2.27 Mention the Usage of preservatives in curing.
- 2.28 Pre-tanning operations
- 2.29 List the Basic features of soaking.
- 2.30 Mention the Chemicals used for soaking and their function.
- 2.31 Explain different types of soaking.
- 2.32 State the Time taken for different types of raw stock
- 2.33 Test for proper soaking
- 2.34 Mention the Effects of over soaking.
- 2.35 State the effect of insufficient soaking.
- 2.36 Explain the method of soaking for green hides and skins, wet salted hides and skins and dry salted hides and skins.
- 2.37 List the Objectives of Liming.
- 2.38 Mention the Chemicals used for liming
- 2.39 Explain the methods of liming and mention the duration of liming for different types of leather.
- 2.40 Test for proper liming.
- 2.41 List the types of unhairing method.
- 2.42 Explain the methods of fleshing.
- 2.43 Mention the Care to be taken during fleshing.
- 2.44 State the Objectives of de-liming.
- 2.45 Mention the Purpose of de-liming.
- 2.46 List different chemicals used in de-liming.
- 2.47 Explain the methods of de-liming.
- 2.48 Mention the duration of de-liming for different end products.
- 2.49 Mention the Selection of de-liming Agents to be done for different end products.
- 2.50 Explain the extent of de-liming to be done for different end products.
- 2.51 Tests for checking de-liming.
- 2.52 Changes that take place during de-liming.

- 2.53 State the Objectives of bating.
- 2.54 List out the Chemicals used for bating.
- 2.55 Mention the Suitable condition required for bating.
- 2.56 State the Duration of bating.
- 2.57 Mention the Changes that take place during bating.
- 2.58 List the Different tests conducted for checking completion of bating.
- 2.59 List out the Precautions to be taken during bating.
- 2.60 Explain the methods of bating.
- 2.61 State the Purpose of pickling.
- 2.62 List out the Chemicals used for doing pickling.
- 2.63 Mention the duration of pickling.
- 2.64 Explain the Changes that take place during pickling.
- 2.65 Mention the change in P^H that takes place during pickling
- 2.66 Define Degreasing.
- 2.67 State the Purpose of degreasing.
- 2.68 List out the Chemicals used for degreasing.
- 2.69 Mention the duration of degreasing.
- 2.70 Explain the methods of degreasing.
- 2.71 Define De-pickling.
- 2.72 State the Objectives of de-pickling.
- 2.73 List out the Chemicals used for de-pickling.
- 2.74 Mention the Changes takes place during de-pickling.
- 2.75 Explain the Method of de-pickling.
- 2.76 Write the Sequence of operations from wet salted stage to pickled stage.

Unit III: Main Tanning methods.

- 3.0 Define the term tanning.
- 3.1 State the Objectives of tanning
- 3.2 Mention the Changes take place during tanning.
- 3.3 Define shrinkage temperature.
- 3.4 List out the shrinkage temperature of chrome tanned leather, rawhide, vegetable tanned leather, and aluminum leather.
- 3.5 Classify tanning agents with examples.
- 3.6 Define Mineral tanning.
- 3.7 List Different mineral tanning materials.
- 3.8 Define chrome Tanning.
- 3.9 Prepare chrome tanning liquor.
- 3.10 Mention the methods of chrome tanning.
- 3.11 Mention the Duration of chrome tanning for different types of leather.
- 3.12 State the Purpose of Basification.
- 3.13 List the Chemicals used for basification.
- 3.14 Explain the Method of basification.
- 3.15 List Different tests conducted for fixation of chrome.
- 3.16 Test the chrome tanned leather for boil test
- 3.17 Test the chrome tanned leather for shrinkage temperature.
- 3.18 List out the mineral tanning materials other than chrome.
- 3.19 Mention the Conditions required for chrome tanning
- 3.20 Write the Sequence of operations for the manufacture of wet blue from wet salted hides
- 3.21 Write the Sequence of operations for the manufacture of wet blue from wet salted skins
- 3.22 Define Vegetable tanning.
- 3.23 Mention the Sources of vegetable tanning materials

- 3.24 List the vegetable tanning materials.
- 3.25 Mention the composition of Vegetable tanning Materials
- 3.26 Explain the Preparation of vegetable tan Liquor by Leaching.
- 3.27 Classify vegetable tanning materials.
- 3.28 Mention the Suitable conditions required for vegetable tanning
- 3.29 Explain vegetable tanning by pit method
- 3.30 Explain vegetable tanning by Drum method
- 3.31 Mention the properties of Pyrogallol Tanning materials
- 3.32 List the examples for Pyrogallol type of Tanning materials
- 3.33 Mention the properties of Catechol Tanning materials
- 3.34 List the examples for Catechol type of Tanning materials
- 3.35 Mention the properties of Vegetable Tanned leathers.
- 3.36 Mention the Changes that take place during in vegetable tanning.
- 3.37 Write the Sequence of operations for the manufacture of E.I Leather from wet Salted hides
- 3.38 Write the Sequence of operations for the manufacture of E.I Leather from wet Salted skins

Unit–IV: Other Tanning methods:

4.1.0 Define Aluminium tanning.

- 4.1 Properties of Aluminium tanned Leather
- 4.2 Method of Aluminium tanning.
- 4.3 Sequence of operations in of Aluminium tanning.
- 4.4 Aum tawing
- 4.5 Define Zirconium Tanning.
- 4.6 Properties of Zirconium tanned Leather
- 4.7 Sequence of operations in Zirconium tanning.
- 4.8 Method of Zirconium tanning.
- 4.9 Define oil tanning.
- 4.10 List of oils used for oil tanning.
- 4.11 Properties of oil tanned Leather.
- 4.12 Uses of oil tanned Leather.
- 4.13 Sequence of operations in oil tanning.
- 4.14 Method of oil tanning.
- 4.15 Define Syntans
- 4.16 Classification of syntans.
- 4.17 Uses of syntans.
- 4.18 List of Aldehyde tanning materials.
- 4.19 Define Formaldehyde tanning.
- 4.20 Properties of Formaldehyde tanned Leather.
- 4.21 Sequence of operations in Formaldehyde tanning.
- 4.22 Uses of Formaldehyde tanning material.
- 4.23 Method of formaldehyde tanning.
- 4.24 Define Glutaraldehyde tanning.
- 4.25 Properties of Formaldehyde tanned Leather.
- 4.26 Sequence of operations in Glutaraldehyde tanning.
- 4.27 Uses of Glutaraldehyde tanning material.
- 4.28 Method of Glutaraldehyde tanning.

Unit–V: Post Tanning Operations:

- 5.1 List of post tanning operations.
- 5.2 Purpose of retanning.
- 5.3 Materials used for retanning.
- 5.4 Definition of semi-chrome leather.

- 5.5 Definition of full chrome leather.
- 5.6 Method of retanning chrome tanned leathers.
- 5.7 Define Neutralisation:
- 5.8 Purpose of neutralisation leathers.
- 5.9 Different chemicals used for neutralisation.
- 5.10 Duration of neutralisation.
- 5.11 P^H of leathers after neutralisation.
- 5.12 Test for completion of neutralisation.
- 5.13 The effect of over neutralisation and under neutralisation.
- 5.14 Purpose of dyeing leather.
- 5.15 Definition of dye and colour.
- 5.16 Classification of dyes.
- 5.17 The selection of dyes for different leathers.
- 5.18 Conditions required for dyeing.
- 5.19 Different methods of dyeing.
- 5.20 Fixation of dye to the leather.
- 5.21 Objectives of fat liquoring.
- 5.22 Classification of fatliquors.
- 5.23 Conditions required for fatliquoring
- 5.24 Fixation of fatliquor to the leather.
- 5.26 Classification of finishes.
- 5.27 Preparation of season in resin finish.
- 5.28 Method of resin finishing for shoe upper leather.
- 5.29 Preparation of season in protein finish.
- 5.30 Method of glaze finishing for shoe upper leather.
- 5.31 Write the Sequence of operations for the manufacture of full chrome crust leather from wet blue sheep skins.
- 5.32 Write the Sequence of operations for the manufacture of semi-chrome crust leather from E.I Goat skins

Unit–VI: Machine Operations and assortment:

- 6.1 Methods of Samming wet blue.
- 6.2 Test for completion of proper Samming.
- 6.3 Objectives of splitting the leathers.
- 6.4 Method of splitting the leathers
- 6.5 Objectives of Shaving the leathers
- 6.6 Method of shaving leathers,
- 6.7 Objectives of setting the leathers
- 6.8 Methods of setting the leathers
- 6.9 Method of slickering the leathers.
- 6.10 Objectives of drying the leathers.
- 6.11 Different methods of drying the leathers.
- 6.12 Objectives of conditioning the leathers.
- 6.13 Methods of conditioning the leathers.
- 6.14 Objectives of staking the leathers.
- 6.15 Different methods of staking the leathers.
- 6.16 Objectives of toggling the leathers.
- 6.17 Objectives of Buffing the leathers.
- 6.18 List different emery papers used in Buffing.
- 6.19 Objectives of snuffing the leathers.
- 6.20 List different emery papers used in snuffing.
- 6.21 Objectives of glazing the leathers.
- 6.22 Method of glazing the leathers.
- 6.23 Objectives of spraying the finish on leathers.
- 6.24 Different methods of spraying.
- 6.25 Objectives of plating the leathers.

- 6.26 Types of plates used in plating.
- 6.27 Method of plating the leathers.
- 6.28 Objectives of embossing the leathers.
- 6.29 Types of plates used in embossing the leathers.
- 6.30 Method embossing the leathers.
- 6.31 Objectives of measuring the leathers.
- 6.32 Type of machines used for measuring the leathers
- 6.33 Define Assortment
- 6.34 Importance of assortment.
- 6.35 Different stages at which assortment to made.
- 6.36 Assortment of raw goat skins.
- 6.37 Assortment of raw sheep skins.
- 6.38 Assortment of raw cow hides.
- 6.39 Assortment of raw buffalo hides.
- 6.40 Assortment of wet blue.
- 6.41 Assortment of E.I leathers.
- 6.42 Assortment of crust leathers before finishing.
- 6.43 Assortment of finished leathers.
- 6.44 Write the Sequence of operations for the manufacture of full chrome shoe upper leather from wet blue cow sides.
- 6.1.45 Write the Sequence of operations for the manufacture of semi-chrome shoe upper leather from E.I goat leather.

INTERNAL EVALUATION:

Note: The following activities or similar activities for assessing CIE (IA) for 5 marks (Any one)

SUGGESTED STUDENT ACTIVITIES:

Each student should do any one of the following type activity or any other similar activity related to the course and before conduction, get it approved from concerned HOD.

Each student should conduct different activity and no repeating should occur.

1. Tech fest/Srujana
2. Paper/Poster presentation
3. Quiz
4. Group discussion
5. Surprise test

CO-PO Mapping Matrix

CO-PO Matrix (GPAC 4.0)

	Engineering Knowledge	Problem Analysis	Design/Development of Solutions	Conduct investigations	Modern tool usage	The Engineer & Society	Ethics & sustainability	Individual & Teamwork	communication	Project Management & Finance	Lifelong Learning	Linked PO
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	PO8	PO9	PO10	PO11	
CO1	3			1					1		1	1,4,9,11
CO2	3	1		3	1			2	1			1,2,4,5,8,9
CO3	3			1		1		1	1			1,4,6,8,9
CO4	3	2		1				2				1,2,4,8
CO5	2			2	1			2	1			1,4,5,8,9
CO6	2				1	1		1	1			1,5,6,8,9

1: Poorly Mapped 2: Moderately Mapped 3: Completely Mapped

QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	4	1	Nil	4 Marks
02	Part-B	Understanding(U)	4	3	2	6 Marks
03	Part-C	Application(A)	4	5	2	10 Marks
Total Marks						20 Marks

MID SEM-I EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-I	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-II	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

MID SEM-II EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-III	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-IV	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

The length of answer for each question framed in respect of Part-A, B&C shall not exceed ¼ of a page, 1 page and 2 pages respectively

QUESTION PAPER PATTERN FOR SEMESTER END EXAM

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	8	1	Nil	8 Marks
02	Part-B	Understanding(U)	8	3	4	12 Marks
03	Part-C	Application(A)	8	5	4	20 Marks
Total Marks						40 Marks

Unit No		Questions to be set for SEE				
		R		U	A	
I	Q4	Q1		Q9(a)	Q13(a)	
II						
III		Q2		Q10(a)	Q14(a)	
IV						
V		Q3	Q5,Q6	Q9(b), Q11(a), Q11(b)	Q13(b), Q15(a), Q15(b)	
VI						
Total Questions		8		8	8	

State Board of Technical Education and Training, Telangana Model Question paper
DLE I year Mid Semester-I Examination

Course Code: LF-105

Course Name: Introduction to Leather Technology

Duration: 1 hour

Max.Marks:20 Marks

PART-A

Answer **all** questions, Each Question carries **one** mark

4x1 = 04 Marks

- 1) Define hide and skin?
- 2) What is meant by Flaying?
- 3) Why curing is done?
- 4) What are pre-tanning operations?

PART-B

Answer **two** questions, Each Question carries **Three** marks

2x3 = 06 Marks

- 5) (a) Distinguish between Hide and Skin
(or)
(b) List the proteins present in Hides and Skins.
- 6 (a) Describe the soaking method of wet salted Skins?
(or)
(b) Mention the objectives of liming?

PART-C

Answer **two** questions, Each Question carries **five** marks

2x5 = 10 Marks

- 7 (a) Explain the Chemical composition of Hides and skins?
(or)
7) (b) Explain the Grain Pattern of Cow Hide?
- 8) (a) Explain the paste liming method?
(or)
8) (b) Explain the pickling method..

State Board of Technical Education and Training, Telangana Model Question paper
DLF I year Mid Semester-II Examination

Course Code: LF-105

Course Name: Introduction to Leather Technology

Duration: 1 hour

Max.Marks:20 Marks

PART-A

Answer **all** questions, Each Question carries **one** mark

4x1 = 04 Marks

- 1) Define tanning?
- 2) Mention the salt used for Chrome tanning?
- 3) What is chamois leather?
- 4) What are syntans?

PART-B

Answer **two** questions, Each Question carries **Three** marks

2x3 = 06 Marks

- 5) (a) Write the properties of chrome tanned leathers.
(or)
b) List the barks used for vegetable tanning.
- 6 (a) Write the properties of zirconium tanned leathers.
(or)
(b) Mention the uses of oil tanned leathers?

PART-C

Answer **two** questions, Each Question carries **five** marks

2x5 = 10 Marks

- 7(a) Explain the method of one bath chrome tanning?
(or)
7) (b) Explain the pit method of vegetable tanning?
- 8) (a) Explain the method of zirconium tanning?
(or)
8) (b) Classify syntans and list uses of syntans in leather manufacture.

MID SEM-I EXAM

S.No	Unit Name	R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

MID SEM –II EXAM					
S.No	Unit Name	R	U	A	Remarks
1	Unit-III	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-IV	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

Semester End Examination

Sl No	Unit No.	Questions to be set for SEE					Remarks
		R		U	A		
1	I	4	1		9(a)	13(a)	
2	II						
3	III		2		10(a)	14(a)	
4	IV						
5	V		3	5, 6	9(b)	13(b)	
					11(a)	15(a)	
					11(b)	15(b)	
6	VI			7,8	10(b)	14(b)	
		12(a)			16(a)		
		12(b)			16(b)		
Total Questions		8		8	8		

Legend:	Remembering (R)	1 Mark
	Understanding (U)	3 Marks
	Application (A)	5 Marks

State Board of Technical Education and Training, Telangana
Semester
End Examination Model Question paper
DLE I

Course Code: LF-105

Duration: 2 hours

Course Name: Introduction to Leather Technology
Marks

Max. Marks: 40

PART – A

Instructions: Answer all the questions. Each question carries ONE mark.
= 08M

MARKS: 08X1

1. Define hides and skins and give examples
2. Write the objectives of curing.
3. What is E.I Leather?
4. List any two mineral tanning materials
5. What is Neutralisation?
6. Define leaching.
7. What is assortment?
8. write the purpose of toggling

PART – B

Instructions: Answer any four questions. Each question carries THREE marks.
= 12M

MARKS: 4X3

9 (A) Write the sources of hides and skins
(OR)

9(B) State the properties required for dyes.

10(A) State the properties of zirconium tanned leathers.

(OR)

10(B) write the objectives of shaving the leathers.

11(A) Discuss about the purpose of Fatliquoring.

(OR)

11(B) Why dyeing is done for leathers?

12(A) Write the objectives of splitting.

(OR)

12(B) Why setting is done for leathers?

PART – C

Instructions: Answer any four questions. Each question carries FIVE marks
4X5=20M

MARKS:

13(A) Explain the different post-mortem defects in hides and skins

(OR)

13(B) Outline the method of Neutralisation.

14(A) Explain the method of one bath chrome tanning method

(OR)

14(B) Explain the method of grading raw hides and skins.

15(A) Explain the drum dyeing method.

(OR)

15(B) Explain the method of resin finishing.

16(A) Write the Sequence of operations for the manufacture of full chrome shoe upper leather from wet blue cow sides.

(OR)

16(B) Mention the sequence of operations for the manufacture of semi-chrome shoe upper

leather from E.I goat leathers.

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