

JK LAKSHMIPAT UNIVERSITY, JAIPUR

INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Regular/Backlog), Nov.-Dec. 2015

B. Tech in Chemical Engineering, Semester VII

Roll No.....

CHE733: SUGAR TECHNOLOGY

Time: 3 hours

Max. Marks: 100

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

Q.1A Objective type multiple choice questions (10 questions @ 1 mark) 10

- i. The treatment of cane juice with lime is called; (a) defecation (b) sulphitation (c) carbonation (d) phosphitation
- ii. Which gas is used for sulphitation of cane juice: (a) CO (b) CO₂ (c) NH₃ (d) SO₂
- iii. Which gas is used for carbonation of cane juice: (a) CO (b) CO₂ (c) NH₃ (d) SO₂
- iv. Solubility of lime in juice: (a) decreases with increasing temperature (b) increases with increasing temperature (c) does not depend on temperature (d) decreases with increasing sugar content
- v. How much CaO is required in a good quality lime intended to be used for cane juice clarification: (a) 60 % (b) 70% (c) 95% (d) 40%
- vi. The bearings designed to work with lime should be made of: (a) bronze (b) brass (c) steel (d) cast iron
- vii. Smaller diameter and longer tubes in evaporator provide: (a) high heating surface (b) less heating surface (c) less efficient heating (d) all of these
- viii. Gasing pipes from the calendrias to the vapour space are provided to: (a) maintain heat transfer (b) remove non condensible gases (c) improve steam economy (d) all of these
- ix. The chances of entrainment are high if: (a) long tubes are used in the evaporator (b) low evaporation rates (c) low vacuum (d) none of these
- x. The increase in hydrostatic head in an evaporator causes: (a) boiling point decrease (b) boiling point does not change (c) boiling point increase (d) evaporation rate increase

Q.2 Short answer type questions (4 questions @ 2.5 marks) 10

- i. Why higher amount of MgO is not desirable in a sample of lime to be used for cane juice clarification?
- ii. Why milk of lime is more preferable over pulverized lime for cane juice clarification?
- iii. In which forms the phosphoric acid is found in the sugar cane?
- iv. Briefly mention the reaction of phosphoric acid with cane juice.

1	Mention the advantages of fractional liming with double heating over cold liming.	05
Q.3B	Describe the action of Sulphur dioxide on cane juice during sulphitation.	05
Q.4A	Differentiate cold sulphitation with the hot sulphitation process.	05
Q.4B	Describe the advantages and disadvantages of sulphitation process.	05
Q.5A	What is carbonation of the cane juice? Mention various steps in the double carbonation.	05
Q.5B	Describe various steps involved in the middle juice carbonation process.	05
Q.6A	Mention different ways to increase the efficiency of a beet sugar factory.	05
Q.6B	What is the diffusion process in beet sugar processing?	05
	OR	
Q.6B	Describe the advantages and disadvantages of adding pressing aid to the diffuser in a beet sugar production.	05
Q.7A	How milk of lime is made from the limestone? Explain with the help of reactions.	05
Q.7B	Mention typical compositions of limestone and of carbonation gas.	05
	OR	
Q.7B	What is denaturation of a beet cell? Describe it with the help of a diagram.	05
Q.8A	Explain the working principle of a multi effect evaporator with the help of a diagram. Mention the advantages of a multi effect evaporator over single effect evaporator.	10
Q.9A	Describe the formation of scales in the evaporator tubes. What are different types of scales and also mention the composition of scale formed in the evaporator tubes.	10
Q.9B	Describe various methods of scale removal from the evaporator tubes in detail.	10
	OR	
Q.9B	Describe raw sugar refining process in detail.	10