

# Unit 13 - Week 11 : Computer-aided balance calculations

## Course outline

How does an NPTEL online course work?

Week 0 : Prerequisite

Week 1: Introduction

Week 2: Process Variables and Rate

Week 3: Fundamentals of Material Balance

Week 4: Basic Principles of Compressible System

Week 5 : Basic principles of multiphase system

Week 6 : Energy and Its Forms

Week 7 : Energy Balances on Nonreactive Processes

Week 8 : Energy Balances on Reactive Systems

Week 9 : Balances on Transient Process

Week 10 : Computational Techniques

Week 11 : Computer-aided balance calculations

● Lecture 1: Process Degrees of Freedom

● Lecture 2: Process Flowsheeting and codes

○ Quiz : Assignment 11

○ Feedback form

Week 12 : Case Study for a Process

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## Assignment 11

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

Due on 2020-04-15, 23:59 IST.

- 1) The table of values gives a function  $f(x)$ . Approximate the area under the curve  $y = f(x)$  between  $x = 0$  and  $x = 4$  using Simpson's Rule with  $n = 4$  subintervals.

x	0	1	2	3	4
f(x)	2	7	12	10	5

- 26  
 33  
 41  
 22

No, the answer is incorrect. Score: 0

Accepted Answers: 33

- 2) In Cumene production, what are the reactants?

- Benzene and Phenol  
 Benzene and Naphthalene  
 Benzene and Propylene  
 Propylene and Phenol

No, the answer is incorrect. Score: 0

Accepted Answers: Benzene and Propylene

- 3) By product formed during Cumene production is separated by \_\_\_\_\_.

- Distillation  
 Adsorption  
 Extraction  
 Absorption

No, the answer is incorrect. Score: 0

Accepted Answers: Distillation

- 4) Using  $n = 5$ , approximate the integral:

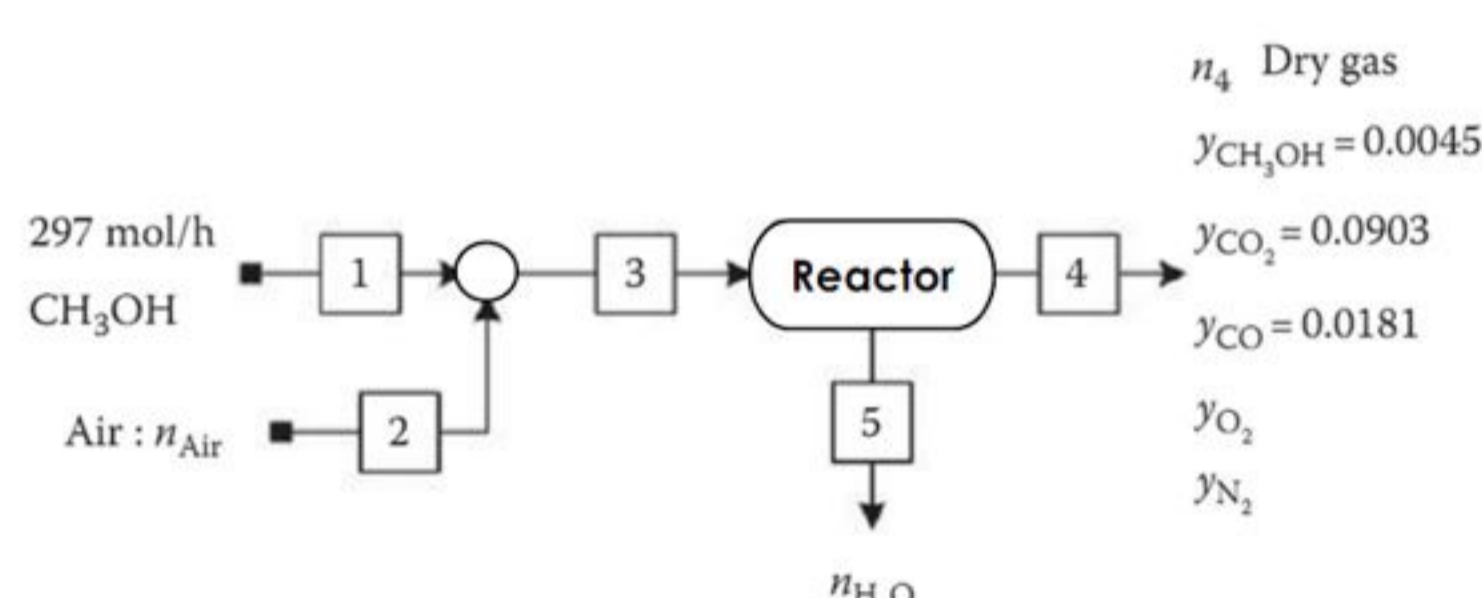
$$\int_0^1 \sqrt{x^2 + 1} dx$$

- 1.50  
 2.0  
 2.54  
 1.15

No, the answer is incorrect. Score: 0

Accepted Answers: 1.15

- 5) The flow diagram for methanol combustion process is shown in Figure below



Calculate the degree of freedom.

- 0  
 1  
 -2

No, the answer is incorrect. Score: 0

Accepted Answers: 0

- 6) What is the ratio of Benzene and propylene for Cumene production?

- 1:2  
 1:1  
 2:1  
 1:3

No, the answer is incorrect. Score: 0

Accepted Answers: 2:1

- 7) If degree of freedom is greater than zero, then

- There are infinite number of solutions  
 No solution  
 System will have a unique solution  
 None of the above

No, the answer is incorrect. Score: 0

Accepted Answers: There are infinite number of solutions

- 8) Statement I. If  $NDF = 0$ , the system is completely defined. You get a unique solution. Statement II. If  $NDF < 0$ , the system is under-defined (under-specified).

- Both statements are correct  
 Both statements are wrong  
 Statement I is incorrect and II is correct  
 Statement I is correct and II is incorrect

No, the answer is incorrect. Score: 0

Accepted Answers: Statement I is correct and II is incorrect

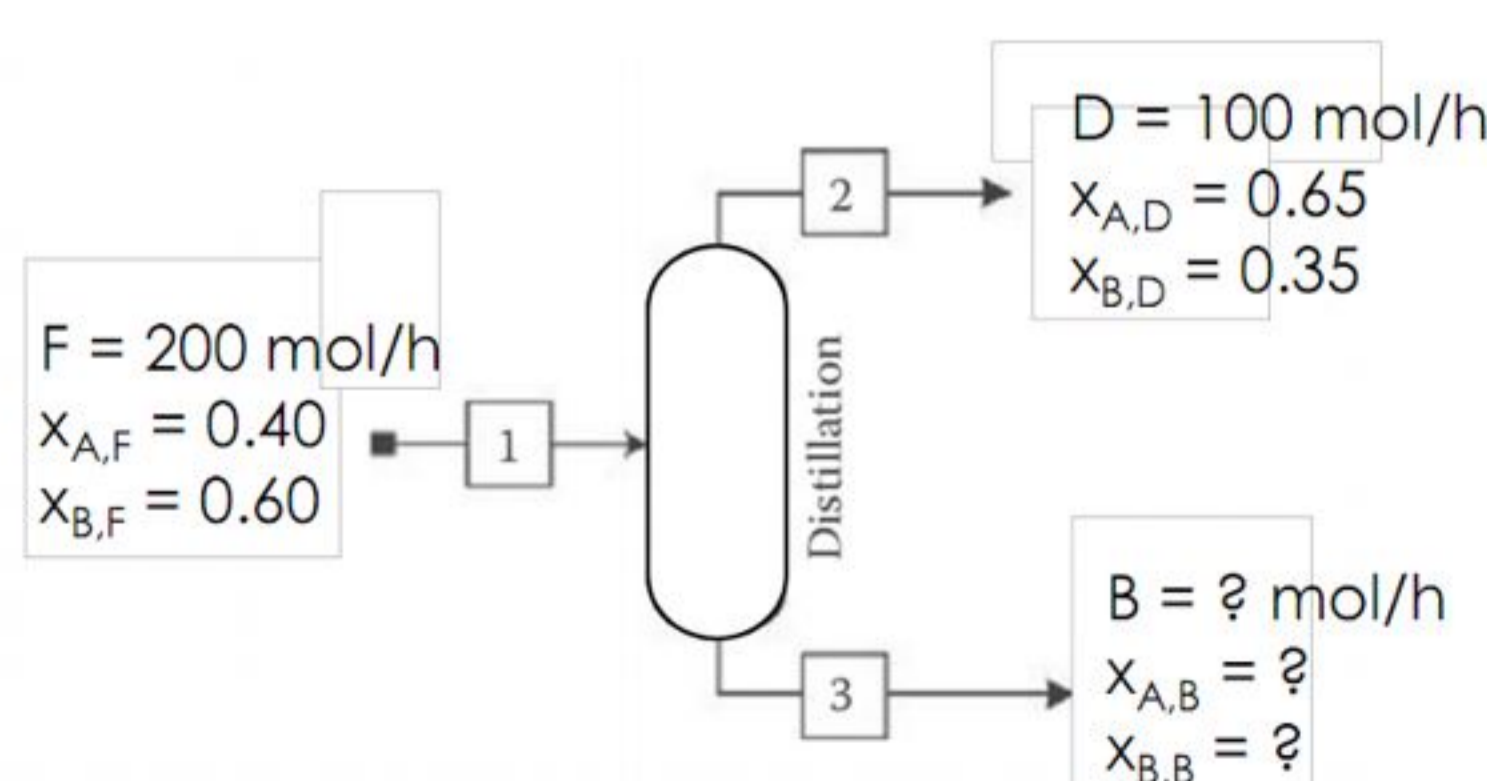
- 9) During Cumene production, reactant benzene is vaporized at \_\_\_\_\_ °C

- 245 °C  
 243 °C  
 350 °C  
 300 °C

No, the answer is incorrect. Score: 0

Accepted Answers: 243 °C

- 10) Predict the nature of the system.



- System is completely defined ( $NDF = 0$ )  
 System is over defined  
 System has unique solution  
 Both a and c

No, the answer is incorrect. Score: 0

Accepted Answers: Both a and c