

Unit 12 - Week 10

Course outline

How does an NPTEL online course work?

Week 0

Week 1

Week 2

Week 3

Week 4

Week 5

Week 6

Week 7

Week 8

Week 9

Week 10

- Lecture 46 : Introduction to Pinch Technology
- Lecture 47 : Composite Curves
- Lecture 48 : The Problem Table Method
- Lecture 49 : The Heat Recovery Pinch and The Grand Composite Curve
- Lecture 50 : Heat Exchanger Network Design
- Week 10 Lecture Material
- Quiz : Assignment 10
- Week 10 Feedback Form

Week 11

Week 12

Download Videos

Assignment Solution

Live Interactive Session

Assignment 10

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

Due on 2020-11-25, 23:59 IST.

1) The slope of a stream is directly proportional to its heat capacity flow rate.
(a) True
(b) False

1 point

☐ a)
☐ b)

No, the answer is incorrect.
Score: 0

Accepted Answers:
b)

2) Select the correct option about Heat Exchanger Network. For maximum heat recovery and minimum use of utilities:

1 point

- I. Do not transfer heat across the pinch
II. Do not use hot utilities above the pinch
III. Do not use cold utilities below the pinch

- (a) Only statement-I is true
(b) Only statement-II is true
(c) Only statement - II and statement – III are true
(d) All the statements are true

☐ a)
☐ b)
☐ c)
☐ d)

No, the answer is incorrect.
Score: 0

Accepted Answers:
a)

3) Select the correct option.

1 point

- I. Design of Heat Exchanger Network should start at the pinch point.
II. Threshold Problems use either hot utility or cold utility, but not both. .
III. Pinch analysis can be used for mass integration.

- (a) Only statement-I and statement-II are true
(b) Only statement-I and statement-III are true
(c) All the statements are true
(d) All the statements are false

☐ a)
☐ b)
☐ c)
☐ d)

No, the answer is incorrect.
Score: 0

Accepted Answers:
c)

4) Which of the following equipment should not be placed above the pinch?

1 point

- (a) A steam heater
(b) A furnace
(c) A cooler
(d) A hot oil circuit

☐ a)
☐ b)
☐ c)
☐ d)

No, the answer is incorrect.
Score: 0

Accepted Answers:
c)

5) Select the correct option about stream matching at immediately adjacent to the pinch. Here, CP represents heat capacity flow rate of hot stream or cold stream.

1 point

- I. Above the pinch, obey $CP_{hot} \geq CP_{cold}$
II. Below the pinch, obey $CP_{hot} \leq CP_{cold}$

- (a) Only statement-I is true
(b) Only statement-II is true
(c) Both the statements are true
(d) Both the statements are false

☐ a)
☐ b)
☐ c)
☐ d)

No, the answer is incorrect.
Score: 0

Accepted Answers:
d)

6) Let us consider that we have a heat source which can provide a fixed quantity of heat (say x kW) but at any temperature we choose. Where should we place it to provide heat to the process?

1 point

- I. Above the pinch
II. Above the Grand Composite Curve

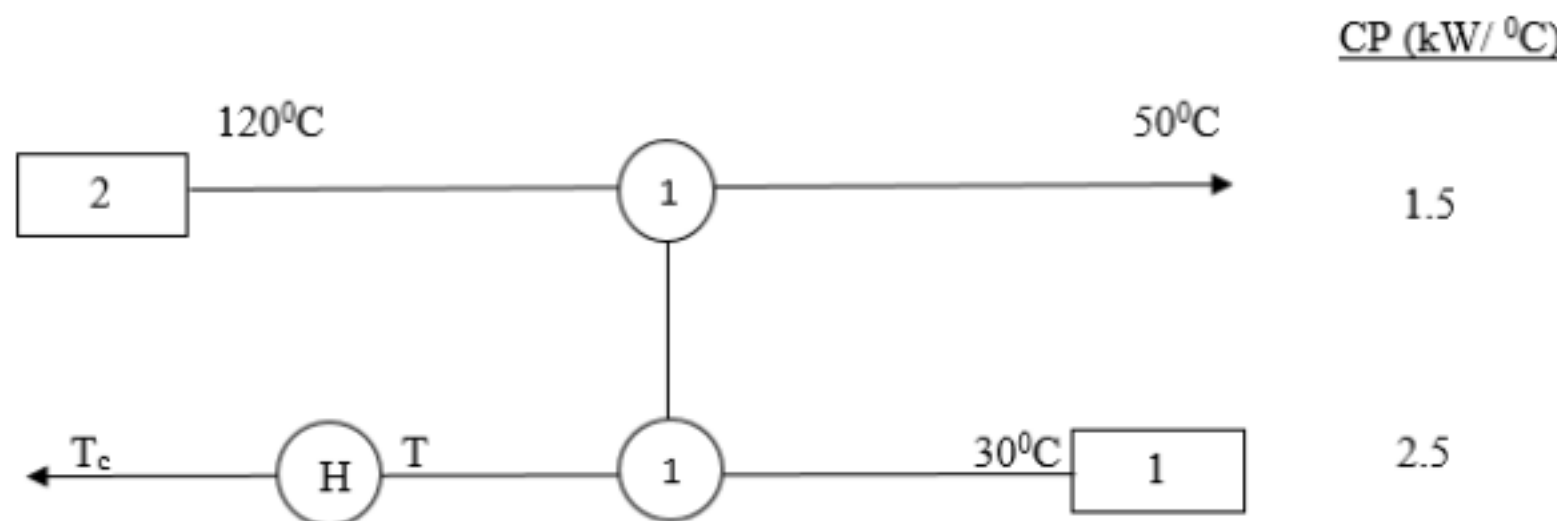
- (a) Only statement-I is true
(b) Only statement-II is true
(c) Both the statements are true
(d) Both the statements are false

☐ a)
☐ b)
☐ c)
☐ d)

No, the answer is incorrect.
Score: 0

Accepted Answers:
c)

7) Consider the following Heat Exchanger Network for a two stream problem as shown below :



Here 'H' represents the external hot utility that supplies a heat of 40 kW. The exit temperature of the cold stream T_c (in $^{\circ}\text{C}$) will be _____.

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 85,90

8) In the pinch design method, as ΔT_{min} (minimum temperature difference between hot and cold streams) is changed from a small to a large value, the capital cost _____ but the energy cost _____.

1 point

- (a) decreases, decreases
(b) increases, increases
(c) decreases, increases
(d) increases, decreases

☐ a)
☐ b)
☐ c)
☐ d)

No, the answer is incorrect.
Score: 0

Accepted Answers:
c)

9) Consider the design of Heat Exchanger Network for Maximum Energy Recovery (MER) for the following four streams.

Stream	Supply Temperature ($^{\circ}\text{C}$)	Target Temperature ($^{\circ}\text{C}$)	CP (kW/ $^{\circ}\text{C}$)	Heat Load (kW)
1	60	180	3	360
2	30	130	2.6	260
3	180	40	2	280
4	150	40	4	440

The minimum hot utility target (kW) is _____.

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 55,70

10) Consider again the design of Heat Exchanger Network in Q. 9 above. The minimum cold utility target (kW) is _____.

1 point

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 150,170

1 point