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reviewer3@nptel.iitm.ac.in ▼

Courses » Computational Systems Biology

Announcements

Course

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Unit 11 - Week 7

Course outline

How to access the portal

Pre-requisite Assignment

MATLAB Access and Introduction

MATLAB Learning Modules

Week 1

Week 2

Week 3

Week 4

Week 5

Week 6

Week 7

56 - Constraint-based Modelling of Metabolic Networks

57 - Flux Balance Analysis

Assignment 7

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment.

Due on 2018-09-19, 23:59 IST.

1)
$$x + y + z = 1$$
$$x + y = 2$$

1 point

This system of equation is

- ☐ Under-determined and has a unique solution
- ☐ Determined and has infinite solutions
- ☐ Under-determined and has many solutions
- ☐ Over-determined and has no solutions

No, the answer is incorrect.

Score: 0

Accepted Answers:

Under-determined and has many solutions

2) Flux Balance Analysis is

1 point

- ☐ A technique to understand interactions in a protein network
- ☐ Used to identify steady state flux distributions in a metabolic network
- ☐ Based on linear programming and requires an objective function to determine the flux distributions
- ☐ An unconstrained technique to determine flux through every reaction in a metabolic network and identify the phenotype

No, the answer is incorrect.

Score: 0

Accepted Answers:

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National Programme on Technology Enhanced Learning

In association with

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Constraint-Based Approaches

61 - Other Constraint-Based Approaches

62 - Lab: FBA using MATLAB

Quiz : Assignment 7

Week 7 Feedback : Computational Systems Biology

Assignment 7 solution

Week 8

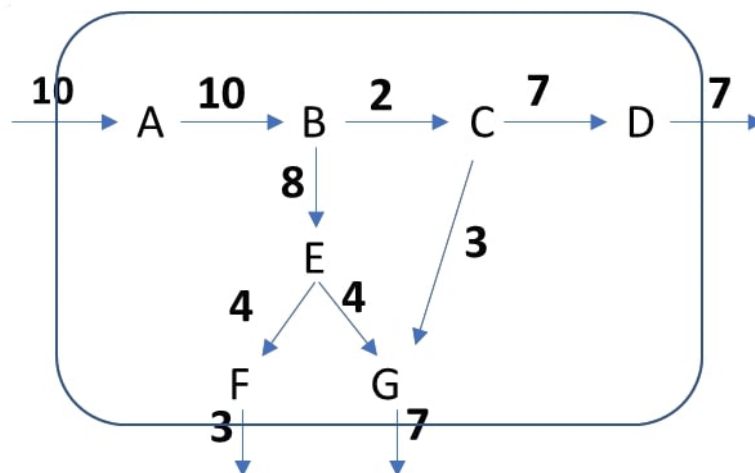
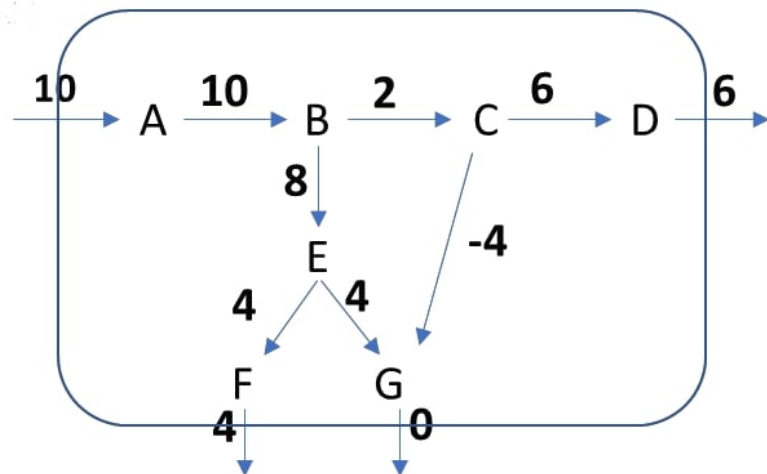
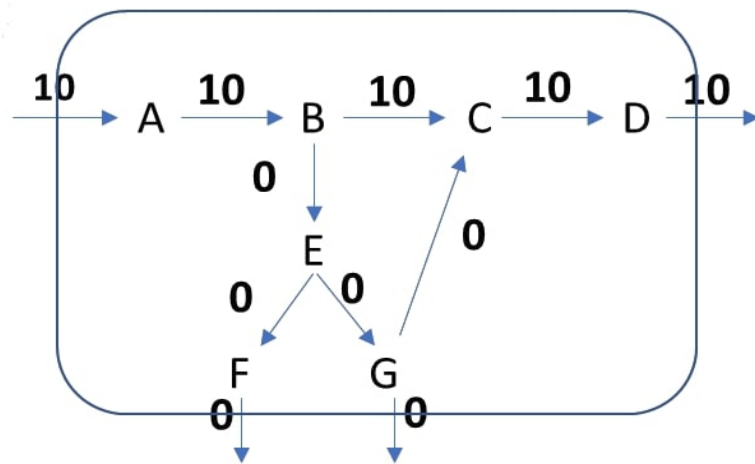
Week 9

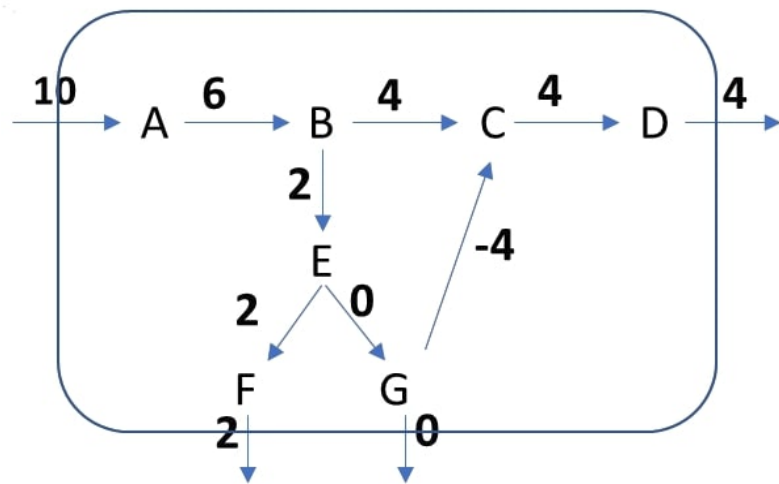
Week 10

Week 11

Week 12

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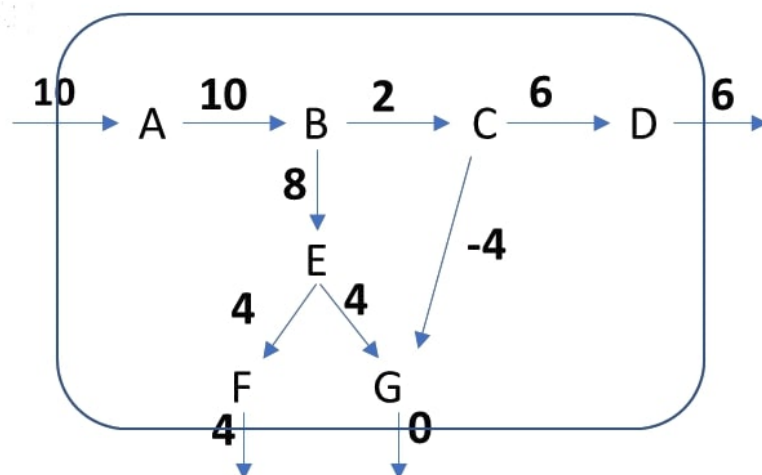
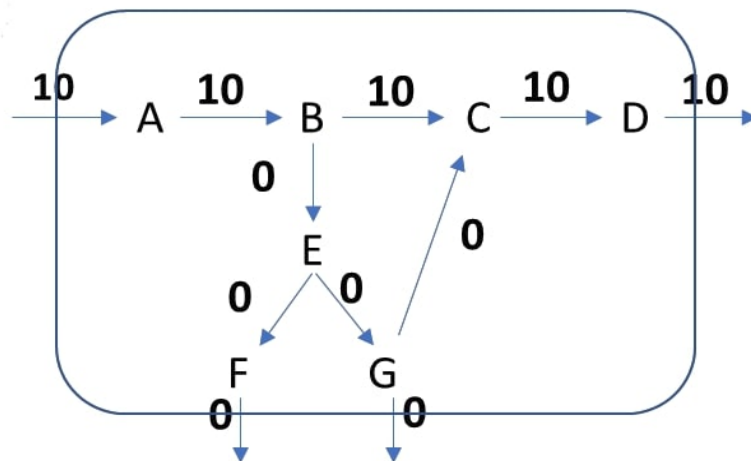




No, the answer is incorrect.

Score: 0

Accepted Answers:



4) Which of the following statements are true with respect to the perturbations in a metabolic network?

1 point

- ☐ Perturbations in a metabolic network are any changes in the reactions or genes that change the flux distribution
- ☐ Perturbations can be identified using flux balance analysis to identify

accumulation of metabolites

- ☐ Linear programming is the only method to identify perturbations
- ☐ MoMA and ROOM are techniques to study changes in the flux distributions in a metabolic network following perturbation

No, the answer is incorrect.

Score: 0

Accepted Answers:

Perturbations in a metabolic network are any changes in the reactions or gene that change the flux distribution

MoMA and ROOM are techniques to study changes in the flux distributions in a metabolic network following perturbation

5) Which of the following statements are true with respect to an objective function in a metabolic network? 1 point

- ☐ A reaction chosen as an objective function need not be balanced.
- ☐ Any reaction in a metabolic network can be an objective function
- ☐ Biomass reaction is the only objective function for performing Flux Balance Analysis
- ☐ An objective function is necessary since the system of reactions is under-determined

No, the answer is incorrect.

Score: 0

Accepted Answers:

Any reaction in a metabolic network can be an objective function

An objective function is necessary since the system of reactions is under-determined

6) Which of the following are true about constraints in Flux Balance Analysis? 1 point

- ☐ Thermodynamic constraints are imposed on reactions in a metabolic network to restrict their reversibility
- ☐ Capacity constraints are imposed on the reactions in a metabolic network to restrict their reversibility
- ☐ Mass balance constraints are imposed on reactions to determine if the reactions can carry a flux
- ☐ Stoichiometric constraints are imposed on metabolites to check if they are balanced in a reaction

No, the answer is incorrect.

Score: 0

Accepted Answers:

Thermodynamic constraints are imposed on reactions in a metabolic network to restrict their reversibility

Stoichiometric constraints are imposed on metabolites to check if they are balanced in a reaction

7) The theoretical maximum capability of a metabolic network to produce a metabolite of interest can be assessed by optimizing for: 1 point

- ☐ Biomass and metabolite together
- ☐ Biomass only
- ☐ Metabolite only

☐ Biomass first followed by metabolite

No, the answer is incorrect.

Score: 0

Accepted Answers:

Metabolite only

8) A reaction that cannot carry a flux on performing FBA is said to be **1 point**

- ☐ An unconstrained reaction
- ☐ A blocked reaction
- ☐ A constrained reaction
- ☐ A lethal reaction

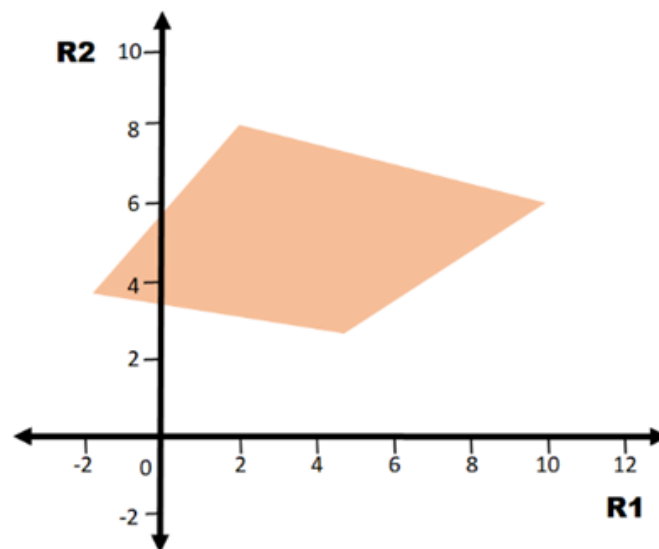
No, the answer is incorrect.

Score: 0

Accepted Answers:

A blocked reaction

9) If an organism's survival is dependent on flux of reaction 1 (R1) and **1 point** reaction 2 (R2), which of the following flux distributions can FBA return? Plot shows the feasible regions given that the upper and lower bounds are as given below:



	R1	R2
Upper bound	-2	2
Lower bound	10	10

☐ R1=6, R2=2

- ☐ R1=-1, R2=-1
- ☐ R1=-1, R2=4
- ☐ R1=4, R2=4
- ☐ R1=10, R2=10

No, the answer is incorrect.

Score: 0

Accepted Answers:

R1=6, R2=2

R1=-1, R2=4

R1=4, R2=4

10) You and your lab mate run Flux Balance Analysis using the same genome-scale model of *E. coli* iAF1260. However, both of you observe different flux distributions for the same model, under the same medium conditions/objective function. The reasons for this difference are: 1 point

- ☐ The LP solver used could have been different
- ☐ FBA returns only one of the feasible solutions for the flux distributions
- ☐ One of you perform parsimonious FBA, while the other performs a 'regular' FBA
- ☐ None of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

The LP solver used could have been different

FBA returns only one of the feasible solutions for the flux distributions

One of you perform parsimonious FBA, while the other performs a 'regular' FBA

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