

Unit 13 - Week 10

| |
|---|
| Course outline |
| How does an NPTEL online course work? |
| Prerequisite Assignment |
| MATLAB |
| Week 1 |
| Week 2 |
| Week 3 |
| Week 4 |
| Week 5 |
| Week 6 |
| Week 7 |
| Week 8 |
| Week 9 |
| Week 10 |
| 79 - Constraint-based Modelling of Metabolic Networks: Recap |
| 80 - Constraint-based Modelling of Metabolic Networks: Recap |
| 81 - Constraint-based Modelling of Metabolic Networks: Recap |
| 82 - 13C-Metabolic Flux Analysis using Mass Spectrometry |
| 83 - 13C-Metabolic Flux Analysis using Mass Spectrometry |
| 84 - 13C-Metabolic Flux Analysis using Mass Spectrometry |
| 85 - Lab: 13C-Metabolic Flux Analysis using Mass Spectrometry |
| Quiz : Practice Assignment 10 |
| Quiz : Assignment 10 |
| Computational Systems Biology : Week 10 Feedback Form |
| Lecture Materials |
| Week 11 |
| Week 12 |
| Download Videos |
| Text Transcripts |

Assignment 10

The due date for submitting this assignment has passed. **Due on 2020-04-08, 23:59 IST.**
 As per our records you have not submitted this assignment.

1) E. coli was grown in a medium containing 100% of $1-^{13}\text{C}$ glucose. More than 80% of the pyruvate was found to be unlabelled. Which of the following is the most abundantly used pathway through which pyruvate was produced? 1 point

Embden-Meyerhof-Parnas pathway
 Pentose phosphate pathway
 Entner-Doudoroff pathway
 Cannot be concluded

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 Pentose phosphate pathway

2) Why do we analyse amino acids GC-MS for ^{13}C flux analysis? 1 point

They are present in small amounts
 They are a good proxy for the central carbon metabolites
 They are easier to analyse
 None of the above

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 They are a good proxy for the central carbon metabolites
 They are easier to analyse

3) Which of the following statements is/are true about analysis of fatty acids through GC-MS? 2 points

Fatty acids are often converted into fatty acid methyl esters before GC-MS analysis
 Fatty acids are derivatized to reduce their polarity
 Derivatization is done to increase the quantity of fatty acids present in the sample
 High polarity of free fatty acids causes adsorption which leads to errors

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 Fatty acids are often converted into fatty acid methyl esters before GC-MS analysis
 Fatty acids are derivatized to reduce their polarity
 High polarity of free fatty acids causes adsorption which leads to errors

Consider the following fragment of Alanine

| | Fragment | Fragment mass | Intensities (ion count) |
|---------|----------|---------------|-------------------------|
| Alanine | M-15 | 302 | 12300 |
| | | 303 | 5800 |
| | | 304 | 1850 |
| | | 305 | 800 |

Calculate the mass distribution vector (enter the answers correct to three decimal places)

4) m_0 value = _____

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 (Type: Range) 0.592,0.593

0.25 points

5) m_1 value = _____

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 (Type: Range) 0.279,0.280

0.25 points

6) m_2 value = _____

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 (Type: Range) 0.089,0.090

0.25 points

7) m_3 value = _____

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 (Type: Range) 0.038,0.039

0.25 points

8) Calculate the fractional labelling from this fragment. (enter the answers correct to three decimal places)

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 (Type: Range) 0.190,0.195

1 point

9) Based on the answers obtained, the experiment was carried out using which of the following as substrate 1 point

- 10% [$U-^{13}\text{C}$] glucose
 20% [$U-^{13}\text{C}$] glucose
 60% [$U-^{13}\text{C}$] glucose
 100% natural glucose

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 20% [$U-^{13}\text{C}$] glucose

Consider the following fragment of Serine

| | Fragment | Fragment mass | Intensities (ion count) |
|--------|----------|---------------|-------------------------|
| Serine | M-15 | 432 | 78523 |
| | | 433 | 1782 |
| | | 434 | 1040 |
| | | 435 | 210 |

Calculate the mass distribution vector of the fragment (enter the values rounded to three decimal places)

10) m_0 value = _____

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 (Type: Range) 0.962,0.963

0.25 points

11) m_1 value = _____

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 (Type: Range) 0.021,0.022

0.25 points

12) m_2 value = _____

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 (Type: Range) 0.012,0.013

0.25 points

13) m_3 value = _____

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 (Type: Range) 0.002,0.003

0.25 points

14) Calculate the fractional labelling (enter the values correct to three decimal places).

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 (Type: Range) 0.017,0.019

1 point

15) Based on the answers obtained, the experiment was carried out using which of the following as substrate 1 point

- 10% [$U-^{13}\text{C}$] glucose
 20% [$U-^{13}\text{C}$] glucose
 60% [$U-^{13}\text{C}$] glucose
 100% natural glucose

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 100% natural glucose