

Unit 6 - Week-5: Basics of mass spectrometry

Course outline

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Week-2: Gel-based proteomics

Week-3: Two-dimensional gel electrophoresis (2-DE)

Week-4: Difference in gel electrophoresis (DIGE) & Systems Biology

Week-5: Basics of mass spectrometry

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L22. Chromatography technologies

L23. Liquid chromatography

L24. Mass spectrometry: Ionization sources

L25. Mass spectrometry: Mass analyzers

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Text Transcripts

Week-5 Assignment

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

Due on 2019-10-02, 23:59 IST.

Week-5 Assignment

1) What is the principle behind mass spectrometric identification of biological samples? 1 point

- Ions with higher molecular weight absorbs higher frequencies of energy
- A beam of lower molecular weight cations is deflected more by a magnetic field
- A beam of higher molecular weight cations is deflected more by a magnetic field
- Higher molecular weight compounds are less volatile

No, the answer is incorrect. Score: 0

Accepted Answers:

A beam of lower molecular weight cations is deflected more by a magnetic field

2) Which of the following ionization methods is more suitable for protein samples? 1 point

- Electron impact ionization
- Fast atom bombardment
- Electrospray ionization
- Atmospheric pressure Photoionization

No, the answer is incorrect. Score: 0

Accepted Answers:

Electrospray ionization

3) Which of the following statement is NOT true with regards to ion exchange chromatography using CM-cellulose matrix? 1 point

- Phosphate buffers are generally used
- Elution can be done by changing the pH of the buffer
- Elution can be done by increasing ionic strength of the buffer
- The matrix resin has positively charged ion

No, the answer is incorrect. Score: 0

Accepted Answers:

The matrix resin has positively charged ion

4) Which of the following chromatography technique would you prefer to desalt a complex protein sample? 1 point

- Gel filtration chromatography
- Ion exchange chromatography
- Thin layer chromatography
- Affinity chromatography

No, the answer is incorrect. Score: 0

Accepted Answers:

Gel filtration chromatography

5) What is the common principle between reverse phase chromatography and zip-tipping? 1 point

- Ionic interactions between peptides and resin
- Hydrogen bonding between peptides and resin
- Hydrophobic interactions between peptides and resin
- Disulphide bond between peptides and resin

No, the answer is incorrect. Score: 0

Accepted Answers:

Hydrophobic interactions between peptides and resin

6) Resolution of a mass spectrometer could be determined by which of the following equations? 1 point

- $(m/z) / \Delta(m/z)$
- $\Delta(m/z) / (m/z)$
- $\{\Delta(m/z) / (m/z)\} / 10$
- $\{\Delta(m/z) / (m/z)\} \times 10$

No, the answer is incorrect. Score: 0

Accepted Answers:

$(m/z) / \Delta(m/z)$

7) A researcher wants to study deep tissue proteomics of a plant sample using Triple Quadrupole (TQ) instrument. What is your perspective on this? 1 point

- No, it is not possible with the TQ
- He can do although he will not get a very good protein coverage
- He should definitely use this platform to use good coverage
- He has to process sample with more than one proteolytic enzyme

No, the answer is incorrect. Score: 0

Accepted Answers:

No, it is not possible with the TQ

8) Theoretical mass of compound X is 180 Da. When an ultrapure compound is subjected to MALDI the mass is found to be 176 Da. What is the mass accuracy? 1 point

- 0.022 PPM
- 0.055 PPM
- 0.065 PPM
- 0.048 PPM

No, the answer is incorrect. Score: 0

Accepted Answers:

0.022 PPM

9) Sudesh processed a cell lysate, prepared peptides and submitted to Mass facility at IIT Bombay. After sample run he got the following chromatogram. 1 point



Answer Q.9 and 10 on the basis of the attached chromatogram.

What can be inferred from the above chromatogram?

- Sample is good and elution has happened properly
- Chromatogram is not good as elution has started at the end of gradient
- The late elution might be due to bad parameters set in liquid chromatography
- Elution has started at 14 minutes of run time

No, the answer is incorrect. Score: 0

Accepted Answers:

Chromatogram is not good as elution has started at the end of gradient

The late elution might be due to bad parameters set in liquid chromatography

10) When Sudesh checked his Liquid Chromatography (LC) parameter he found the details of setting (see figure). What changes in LC settings would you suggest him to get a better chromatogram? 1 point

Time (mm:ss)	Duration (mm:ss)	ACN Percentage
00:00	00:00	5
05:00	05:00	5
25:00	20:00	15
40:00	15:00	50
60:00	20:00	95

- The LC parameters are good and does not require any changes
- He should use less ACN percentage during 5 to 25 minutes
- ACN percentage should be greater than 95 during 10 to 25 minutes
- He should extend 50 percent ACN during 10 to 40 minutes

No, the answer is incorrect. Score: 0

Accepted Answers:

He should extend 50 percent ACN during 10 to 40 minutes