


**NAVRACHANA  
UNIVERSITY**
*a UGC recognized University*

**School:** School of Science  
**Program:** M. Sc. in Chemistry  
**Year:** 1<sup>st</sup> **Semester:** 1<sup>st</sup>  
**Examination:** End Semester Examination  
**Examination year:** December - 2022

**Course Code:** CH112 **Course Name:** Basics of Analytical chemistry  
**Date:** 02/12/2022  
**Time:** 11:30 to 13:30 pm

**Total Marks:** 40  
**Total Pages:** 2

**Instructions:**

- Write each answer on a new page.
- Use of a calculator is not required.
- \* COs=Course Outcome mapping. # BTL=Bloom's Taxonomy Level mapping

Q. No.	Details	Marks	COs*	BTL #		
Q.1	<p>Q. Match the following (write complete options in answer sheet)</p> <table border="0"> <tr> <td style="vertical-align: top;"> <p>Sr. No.    <b>Column A</b></p> <p>1        rhenium filament</p> <p>2        nuclear fission</p> <p>3        methane</p> <p>4        coulombic fission</p> <p>5        quantum tunnelling</p> </td> <td style="vertical-align: top;"> <p><b>Column B</b></p> <p>a)    Fast atom bombardment</p> <p>b)    Electrospray ionization</p> <p>c)    Electron impact ionization</p> <p>d)    MALDI</p> <p>e)    Plasma Desorption</p> <p>f)    Field desorption</p> <p>g)    Chemical ionization</p> <p>h)    Field ionization</p> </td> </tr> </table>	<p>Sr. No.    <b>Column A</b></p> <p>1        rhenium filament</p> <p>2        nuclear fission</p> <p>3        methane</p> <p>4        coulombic fission</p> <p>5        quantum tunnelling</p>	<p><b>Column B</b></p> <p>a)    Fast atom bombardment</p> <p>b)    Electrospray ionization</p> <p>c)    Electron impact ionization</p> <p>d)    MALDI</p> <p>e)    Plasma Desorption</p> <p>f)    Field desorption</p> <p>g)    Chemical ionization</p> <p>h)    Field ionization</p>	5	CO2	BT1, BT2, BT3
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Q.2	<p>Fill in the blanks (Write complete statements in answer book)</p> <ol style="list-style-type: none"> <li>Qualitative analysis provides ..... and Quantitative analysis provides..... type of information pertaining to the sample</li> <li>The technique where sample is heated to a constant weight with increasing temperatures is known as .....</li> <li>An instrument that measures the change in enthalpy for a sample is .....</li> <li>Full form of ICP-MS is .....</li> <li>The significant figures for 1.524604 and 0.05647 is ..... and ..... respectively.</li> <li>The value of Pearson's coefficient <math>r^2</math> closer to 1 indicates .....</li> </ol>	7	CO1, CO3, CO4	BT1, BT2, BT3		

	7. Hydride generation technique in atomic spectroscopy can be applied for elements forming _____.																					
<b>Q.3</b>	<p>Answer the following</p> <p>a) Describe MALDI. Explain why it is a preferred ion source for biomolecules.</p> <p>b) Explain working of ion trap mass analyzer.</p> <p>c) Discuss the instrumentation of AAS in detail and its applications.</p> <p>d) Discuss various types of errors in detail with an example.</p> <p>e) A calorimetric method is developed for determining the glucose content in blood sample, where Folin-Wu's procedure is used as standard method. From the following sets of replicate analysis on the same sample, determine the differences in variance for the developed method with respect to standard. The tabulated value at 95% confidence is 4.95.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Developed method</th> <th>Folin Wu's method</th> </tr> </thead> <tbody> <tr><td>128</td><td>130</td></tr> <tr><td>127</td><td>128</td></tr> <tr><td>126</td><td>131</td></tr> <tr><td>123</td><td>129</td></tr> <tr><td>124</td><td>127</td></tr> <tr><td>128</td><td>125</td></tr> <tr><td>129</td><td></td></tr> <tr><td>126</td><td></td></tr> </tbody> </table>	Developed method	Folin Wu's method	128	130	127	128	126	131	123	129	124	127	128	125	129		126		15	CO1, CO2, CO3	BT1, BT2, BT3
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<b>Q.5</b>	<p>Answer the following</p> <p>(a) Explain how resolution in mass spectrometry is calculated. Calculate the resolution required to resolve peaks occurring at 16.0122 and 17.0312</p> <p>(b) Give expressions for chi square test, F-test and Standard deviation.</p> <p>(c) Define the terms Accuracy, Precision, Sensitivity and Selectivity.</p> <p>(d) Discuss the interferences associated with AES in detail.</p>	8	CO1, CO2, CO3	BT1, BT2, BT3																		
<b>Q.6</b>	<p>Explain the following in detail (<b>any one</b>)</p> <p>(a) Discuss TGA in detail.</p> <p>(b) Discuss DSC in detail.</p>	5	CO4	BT1, BT2, BT3																		