

## ANNEXURE A

### RFP UJ 45 2023 ACQUISITION OF AN ION CHROMATOGRAPH SYSTEM FOR ANIONS AND CATIONS

#### Background:

##### 1. EQUIPMENT DESCRIPTION AND BACKGROUND – REASON FOR PURCHASE

The ion chromatograph (IC) is a state-of-the-art analytical instrument for undergraduate practicals with research capability. It offers a versatile platform for separating charged (ionic) species from aqueous solutions and quantifying their concentration. IC systems can analyse charged species such as organic salts, anions, cations, and proteins depending on the model or type. The IC system consists of the following key components:

**Pump:** The pump delivers the mobile phase (eluent) at a constant flow rate, ensuring a stable and reproducible separation.

**Injection System:** The injection system enables precise and automated sample introduction into the IC system, ensuring accurate analysis.

**Column:** The IC column is packed with ion exchange or ion exclusion materials, providing the separation medium for different ionic species. The column dimensions are optimised for efficient separation and resolution.

**Detector:** The IC system is equipped with a sensitive and selective detector, such as a conductivity detector or UV-Vis detector, to monitor the eluent and detect separated ions. The detector generates a signal proportional to the concentration of the analytes, allowing for quantification and identification.

**Software and Data Analysis:** The IC system is controlled by intuitive software, providing a user-friendly interface for method setup, instrument control, and data analysis. The software enables peak integration, calibration curve generation, and reporting of results.

Acquiring an ion chromatograph for undergraduate practicals can offer several valuable benefits and motivations. Here are some key reasons to consider:

**Comprehensive Practical Training:** Ion chromatography is a widely used analytical technique in various fields, including environmental science, chemistry, and biochemistry. Introducing an ion chromatograph in undergraduate practicals exposes students to a robust and versatile analytical tool, providing hands-on experience with a technique commonly employed in research and industry settings. It equips students with valuable skills relevant to their future scientific research or industry careers.

**Real-World Applications:** Ion chromatography is applied in diverse areas such as environmental monitoring, water quality assessment, pharmaceutical analysis, and food and beverage analysis. Incorporating an ion chromatograph into undergraduate practicals exposes students to the real-world applications of this technique, enabling them to understand the relevance of their laboratory work to pressing societal and environmental issues. This practical experience enhances their understanding of their scientific studies' broader implications and impact.

**Research Capability:** An ion chromatograph with research capabilities allows undergraduate students to engage in research-oriented projects. It enables them to explore different separation conditions, optimise methods, and investigate novel ion chromatography applications. This hands-on research experience fosters critical thinking, problem-solving skills, and scientific inquiry, preparing students for future research endeavours or advanced academic pursuits.

**Collaboration Potential:** Incorporating an ion chromatograph into undergraduate practicals creates opportunities for collaboration with other academic institutions, research organisations, or industry partners. Such collaborations can enhance the learning experience by exposing students to a broader network of researchers, facilitating knowledge exchange, and fostering multidisciplinary projects. Collaborative research projects can also help bridge the gap between academia and industry, providing students valuable exposure to real-world challenges and potential career opportunities.

**Advanced Analytical Techniques:** Ion chromatography offers excellent selectivity and sensitivity for separating and quantifying ionic species. By incorporating this technique into undergraduate practicals,

students gain exposure to advanced analytical methods beyond basic qualitative and quantitative analysis. They learn to handle complex sample matrices, optimise separation conditions, and interpret data, preparing them for more sophisticated analytical challenges in their future careers.

**Professional Development:** Utilising an ion chromatograph in undergraduate practicals enhances the overall professional development of students. It familiarises them with sophisticated analytical instruments in research and industry settings. This experience helps students develop important skills such as instrument operation, method development, data analysis, and troubleshooting. Employers highly seek such skills and lay a solid foundation for future success in scientific careers.

The current Ion Chromatograph that we have is more than 10 years old and is unable to provide the analysis that we require. The supplier no longer supports the repairs and maintenance of the equipment.

In summary, acquiring a new ion chromatograph for undergraduate practicals provides students with hands-on training, exposes them to real-world applications, fosters research capabilities, encourages collaboration, introduces advanced analytical techniques, and

contributes to their overall professional development. By offering these valuable experiences, an ion chromatograph can greatly enrich undergraduate education in analytical chemistry and related disciplines.

#### SPECIFICATIONS:

Standard features		Comply / do not Comply	Comments
	Must be a totally integrated and preconfigured ion chromatograph consisting of a pump, conductivity detector, degas assembly, conductivity cell, column heater, injector valve, suppressor, and columns		
	The suppressor must be operated continuously without the need of switching motors and based on a single membrane based ion exchanger		
	Suppressor regeneration must be carried out electrolytically		
	Must utilize optical leak detection for laboratory safety and management to allow fast response to system leaks.		
	Must have available built in vacuum degas assembly which provides in-line degassing of eluents ensuring reproducibility and protection of eluents from contamination and decomposition		
	The specifications of the pump must be consistent with industry standards, which must include precision, accuracy, ripple, maximum flow rate, maximum pressure, and gradient proportioning accuracy		
	The pump must also have a piston seal wash, which can be continuous when connected to rinse solution supply.		
	Pump must be capable of running 2 mm and 4 mm i.d. columns without modification of the pump heads.		
	Must allow for user-selectable high- and low-pressure limits to automatically stop the pump in the event of leaks, flow restrictions, flow blockages, or empty eluent reservoirs. The		

	upper limit must be at least 0-35 MPa or 0-5000 psi in one unit (MPa or psi) increments		
	The software must be a 64 bit application for future upgradeability		
	<b>Comments</b>		
	<b>Warranty and Price:</b>		
	A warranty period that ensures coverage for a reasonable timeframe.		
	Competitive pricing that includes the instrument, necessary accessories, and initial consumables.		
	<b>3. INSTALLATION AND COMMISSION</b>		
	Delivery required to the point of operation.		
	The supplier is required to do installations and commissioning of the equipment.		
	The Supplier is required to provide training on how to use the machine.		
	The supplier should include the workstation, software, and applicable licenses for operation		
<b>Sub Total</b>			
<b>VAT</b>			
<b>Final Total</b>			
<b>Evaluation Criteria</b>			
‘This tender will be evaluated in three (3) stages:			
<b>Stage 1: Tender Compliance</b>			
<b>Stage 2: Technical / Functionality</b>			
<b>Stage 3: Financial and B-BBEE (80/20)</b>			
<b>Technical / Functionality Criteria</b>			
<b>A minimum scoring of 70 points must be achieved to be evaluated further for financial and B-BBEE.</b>			
	<b>Criteria</b>	<b>Maximum points obtainable</b>	<b>Comments</b>
1	Compliance to product specification	70	
2	2 years’ Service Plan and After Sale Service	10	
3	Equipment Warranty –  The tenderer to submit a Equipment warranty (1-3) Year’s	20	
	<b>Total</b>	<b>100</b>	

A minimum of 70 points is required by any tenderer in terms of the Stage 2

**Stage 3: Financial and B-BBEE (80/20)**