

	Sanjay Ghodawat University, Kolhapur		2018-19
	Established as State Private University under Govt. of Maharashtra. Act No XL, 2017		
Year and Program: 2018-19/ M. Sc.	School of Science	Department of Chemistry	
Course Code: CHS507	Analytical Chemistry-I	Semester – Odd (I)	
Day and Date: Friday, 07/06/2019	End Semester Examination	Time: 3 hrs, Max Marks: 100 10.30am to 11.00 AM	
PRN:	Seat No:	Section A Marks out of 20:	
Students sign:	Jr. Supervisor sign:		

Section A

Instructions:

- 1) All Questions are compulsory.
- 2) For MCQs mark tic (✓) for correct answer. No marks for multiple tics (✓).
- 3) Section A should be submitted to Jr. Supervisor immediately after first 30 min.

Q.1 Multiple choice questions.

	Marks	level	CO
	20		
1 Error (E) =-----+-----	1	L2	1
i) $E_r + E_a$ ii) $E_d + E_s$			
iii) $E_a + E_b$ iv) $E_r + E_s$			
2 ----- describes accuracy	1	L2	1
i) Standard deviations ii) Absolute error			
iii) Coefficient of Variance iv) Variance			
3 -----, describes precision	1	L3	1
i) Absolute error ii) Random error			
iii) Relative error iv) Standard deviation,			
4 Distribution Coefficient (K) = $\frac{A}{B}$	1	L2	2

Where, A= Concentration of solute in stationary phase, then
B= ?

- i) B= Retention time
- ii) B=Selectivity
- iii) B= Concentration of solute in mobile phase
- iv) B= Resolution

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|----|---|---|----|---|
| 5 | In rotational spectroscopy ----- radiation is used. | 1 | L3 | 2 |
| | i) Radio-frequency ii) UV | | | |
| | iii) Microwave iv) IR | | | |
| 6 | In reverse phase partition chromatography, the stationary phase is -----. | 1 | L3 | 2 |
| | i) Non-polar ii) Polar | | | |
| | iii) Adsorbent iv) None of these | | | |
| 7 | The universal detector used in gas chromatography is----- | 1 | L2 | 3 |
| | i) FID ii) ECD | | | |
| | iii) TCD iv) None of these | | | |
| 8 | Units of wavelengths (λ)----- | 1 | L2 | 3 |
| | i) F ii) mg | | | |
| | iii) nm iv) Nm | | | |
| 9 | Fundamental modes of vibration for NH_3 molecules is ----- | 1 | L2 | 3 |
| | i) 3 ii) 7 | | | |
| | iii) 5 iv) 6 | | | |
| 10 | Fundamental modes of vibrations for linear molecules =----- | 1 | L3 | 3 |
| | i) $3n-6$ ii) $3n$ | | | |
| | iii) $3n-5$ iv) $4n$ | | | |
| 11 | IR absorption value for Ketone functional group is ----- | 1 | L3 | 3 |
| | i) 1715-1830 ii) 1715-1780 | | | |
| | iii) 2200-2600 iv) 3000-3300 | | | |
| 12 | ----- detectors used in IR spectroscopy | 1 | L2 | 3 |
| | i) TCD ii) Bolometer | | | |
| | iii) ECD iv) None of these | | | |
| 13 | Absorbance (A) =----- | 1 | L2 | 3 |
| | i) ϵ . C. A ii) ϵ . c. t | | | |
| | iii) E. C. t iv) A. c. t | | | |
| 14 | Volumetric methods based upon the formation of slightly soluble precipitate are called as-----titrations. | 1 | L1 | 4 |
| | i) Precipitation ii) Redox | | | |
| | iii) Complexometric iv) Acid-base | | | |

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Day and Date: Friday, 07/06/2019	End Semester Examination	Time: 3 hrs, Max Marks: 100 11:00 am to 1:30 pm.	
PRN:	Seat No:	Section A Marks out of 20:	

Section B

		Marks	level	CO
Q.2	Answer the following questions (Solve any Two)	12		
a)	Explain the findings of least square line.	6	L3	1
b)	Explain the term i) Absolute error ii) Relative error iii) Standard deviations	6	L2	1
c)	Define the pure water. Explain classification of water.	6	L1	1
Q.3	Answer the following questions (Solve any Two)	12		
a)	Explain columns used in HPLC.	6	L2	2
b)	Substance A and B have retention time of 16.40 and 17.63 min respectively, on 30.0 cm column. An unretained species passes through the column in 1.30 min. The peak width (at base) for A and B are 1.11 and 1.21 min respectively. Calculate (a) Column resolution, (b) the average number of plates in the column, (c) the plate height, (d) the length of column required to achieve a resolution of 1.5.	6	L6	2
c)	Define chromatography? Give relation between the column resolution, column efficiency, and selectivity.	6	L1	2
Q.4	Answer the following questions (Solve any Two)	12		
i)	Write note on fundamental modes of vibrations for linear and non-linear molecules	6	L4	3
ii)	Explain the ultraviolet spectroscopy with the help of neat labeled diagrams.	6	L2	3

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	iii) Define i) Wavelength ii) Frequency iii) Wavenumber, and derive relation between velocity, frequency, wave number	6	L2	3
	b) Answer the following questions (Solve any Four)	16		
	i) Explain the types of vibration in IR-spectroscopy.	4	L2	3
	ii) Explain with the help of energy level diagram rotational, vibrational, and electronic spectra.	4	L2	3
	iii) Explain sample preparation methods in FT-IR spectroscopy.	4	L3	3
	iv) Explain UV-Visible spectroscopy for mixture of elements and drug analysis.	4	L4	3
	v) Write note on applications of IR-Spectroscopy.	4	L2	3
Q.5	a) Answer the following questions (Solve any Two)	16		
	i) What is stepwise, overall formation constants? Explain masking and damasking agents with suitable examples.	8	L4	4
	ii) Define complexing agents; explain complexometric titrations with the help of suitable complexing agents.	8	L2	4
	iii) Explain the Karl-Fischer titrations for determination of moisture.	8	L3	4
	b) Answer the following questions (Solve any Three)	12		
	i) Write note on Fajans titrations.	4	L2	4
	ii) Explain the applications of precipitation titrations.	4	L3	4
	iii) Explain precipitation titrations.	4	L4	4
	iv) What is chelating agents? Explain types of chelate.	4	L4	4

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