

Q1/ Find the Accuracy of these Major, Trace and REE elements. (Sa Analyzed results, Sb Published (expected) results)

Elements	Sa	Sb	Accuracy %
Al (%)	7.46	7.75	
Fe	3.36	3.36	
Ca	1.9	1.99	
Mg	0.86	0.88	
Na	2.53	2.6	
K	3.51	3.54	
Mn	0.048	0.049	
Co	10.55	10.3	
Cr	26.5	25	
Cd	0.16	0.16	
Rb	128	123.5	
Sr	424	425	
Th	40.2	40.2	
U	4.7	4.7	
V	59	59	
Zr	174.5	171.5	
Ni	424	428	
La	112	115	
Ce	220	214	
Pr	23.3	23	
Nd	82.7	81.6	
Sm	13.8	13.75	
Eu	2.31	2.19	
Gd	11.31	10.1	
Tb	1.58	1.5	
Dy	8.96	8.61	

Q2/ Find the Accuracy of the following data:

Sample	SARM-8 Chromium Ore	STD 1.1	Accuracy%	BCS-370 Magnesite Chrome	STD 4.1	Accuracy%
TiO ₂	0.24	0.23		0.13	0.13	
Fe ₂ O ₃	20.30	20.20		7.23	7.21	
Al ₂ O ₃	10.60	10.50		12.30	12.40	
SiO ₂	4.30	4.29		3.01	3.04	
MnO	0.25	0.25		0.11	0.10	
CaO	0.26	0.27		1.54	1.56	
Cr ₂ O	49.00	49.10		13.40	13.50	
MgO	14.60	14.60		61.80	61.80	
SO ₃	0.08	0.08		0.01	0.01	
P ₂ O ₅	0.01	0.01		0.02	0.02	
K ₂ O	0.07	0.07		0.03	0.03	
Mn	1940	2000		852.00	826.00	
Ti	1440	1400		779.00	715.00	

Q3/ Find the Precision of the following data:

Elements	S1	S2	S3	Precision 63%	Precision 95%
Al %	4.18	4.17	4.18		
Fe	1.79	1.78	1.79		
Ca	24.00	23.90	23.95		

Q2/ The following table is data of geochemical analysis of Ca, Na and TDS for water samples of Lesser Zab River, using the diagram to determine the mechanisms controlling the chemistry of river?

NO. of samples	Ca (epm)	Na (epm)	TDS mg/L
1R	3.41	0.26	160
2R	3.45	1.00	150

3R	3.72	0.33	160
4R	3.12	0.28	150
5R	3.25	0.28	160
6R	3.70	0.28	180
7R	3.50	0.30	190
8R	3.65	0.30	170
9R	3.70	0.22	130
10R	3.80	0.22	130
1D	2.53	0.26	140
2D	1.48	0.22	130
3D	1.70	0.26	140
4D	1.78	0.26	140
5D	1.63	0.26	140
6D	2.86	0.26	150
7D	2.27	0.26	140
8D	1.60	0.26	140
9D	1.96	0.26	140
10D	2.16	0.26	150
1T	2.77	0.35	140
2T	2.44	0.30	150
3T	2.64	0.35	150
4T	2.65	0.35	160
5T	2.26	0.35	150
6T	2.58	0.35	160
7T	2.81	0.39	150
8T	2.71	0.39	160
9T	2.91	0.39	180
10T	5.04	0.39	190

Q3/ The following table is data of geochemical analysis of cations and anions for water samples of Dokan Lake, using the diagram (semi-logarithm) to determine the quality of water?

Sample/ ppm	Ca ⁺²	Mg ⁺²	Na ⁺	K ⁺	HCO ₃ ⁻	Cl ⁻	NO ₃ ⁻	SO ₄ ⁻²
1	53.00	10.80	9.00	1.20	158.00	10.35	2.90	55.71
2	50.00	11.36	10.00	1.40	169.00	15.30	2.90	40.50
3	55.00	11.20	8.00	1.00	164.00	14.95	3.40	45.99
4	52.70	10.90	8.00	1.00	165.00	10.70	2.10	49.63
5	56.00	11.17	9.00	1.20	173.00	10.35	2.20	52.78
6	64.00	10.90	9.00	1.20	192.00	10.00	4.30	50.90
7	75.90	9.67	6.00	0.70	195.00	13.90	8.60	60.33
8	69.30	9.84	10.00	0.85	186.00	15.30	4.90	60.00
9	38.60	10.00	7.00	1.00	137.00	9.25	1.27	35.60
10	37.27	10.05	7.00	1.20	142.00	10.30	1.32	31.02

Q4/ Fill in the blank of the following sentences by the appropriate words:

1. Exploration Geochemistry is divided to andsurvey.
2. is an instrument used in soil sampling.
3. The occurrence of trace elements in solids, as a trace element on the surface of a colloidal particle of Fe-Mn Oxides, Clay mineral or Organic material.
4. The points which located under inflection point in the table are used to determine
5. Relative difference (R.D) for water is the difference between sum of and in (epm).
6. Planning of exploration....., and

Q5/ The following table is data of geochemical analysis of Pb element from stream sediment sample of Dokan area using semi log paper to determine the Anomaly, Background & Threshold?

Note: Standard deviation (SD or σ) = 0.24, and Arithmetic mean (X) = 1.01

Class Interval	Frequency
1.1-1.2	1
1.2-1.3	16
1.3-1.4	33
1.4-1.5	50
1.5-1.6	49
1.6-1.7	36
1.7-1.8	9
1.8-1.9	6
1.9-2.0	5
2.0-2.1	4
2.1-2.2	10
2.2-2.3	8
2.3-2.4	5
2.4-2.5	4
2.5-2.6	2
2.6-2.7	0
2.7-2.8	1

Q6/ Find precision for these cations of some water samples taken from the river, if it is acceptable or not accepted.

If Standard deviation (SD or σ) Arithmetic mean(X)

Elements (ppm)	SD (σ)	X
Ca	2.15	68.03
Mg	0.51	9.03
Na	0.5	6.5
K	0.02	0.8

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Q7/ Provide short answers (using words or figure as required):

- Write the mode occurrence of Zn in Magnetite.
- Why we use Platinum and Nickel bowl in fusion method?
- Oxalate is used for what?
- Why separation and pre-concentration should be avoided?
- Draw the relationship between Mn and Cu when the correlation coefficient (r) is (-0.98).
- List the requirements that are needed in samples collecting?

Q8/ Find precision for these cations of some water samples taken from the river, if it is acceptable or not accepted.

If Standard deviation (SD or σ) Arithmetic mean(X)

Elements	SD (σ)	X
Ca ppm	2.15	68.03
Mg ppm	0.51	9.03
Na ppm	0.5	6.5
K ppm	0.02	0.8

Q9/ The data of geochemical analysis for Pb element from stream sediment is given below, using semi-log paper to determine the Anomaly, Background and Threshold?

Note: Standard deviation (SD or σ) = 0.24, and Arithmetic mean(X)=1.01

Class Interval	Frequency
1.1-1.2	1
1.2-1.3	16
1.3-1.4	33
1.4-1.5	50
1.5-1.6	49
1.6-1.7	36
1.7-1.8	9
1.8-1.9	6

1.9-2.0	5
2.0-2.1	4
2.1-2.2	10
2.2-2.3	8
2.3-2.4	5
2.4-2.5	4
2.5-2.6	2
2.6-2.7	0
2.7-2.8	1

Q10/ The table below represent data of geochemical analysis of Mn element from soil sample of Bastora area, determine the *Anomaly*, Background and Threshold, by using semi log paper.

Note: Standard deviation (S)= 0.43, Mean (X)= 1.75.

Log ppnr	Frequency	Cumulative frequency	Cumulative percent%			
0.71-0.90	5	255	100.0	0.71	192	100
0.91-1.10	13	250	98.0	0.91	187	97.39583
1.11-1.30	39	237	92.9	1.11	174	90.625
1.31-1.50	55	198	77.6	1.31	135	70.3125
1.51-1.70	45	143	56.1	1.51	80	41.66667
1.71-1.90	35	98	38.4	1.71	35	18.22917
1.91-2.10	11	63	24.7			
2.11-2.30	9	52	20.4	2.11	58.26331	
2.31-2.50	7	43	16.9	2.31	48.17927	
2.51-2.70	6	36	14.1	2.51	40.33613	
2.71-2.90	7	30	11.8	2.71	33.61345	
2.91-3.10	8	23	9.0	2.91	25.77031	

1.4-1.5	50
1.5-1.6	49
1.6-1.7	36
1.7-1.8	9
1.8-1.9	6
1.9-2.0	5
2.0-2.1	4
2.1-2.2	10
2.2-2.3	8
2.3-2.4	5
2.4-2.5	4
2.5-2.6	2
2.6-2.7	0
2.7-2.8	1

Q12/ Choose correct word for the following:

(colorless) , (Anomaly%100) ,(-1) ,(Ca) ,(zero) ,(Pb) , (Gain) , (+1) , (Anomaly population) ,(Loss),(blue) ,(Background population),(Na),(10),(Insoluble Residual).

- 1- The points witch located under inflection point in the table are used to determine -----.
- 2- ΔG at equilibrium state is equal to -----.
- 3- Transport of elements from rocks to water called -----.
- 4- Point located above the line of population Anomaly represented ----- .
- 5- When material is ideal mixing and impure then γ =-----.
- 6- First ion precipitate is -----.

- 7- -----is very important for studying correlation between rock bed.
- 8- When EBT is added to a sample and then titrated with EDTA, the color changes to-----.
- 9- When Phenolphthalein alkalinity is added to a sample and then titrated with Sulfuric acid the color change from purple to -----.
- 10- Mode occurrence of ----- element in K-Feldspar as a trace element.

Q13/ The table below represent data of geochemical analysis of Cd element from soil sample of Bastora area, determine the Anomaly , Background and Threshold ,by using semi log paper.

Note: Standard deviation, $S= 0.12$, $X= 1.22$.

Log x

1.21

1.23

1.23

1.24

1.25

1.25

1.26

1.28

1.30

1.30

1.36

1.39

1.40

1.47

1.51

1.66

1.73

1.77

1.79

1.90

Q14/ Choosing the type of survey dependent on:

- 1- Geochemical nature of prospecting elements.
- 2- Simplify of collecting samples and its abundance.
- 3- Conditions of weathering and erosion.
- 4- The characteristic and diffusion of elements.

Q15/ Enumerate the followings

1. There are many ways for obtain background, threshold and anomaly, depended on.
2. Preparation soil sample in the Laboratory.
3. Mention **5** of the equipment that used for analyzing and separating of elements.

Q16/ The following table is data of geochemical analysis of Pb element from stream sediment sample in Dokan Lake?

1. Find the Median.

2. Calculate Standard deviation (S.D), and explain to what the result indicates?
3. Find threshold.
4. Draw the relationships between Pb and S, when correlation coefficient ($r=+0.99$) and between Pb and Ni when ($r=0.001$).
5. Calculate Cumulative frequency percent.

Number of sample	Pb (ppm)	Log				
1	19.32	1.05				
2	17.32	1.09				
3	18.33	1.13				
4	17.53	1.19				
5	18.25	1.19				
6	11.25	1.24				
7	19.36	1.24				
8	15.32	1.26				
9	18.92	1.26				
10	20.00	1.26				
11	18.96	1.28				
12	13.36	1.28				
13	18.25	1.29				
14	15.63	1.29				
15	12.35	1.30				

Q17/ The following table is data of geochemical analysis of Ni element from stream sediment samples using semi log paper to determine the Anomaly ,Background & Threshold ?

Note: Standard deviation (SD)=0.24, \bar{X} =2.61

Class Interval	Frequency
2.0-2.15	1
2.15-2.30	9
2.30-2.45	20
2.45-2.60	50
2.60-2.75	29
2.75-2.90	15
2.90-3.05	-----
3.05-3.15	6

3.15-3.30	5
3.30-3.45	3
3.45-3.60	10
3.60-3.75	2

Q18/ Complete the following:

- 1-Reconnaissance survey:.....
- 2-Sieving the samples by using sieve size for getting Clay sizes.
- 3-To calculate precision depend on
- 4-Anomaly is

Q19/ Find precision for these cations of some water samples taken from the river, if it is acceptable or not accepted.

If Standard deviation (SD or σ) Arithmetic mean(X)

Elements	SD (σ)	X
Ca ppm	2.15	68.03
Mg ppm	0.51	9.03
Na ppm	0.5	6.5
K ppm	0.02	0.94

Q20/ The following table is data of geochemical analysis of Pb element from stream sediment sample in Dokan Lake?..

1. Find the Median.
2. Calculate Stander division (S.D), and explain to what the result indicates?
3. Find threshold.
4. Draw the relationships between Pb and S, when correlation coefficient ($r=+0.99$) and between Pb and Ni when ($r=0.001$).
5. Calculate Cumulative frequency percent.

No. of sample	Pb (ppm)	Log				
1	19.32	1.05				
2	17.32	1.09				
3	18.33	1.13				
4	17.53	1.19				

5	18.25	1.19				
6	11.25	1.24				
7	19.36	1.24				
8	15.32	1.26				
9	18.92	1.26				
10	20.00	1.26				
11	18.96	1.28				
12	13.36	1.28				
13	18.25	1.29				
14	15.63	1.29				

Q21/ Answer **ONE** of the following questions?

A- Kinds of the exploration geochemistry.

B- Laboratory works for the sediments (soil) sample.

Q22/ Find the precision of the following Trace Elements?

Elements	Number of analyses			
	S (1)	S (2)		
Sc	9	10		
V	74	75		
Cr	370	380		
Co	16	16		
Ni	137	140		

Q23/ Find the Accuracy for

the bellow Major Elements?

Elements	Sample	Published Value	Accuracy %
SiO ₂ (%)	12.2	12.3	
Al ₂ O ₃	1.51	1.52	
Fe ₂ O ₃	21.1	21.5	
CaO	28.2	28.2	
MgO	2.83	2.74	
Na ₂ O	0.1	0.1	
K ₂ O	0.27	0.27	
TiO ₂	1.72	1.78	
MnO	0.43	0.44	
P ₂ O ₅	18.35	18.30	

Q24/ Mode of occurrence of trace elements in solids

A:.....

B:.....

C:.....

D:.....

Q25/ The following table is data of geochemical analysis of Sc element from stream sediment samples using semi log paper to determine the Anomaly, Background & Threshold?

Note: Standard deviation (**SD**)= 0.192277, **X**= 0.955622

No. of sample	Sc (ppm)	Log	C.I
1	5.1	0.71	0.70-0.75
2	5.7	0.76	0.75-0.80
3	5.9	0.77	0.80-0.85
4	6	0.78	0.85-0.90
5	6.3	0.80	0.90-0.95
6	6.4	0.81	0.95-1.0
7	6.5	0.81	1.0-1.05
8	7.2	0.86	1.05-1.1
9	7.4	0.87	1.1-1.15
10	8	0.90	1.15-1.2
11	8.2	0.91	1.20-1.25
12	8.3	0.92	1.25-1.3
13	8.6	0.93	1.30-1.35
14	9.3	0.97	
15	12.7	1.10	
16	14.7	1.17	
17	16.2	1.21	
18	18.2	1.26	
19	18.9	1.28	
20	19.9	1.30	