

Name _____ Pd _____ Date _____

Lab # _____ - Periodic Trends

Aim: _____

Material: Reference Table, graph paper

Definitions (source: _____):

Period: _____

Group: _____

Atomic Radius: _____

Ionization Energy: _____

Electronegativity: _____

Method: Use Table S determine the ionization energy, electronegativity and atomic radius for the first 20 elements. Complete each of the tables below and construct a graph for each of the relationships. Be sure to label your graphs.

Do not connect the points between the periods.

Data:

Element	Atomic #	Ionization energy (kJ/mol)
	1	
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	10	
	11	
	12	
	13	
	14	
	15	
	16	
	17	
	18	
	19	
	20	

Element	Atomic #	Electronegativity
	1	
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	10	
	11	
	12	
	13	
	14	
	15	
	16	
	17	
	18	
	19	
	20	

Element	Atomic #	Atomic Radius (pm)
	1	
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	10	
	11	
	12	
	13	
	14	
	15	
	16	
	17	
	18	
	19	
	20	

Analysis:

1) Connect the dots by period on your graph, e.g., connect the points for elements 1-2; 3-10; etc, but do not connect 2-3, 10-11, etc. Label each line with its period.

Using complete sentences, describe the trend seen for the first 20 elements as you go across each period:

Ionization energy _____

Electronegativity _____

Atomic radius _____

2) Using a different color, connect the dots for group 1 elements, i.e., 3, 11, and 19

Using complete sentences, Describe the trend seen for the group 1 elements as you go down the group:

Ionization energy _____

Electronegativity _____

Atomic radius _____

3) Metallic Character:

Metals want to _____ electrons. Circle the conditions which best support the metal's goal:

HIGH / LOW Ionization Energy
HIGH / LOW Electronegativity

Based on the above, predict the trends in metallic character:

As elements are considered across a period, metallic character _____.

As elements are considered down a group, metallic character _____.

Summarize your findings in the table below. Your answers should include the terms "increases" or "decreases" as applicable:

Characteristic	Across a period	Down a group
Metallic Character		
Ionization energy		
Atomic Radius		
Electronegativity		

Regents Questions:

- 1) An atom of which of the following elements has the largest atomic radius:
a) Zn b) Si c) Fe d) Mg
- 2) Which one of the following lists of elements from Group 2 on the Periodic Table is arranged in order of increasing atomic radius?
a) Be, Mg, Ca b) Ca, Mg, Be c) Dr, Ra, Ba d) Ba, Ra, Sr
- 3) When an atom loses one or more electrons, this atom becomes a
a) negative ion with a radius smaller than the radius of the atom
b) positive ion with a radius larger than the radius of the atom
c) positive ion with a radius smaller than the radius of the atom
d) negative ion with a radius larger than the radius of the atom
- 4) An atom of an element has a total of 12 electrons. An ion of the same element has a total of 10 electrons. Which of the following statements describes the charge and radius of the ion:
a) The ion is negatively charged and its radius is smaller than the radius of the atom
b) The ion is positively charged and its radius is smaller than the radius of the atom
c) The ion is negatively charged and its radius is larger than the radius of the atom
d) The ion is positively charged and its radius is larger than the radius of the atom

IONIZATION ENERGY

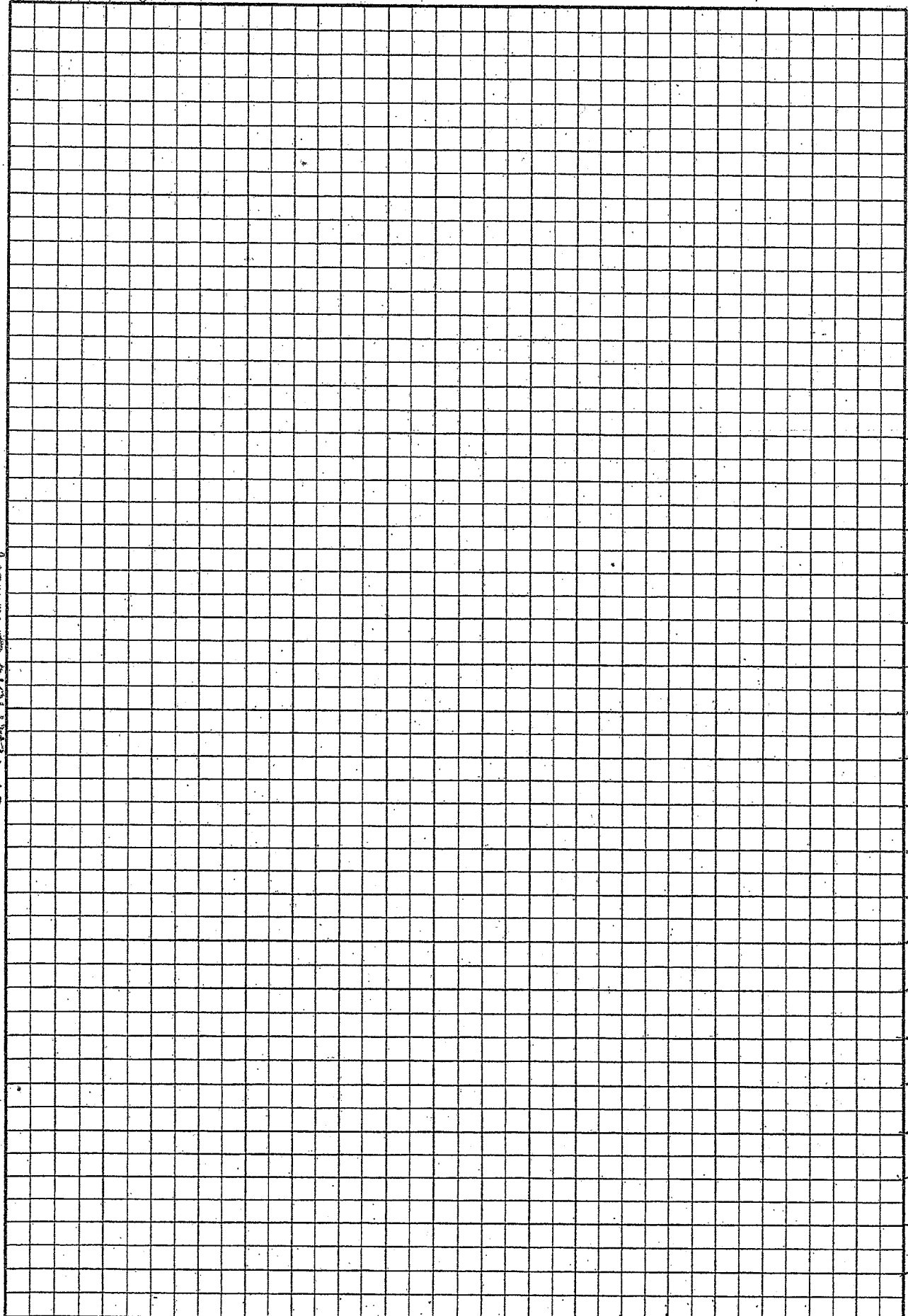
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

ATOMIC NUMBER

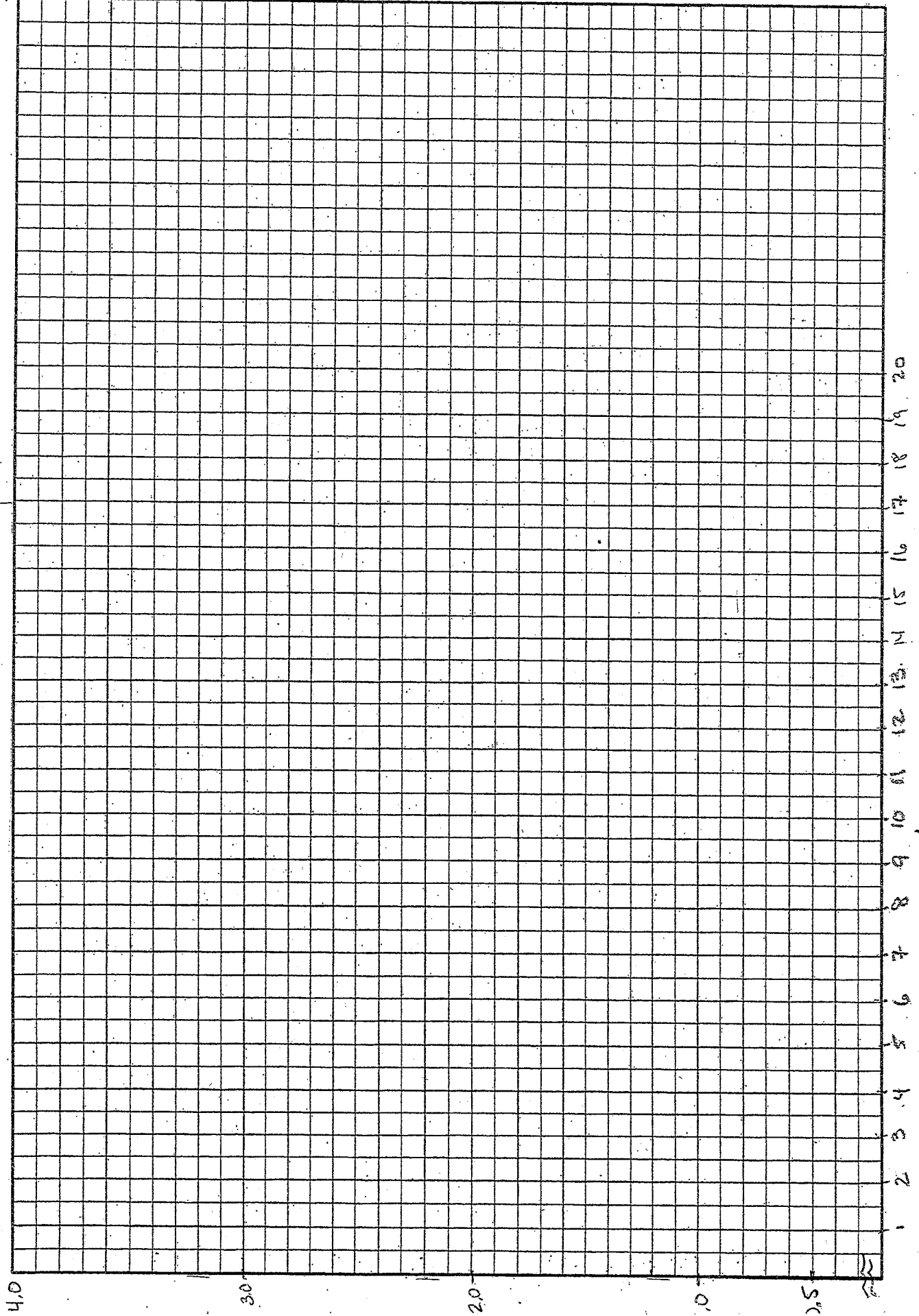
3000

2000

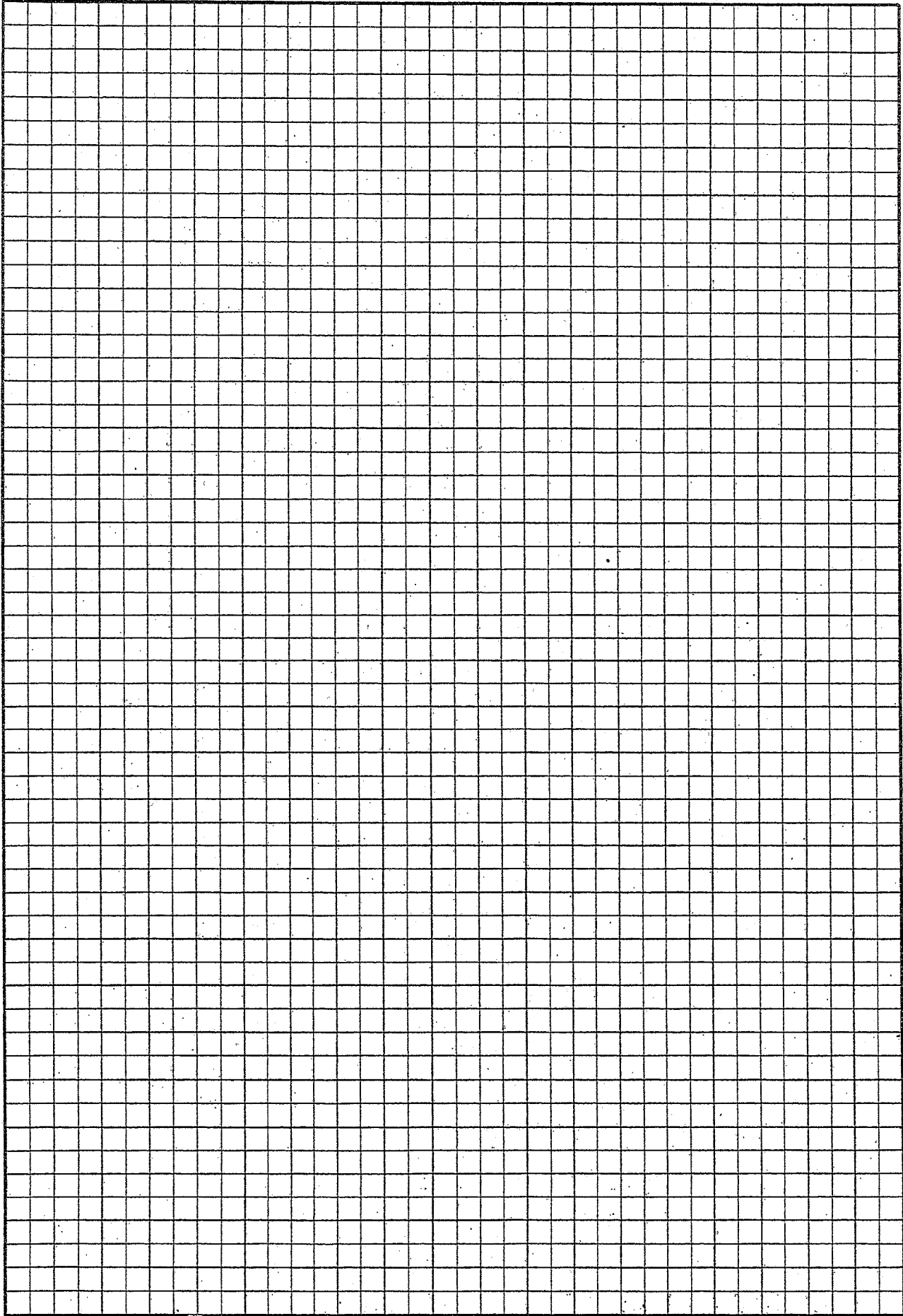
1000



ELECTRONEGATIVITY



Atomic Radius



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Atomic Number

300

Atomic Radius (pm)

100

200