Extended or long form of periodic table

61. (b) Nitrogen

Count electrons:
2+8+18+5=33.
→ Atomic number = **33**, element = **Arsenic (As)**.

Outer configuration = **$ns^2\ np^3$** (here: $4s^2\ 4p^3$).
This corresponds to **Group 15 (Nitrogen family / Pnictogens)**.
So the chemistry of As will be similar to **Nitrogen (N, group 15)**.

62. (b) A representative element as last e^- enters p-orbital.

63. (a) The configuration represents on alkaline earth metals.

64. (c) Atomic number of the atom
Modern (long form) periodic law: "The physical and chemical properties of elements are a periodic function of their **atomic number**."

Not based on shape, mass, or electronegativity.

65. (a) First group
e.g. $NaCl + H_2O \rightleftharpoons NaOH + HCl$

66. (d) Arranged in the order of increasing number of protons in the nucleus
Old tables (Mendeleev's) → based on **atomic weight**.

Modern periodic law → based on **atomic number = number of protons in the nucleus**.Hence:

67. (d) Number of electrons in the outermost shell or number of electrons for bonding

Atomic number → different for each element.

Electronic configuration → inner parts differ, but **valence shell configuration is the same**.

Atomic weight → increases down the group.

Valence electrons (outermost electrons) → remain constant within a group → define bonding.

68. (a) Ionic bond is formed when there is large difference of electro-negativities between the atoms.

69. (c) d-block - $[Ar]3d^1 4s^2$

70. (d) Be: $1s^2 2s^2$

71. (c) Increasing atomic number. Mosley found that atomic no. was better fundamental property than atomic weight.

72. (b) Lowest ionisation energy due to largest size.

73. (c) Elements on the right side of the periodic table are p-block. Mostly non-metals.

74. (c) Screening effect of d and f block elements is nearly same.

75. **(a) Atomic number**

Chemical behaviour depends on **valence electrons**, which are decided by the **atomic number (Z = number of protons/electrons)**.

Mass number, binding energy, or number of isotopes do not directly control chemical properties.

76. **(d) He**

Inert (noble gases) → complete octet, chemically unreactive.

Na, Fe, Li → reactive metals.

He (Helium) → noble gas, inert.

77. (a) Li because of its smallest size.

78. (b) In third group Na is a typical element.

79. **(d) Boron and silicon**

Metalloids = B, Si, As, Sb, Te, etc.

Sodium & potassium → alkali metals
Fluorine & chlorine → halogens
Calcium & magnesium → alkaline earth metals
Boron & silicon → both metalloids

80. **(c) 18**

Long periods = 4th and 5th → 18 elements each.

6th and 7th (also long) → 32 elements each.
Standard MCQ answer: **18**.

81. **(b) p-block**

Non-metals are found on the right side → **p-block**.

82. **(d) Noble gases**

That is a **completely filled p-subshell** = **noble gases**.

83. **(b) Os**
Compare:

Iridium (Ir) ≈ 22.56 g/cm³
Osmium (Os) ≈ 22.59 g/cm³ (**highest known**)
Lead (Pb) ≈ 11.3 g/cm³

Mercury (Hg) ≈ 13.5 g/cm³

84. (b) Mg

Li (Group 1, Period 2) shows diagonal relationship with **Mg (Group 2, Period 3)**.

85. (b) On equating no. of e^-'s atomic no. is 12 which is for Mg.

86. (d) $17 - 1s^2 2s^2 2p^6 3s^2 3p^5$.

87. (a) Mendeleef

Dalton → atomic theory.

Avogadro → Avogadro's law.
Cavendish → discovery of hydrogen.
Mendeleev → arranged elements in order of atomic weights, left gaps, predicted new elements.

:

88. (d) Lavoisier

Antoine Lavoisier → often called the Father of Modern Chemistry for his work on law of conservation of mass, naming of elements, and systematic classification.

89. (c) Lanthanide's are called rare earth metals.

90. (b) Sb

Pb (lead) → metal

Sb (antimony) → metalloid
Bi (bismuth) → metal
Zn (zinc) → metal
Mg (magnesium) → metal