Limitations of Aufbau [illegible]

(3) In the 6th Periods of Modern Periodic table.

6th Period →	55 Cs	56 Ba	57-71 La	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn

58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu

In the above Configuration of Lanthanoids gr. (i.e 57 - 71)
4f and 5d Orbitals are close in energy level

In Case of $_{57}La$, the last electron does not go to 4f as predicted in Aufbau Order, but goes to 5d Orbital to give it $4d^{10}, 5s^2 5p^6 5d^1, 6s^2$ Configuration.

However, the next electron for Cerium (z=58) is added to the '4f' Orbital and the previous electron in 5d in Lanthanum also goes to '4f' Orbital to give it's electronic Configuration.. $4d^{10}, 5s^2 5p^6, 4f^2, 5d^0\ 6s^2$.

(4) The electronic Configuration of Zr (z=40)

$1s^2, 2s^2 2p^6, 3s^2, 3p^6, 3d^{10}, 4s^2 4p^6, 4d^2\ 5s^2$

or

(Z=40) $1s^2, 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^{10}\ 4s^2\ 4p^6\ 5s^2, 4d^2$ (According to Aufbau order)

Now Aufbau electronic Configuration of Niobium Nb (z=41)

Nb (Z=41) $1s^2, 2s^2 p^6, 3s^2, 3p^6, 3d^{10}, 4s^2, 4p^6, 5s^2, 4d^3$ (Aufbau's Configuration)

(z=41) $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^{10} 4s^2 4p^6 5s^1 4d^4$ (Experimental Observed Configuration)

Mo (Molybdenum) - - - - - - $5s^1 4d^5$ (Both Configuration due to higher Stability related to Half-filled Configuration)
(z=42) - - - - - - $5s^1 4d^5$

Tc (Technetium) - - - - - - $[Kr]\ 4d^5, 5s^2$
(z=43)

Pd Palladium (z=46) —— $[Kr]\ 4d^{10} 5s^0$ (Correct)
not $[Kr]\ 4d^8 5s^2$ (NOT)