NCERT EXEMPLAR PROBLEMS WITH SOLUTION :-

Q1. Why first ionisation enthalpy of Cr is lower than that of Zn ?

Q2.Ionisation enthalpies of Ce, Pr and Nd are higher than Th, Pa and U. Why?

Q3.(a) Answer the following questions :
(i) Which element of the first transition series has highest second ionisation enthalpy?
(ii) Which element of the first transition series has highest third ionisation enthalpy?
(iii) Which element of the first transition series has lowest enthalpy of atomisation?
(b) Identify the metal and justify your answer.
(i) Carbonyl M $(CO)_5$
(ii) MO_3F

Sol 1. Ionisation enthalpy of Cr is lower due to stability of d^5 and the value for Zn is higher because its electron comes out from 4sorbital.

Sol 2. It is because in the beginning, when 5f orbitals begin to be occupied, they will penetrate less into the inner core of electrons. The 5felectrons will therefore, be more effectively shielded from the nuclear charge than 4f electrons of the corresponding lanthanoids. Therefore outer electrons are less firmly held and they are available for bonding in the actinoid.

Sol 3.(a) (i) Cu, because the electronic configuration of Cu is $3d^{10}4s^1$. So second electron needs to be removed from completely filled d-orbital.
(ii) Zn [Hint : As above]
(iii) Zn [Hint : No unpaired electron for metallic bonding]
(b) (i) $Fe(CO)_5$ [Hint : EAN rule]
(ii) MnO_3F [Hint : Mn shows +7 oxidation state;d-electrons are not involved in bonding.]