The octahedral complex of a metal ion  $M^{3+}$  with four monodentate ligands  $L_1$ ,  $L_2$ ,  $L_3$  and  $L_4$  absorb wavelengths in the region of red, green, yellow and blue, respectively. The increasing order of ligand strength of the four ligands is (2014 Main)

(a) 
$$L_4 < L_3$$
,  $L_2 < L_1$ 

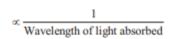
(b) 
$$L_1 \le L_3 \le L_2 \le L_4$$

(c) 
$$L_3 \le L_2 \le L_4 \le L_1$$

(d) 
$$L_1 \le L_2 \le L_4 \le L_3$$

 Arrange the complex formed by different ligands L<sub>1</sub>, L<sub>2</sub>, L<sub>3</sub> and L<sub>4</sub>, according to wavelength of their absorbed light, then use of the following relation to answer the question.

Ligand field strength ∞ Energy of light absorbed



Absorbed light

$$L_1$$
  
Red

$$L_2$$
  $L_3$ 

 $L_4$ 

Blue

Wavelength of absorbed light decreases.

.. Increasing order of energy of wavelengths absorbed reflect greater extent of crystal field splitting, hence, higher field strength of the ligand.

Energy blue  $(L_4)$  > green  $(L_2)$  > yellow  $(L_3)$  > red  $(L_1)$