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Abstract : There are different methods by which the potential energy curve for a molecule can be obtained. One important method is calculating the turning points for the vibrational motion by the semi-classical Rydberg-Klein-Rees (RKR) procedure. Another method is based on the empirical functions when the parameters in the expression are evaluated from the known spectroscopic constants. We have used both methods in the potential curve calculations of the stable diatomic molecules. We have devised methods of calculating the spectroscopic constants to be used in the RKR method. Program of Le Roy has been used to determine the turning points of the RKR curve. In the method of empirical functions, we have proposed four- and five- parameter functions to calculate the potential energy curves of fifteen molecular states. These potential curves have been compared with the RKR values and those of the Hulbert- Hirschfelder function. We have also predicted the values of a and OJ from a three-parameter function of Fayyazuddin et al (1996)

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