

Think It Over



This section of Resonance is meant to raise thought-provoking, interesting, or just plain brain-teasing questions every month, and discuss answers a few months later. Readers are welcome to send in suggestions for such questions, solutions to questions already posed, comments on the solutions discussed in the journal, etc. to Resonance Indian Academy of Sciences, Bangalore 560 080, with "Think It Over" written on the cover or card to help us sort the correspondence. Due to limitations of space, it may not be possible to use all the material received. However, the coordinators of this section (currently R Nityananda and C S Yogananda) will try and select items which best illustrate various ideas and concepts, for inclusion in this section.

Look at the following 3×3 square arrays of 'squares' that read the same horizontally and vertically. B S Rangaswamy, Bangalore

- (i) $5 \ 2 \ 9 (=23^2)$ (ii) $1 \ 6 \ 9 (=13^2)$ (iii) $1 \ 2 \ 1 (=11^2)$
 $2 \ 5 \ 6 (=16^2)$ $6 \ 7 \ 6 (=26^2)$ $2 \ 8 \ 9 (=17^2)$
 $9 \ 6 \ 1 (=31^2)$ $9 \ 6 \ 1 (=31^2)$ $1 \ 9 \ 6 (=14^2)$

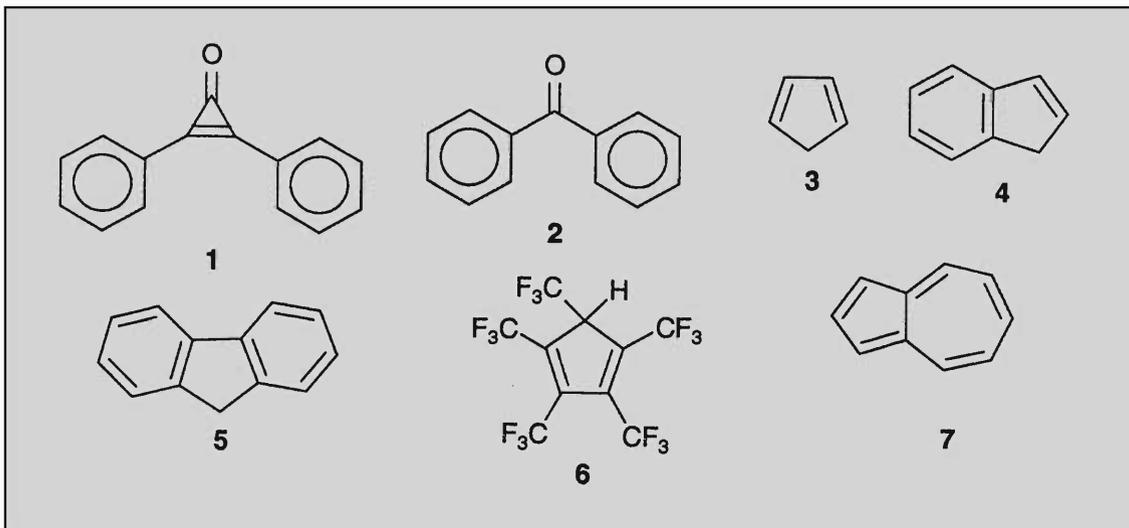
Can you find a 4×4 square array of squares reading the same across and down? What about 5×5 , 6×6 , 7×7 ,

Why does diphenylcyclopropanone (1) have a large dipole moment of 5.07 Debyes? For comparison, the dipole moment of benzophenone (2) is only 2.97 D.

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We normally do not think of hydrocarbons as being acidic. But cyclopentadiene (3), indene (4) and fluorene (5) are fairly acidic. In fact, with five trifluoromethyl substituents, the cyclopentadiene derivative (6) is more acidic than nitric acid! Why?





Azulene (7), an isomer of naphthalene, is a blue solid. It has a dipole moment of 0.8 D, without having any polar substituents. What could be the reason?

(Hint: The answers to all the above questions have a common basis).

