DPP-3

SOLUTION

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1. $\Rightarrow \text{DBE} = 4 + 1 - \frac{6}{2} - 0 + 0$

$\Rightarrow \text{DBE} = 5 - 3$

$\Rightarrow \text{DBE} = 2$

So, the double bond equivalent of C_4H_6 is 2

Hence, option C is correct.

2. Number of double bonds $= 7$

Number of rings $= 2$

So, the double bond equivalent $= 9$

3. By observation, molecular formula of compound is $C_{10}H_{10}$ We know,

Double bond equivalent $= \frac{\Sigma n(V-2)}{2} + 1$ Where,

n $\rightarrow$ number of atoms of element

V $\rightarrow$ valency of particular element.

So, $\frac{10(4-2)+10(1-2)}{2} + 1 = \frac{20-10}{2} + 1 = 6$

4. degree of unsaturation = no of pi bonds + no of rings

here,

no of rings $= 2$

and 1 mole of hydrogen gas is used by compound (A) for reduction of one pi bond

therefore, no of pi bonds in A $= 1$

hence

DBE $= 3$

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5. Hint: The double bond equivalent or level of unsaturation is the number of unsaturation present in an organic molecule. We can find this by the formula:

$$\text{DBE} = \text{C} + \frac{\text{H}}{2} - \frac{\text{X}}{2} + \frac{\text{N}}{2}$$

Complete step by step solution:

The term unsaturation here means a double bond or a ring system. For example, in benzene there are 3 double bonds and 1 ring which gives us 4DBE.

Moreover, a triple bond can be regarded as DBE = 2.

It must be noted that in the formula

$$\text{DBE} = \text{C} + \frac{\text{H}}{2} - \frac{\text{X}}{2} + \frac{\text{N}}{2}$$

where, X is the total number of halogens, namely Cl, Br, F and I present in the structure

C = number of carbon atoms.

H = number of Hydrogen atoms.

N = number of nitrogen atoms

Presence of an oxygen atom does not affect the DBE calculation.

Now, in this compound the number of Carbon atoms are 14.

Number of Hydrogen atoms is 9

Number of Nitrogen atoms is 1.

Number of halogen atoms is 0

On applying the DBE formula:

$$= 14 + 1 - \frac{9}{2} + \frac{1}{2}$$

$$= 15 - 4$$

$$= 11$$

Therefore, from the above solution we can conclude that the correct answer is (b).

6. (1) One pi bond. DBE = 1

(2) Two pi bond. DBE = 2

(3) One pi bond. DBE = 1

(4) Two rings. DBE = 2

(5) One pi bonds and three rings. DBE = 4

(6) Three pi bonds and one ring in the middle and three pi bonds on substituents. DBE = 7

exercise

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8. $C_{10}H_{14}O_2, \text{DBE} = (C + 1) - \left(\frac{H+X-N}{2}\right)$

DBE (4) means = 2 double bonds + 2 rings

= 1 triple bond + 2 rings

9. D.B.E. of both anthracene & phenanthrene is 10.