

Maharashtra State Eligibility Test (SET) 2010

Sample Questions:

Chemical Sciences (Paper II and Paper III)

1. The total number of permitted electrons in a 4f orbital is

- (A) 10, (B) 6,
(C) 14, (D) 2.

Ans. C

2. Which one of the following is a molecular solid ?

- (A) NaCl, (B) Phosphorus,
(C) Diamond, (D) Iron.

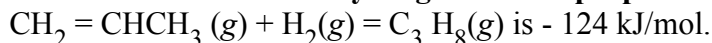
Ans. B

3. The chiral molecules among the following are

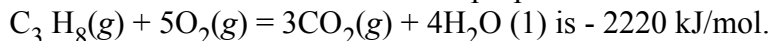
- (i) 1, 1-Dimethylcyclopropane.
(ii) cis-1, 2-dimethylcyclopropane.
(iii) trans-1, 2-dimethylcyclopropane.
(A) All three, (B) (ii) and (iii), (C) only (ii), (D) only (iii).

Ans. D

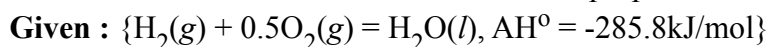
1. The standard heat of hydrogenation of propane in the reaction



The standard heat of combustion of propane in the reaction



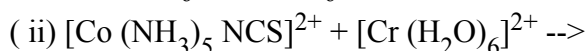
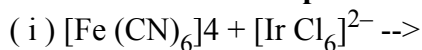
Calculate the standard heat of combustion of propane.



2. Match the following Hammett σ values :

- | | |
|---------------------------|--------------|
| (a) m - Me | (i) + 0.78 |
| (b) p - Me | (ii) - 0.27 |
| (c) p - NO ₂ | (iii) + 0.12 |
| (d) p - COCH ₃ | (iv) - 0.07 |
| (e) m - OMe | (v) + 0.50 |
| (f) p - OMe | (vi) - 0.17 |

3. (a) Predict whether the following reactions will proceed via inner, sphere or outer sphere mechanism. Give the products also.



(b) Name the factors that determine the magnitude of crystal field splitting.