Name: Reg. Number:

NATIONAL INSTITUTE OF TECHNOLOGY CALICUT
DEPARTMENT OF CHEMISTRY

B. Tech. Semester -I, Monsoon Semester -Test II, October 2013

CY1001 Chemistry

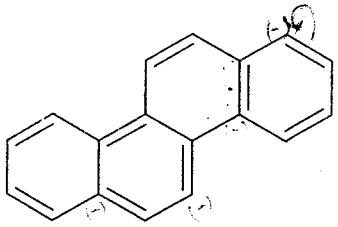
Time: 1 hr **Maximum Marks: 20**

Answer all questions

1. Which of the following molecules are microwave active? Justify your answer.

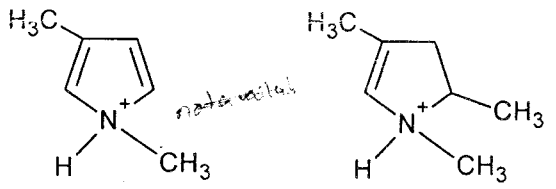
   (a) HD (b) *cis*-$CH_3CH{=}CHCH_3$ (c) *meta*-dichlorobenzene (d) CH_2Cl_2 (2 Marks)

2. Suggest the most stable resonance structure of the following molecule.



(2 Marks)

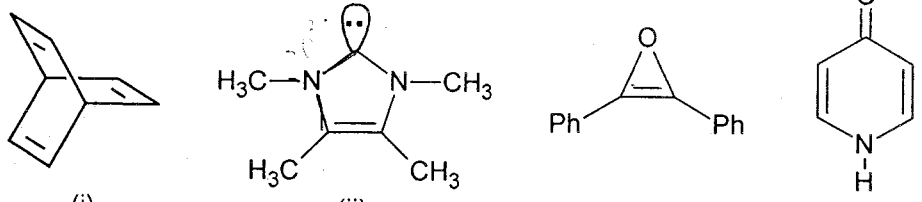
3. Arrange the following compounds in the increasing order of their pK_a values. Explain.



(i) (ii)

(2 Marks)

4. Classify the following compounds as aromatic, anti-aromatic and non-aromatic with proper justification.

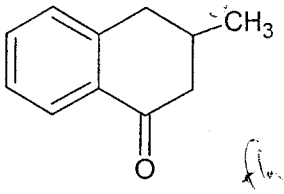


(i) (ii) (iii) (iv)

(2 Marks)

5. Sketch the first four lines of the rotation spectrum of the mixture of $^{12}C^{16}O$ and $^{13}C^{16}O$ where the inter-nuclear distance is 112.8 pm. Calculate the number of revolutions per second which $^{12}C^{16}O$ and $^{13}C^{16}O$ undergo at J = 5 state. Comment on your answer. (4 Marks)

6. Suggest a possible synthetic route with appropriate mechanism for the preparation of the following compound from benzene.

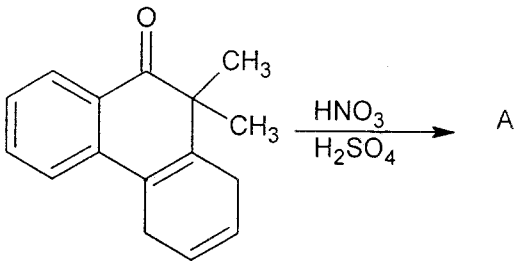


(4 Marks)

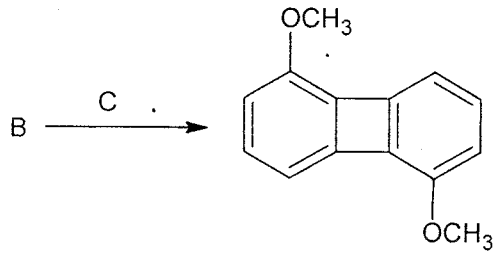
P. T. O.

7. Identify the missing compounds (**A** to **D**) in the following reactions.

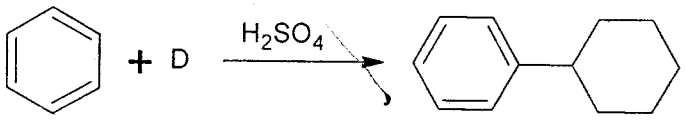
(i)



(ii)



(iii)



(4 Marks)