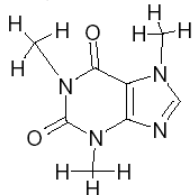


Caffeine ( $C_8H_{10}N_4O_2$ ) is a drug found in tea and coffee leaves, to name a few. Answer the following questions concerning this molecule.



**Q.1** What is the total no. of electrons in caffeine?

- (A) 118 (B) 166 (C) 194 (D) None

**Q.2** How many N atoms in caffeine are  $sp^2$  hybridised?

- (A) 1 (B) 2 (C) 4 (D) None

**Q.3** What is the hybridization of each of N, C and 'O' constituting the ring-

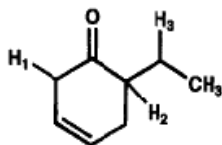
- |     |        |        |        |     |        |        |        |
|-----|--------|--------|--------|-----|--------|--------|--------|
|     | N      | C      | O      |     | N      | C      | O      |
| (A) | $sp^2$ | $sp^3$ | $sp^2$ | (B) | $sp^2$ | $sp^2$ | $sp^2$ |
| (C) | $sp^3$ | $sp^2$ | $sp^2$ | (D) | $sp^3$ | $sp^3$ | $sp$   |

**Q.4** Which of the following statements is/are correct-

- (A) Both 5 and 6 membered rings are non aromatic  
 (B) Both 5 and 6 membered rings are aromatic  
 (C) 5 membered is aromatic but 6 membered is non aromatic  
 (D) Both are anti aromatic

**THESE QUESTIONS ARE NOT BASED ANY PARAGRAPH:**

**Q.5** Rank the labeled protons in order of acidity

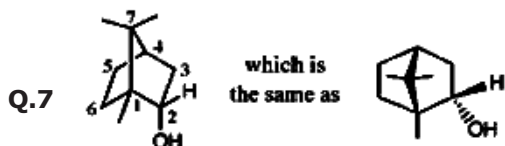


- (A)  $H_1 > H_2 > H_3$  (B)  $H_1 < H_2 < H_3$   
 (C)  $H_1 = H_2 = H_3$  (D)  $H_2 > H_1 > H_3$

**Q.6** Which of the following pairs are cis-trans isomers?

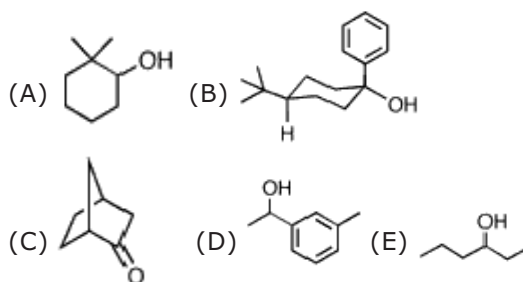


- (A) I and II (B) II and III  
 (C) I and IV (D) I and III  
 (E) None of them



- (A) One (B) Two  
 (C) Three (D) Four (E) Five

**Q.8** Which of the following molecules has a plane of symmetry and is thus achiral (not chiral)?



**Q.9** Possible combinations of R-S configurations at the three centers are shown below. Which of these could be meso compound?

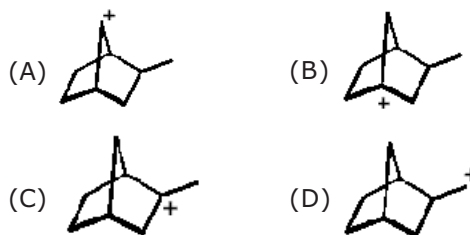
Entry	Stereo-isomer	Mirror-Image
1.	RRR	SSS
2.	RRS	SSR
3.	RSR	SRS
4.	RSS	SRR

- (A) Entries 1 and 3 could be meso compounds  
 (B) Entries 2 and 4 could be meso compounds  
 (C) Entries 1 and 2 could be meso compounds  
 (D) Entries 3 and 4 could be meso compounds  
 (E) There is no way to determine which might be meso from the information given.

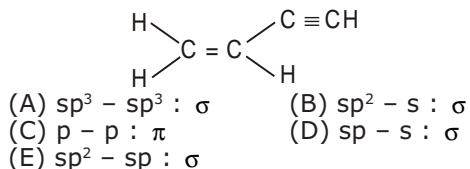
**Q.10** An alkyl group, attached to a doubly-bonded carbon, stabilizes the alkene because of-

- (A) An electron-releasing inductive effect.  
 (B) Hyperconjugation.  
 (C) Negative steric strain.  
 (D) High charge density in the  $\pi$  bond.

**Q.11** Which of the following carbocations least stable:



**Q.12** Which of the following types of bonds is not represented in the structure below?



## CHEMISTRY IIT JEE (CLASS TEST - 4) ANSWER KEY

Name : .....

Roll No. : .....

	A	B	C	D	E		A	B	C	D	E		A	B	C	D	E
1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	5	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	9	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	6	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	10	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	7	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	11	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	8	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	12	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>